



Brighton Katabaro (Ed.)

Soil & Soul

Agroecological and Theological
Perspectives on Earth's Habitability



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Preface

This volume emerged from a series of conversations among theologians, agricultural scientists, church leaders, development practitioners, students, and smallholder farmers. These exchanges took place within the framework of the development cooperation project *Intercultural and Theological Approaches to Agroecology* (*Interkulturelle und theologische Zugänge zur Agrarökologie*), based at the Academy for International Ecumenism, University of Hamburg, and funded by Bread for the World. Through conferences, workshops, field visits, and collaborative research, the project created opportunities to explore ecological, agricultural, and theological questions across diverse cultural and disciplinary contexts in Germany, Tanzania, Zambia, and other countries in Sub-Saharan Africa. Despite their different backgrounds and perspectives, participants shared a common concern: how can humanity contribute to a future in which the Earth remains capable of sustaining life in all its fullness?

The title *Soil & Soul* captures the spirit of this collaboration, and the Introduction that follows explores its meaning in greater depth. Here it is enough to note that *soil* points to the ecological and agricultural foundations of life, while *soul* points to the moral, spiritual, cultural, and theological dimensions through which human beings understand and inhabit the world. This volume brings these dimensions into conversation, convinced that the ecological challenges of our time cannot be addressed adequately when they are treated in isolation from one another.

I am deeply grateful to Bread for the World and the *Kirchlicher Entwicklungsdienst der Nordkirche* (KED) for their generous support of this work. My sincere thanks also go to the contributors whose scholarship, experience, and commitment have made this volume possible. I likewise acknowledge our partner institutions, including the Mindolo Ecumenical Foundation, Nyakato Lutheran College, KARUCO College, Iringa University, Sokoine University of

Agriculture, Sustainable Agriculture Tanzania (SAT), and Essen mit Zukunft Hamburg.

Above all, I wish to thank the many smallholder farmers in Tanzania and Kenya whose wisdom, resilience, and intimate knowledge of the land have profoundly shaped this work. Many of the insights explored in this volume were first encountered not in lecture halls or academic conferences, but in villages, farms, churches, and local communities. Their experience reminds us that ecological questions are never merely technical or theoretical; they are bound up with the everyday realities of food, livelihoods, justice, dignity, and hope. Most importantly, they remind us that care for the soil and care for the soul belong together.

I hope this volume will foster deeper engagement between theology and agriculture, and between local knowledge and academic scholarship, thereby contributing to ongoing efforts towards ecological responsibility, social justice, and sustainable futures. May it encourage renewed collaboration among theologians, agricultural practitioners, scientists, churches, and local communities as they seek together to care for creation and sustain the conditions upon which life depends.

Brighton Katabaro
Hamburg, July 2026

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Introduction

BRIGHTON KATABARO

What resources can theology, in conversation with agroecology and lived experience, offer as humanity confronts a world in which the conditions that sustain life are becoming increasingly fragile? This question lies at the heart of this volume.

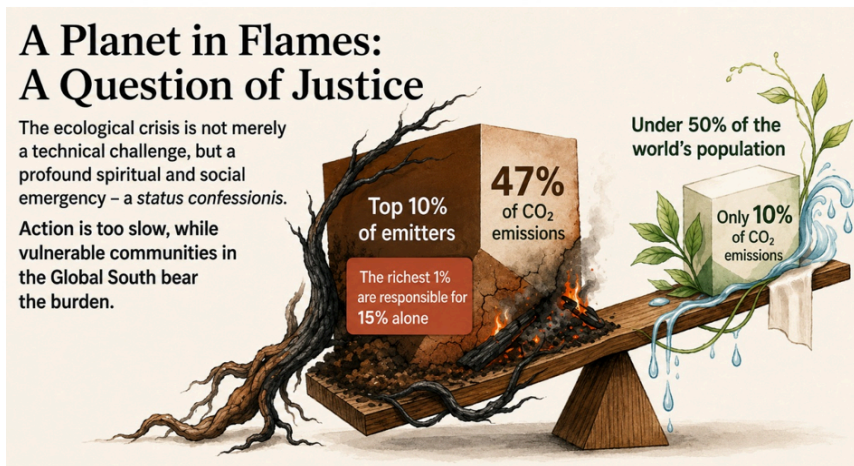
The ecological crisis, manifested in climate change, biodiversity loss, soil degradation, and growing pressures on food and water systems, raises profound questions about the future habitability of the Earth. Habitability refers not only to the resilience of ecological systems but also to the social, economic, cultural, and spiritual conditions that enable both human and non-human life to flourish across generations. Although ecological challenges are global in scope, their consequences are experienced locally. Communities whose livelihoods depend directly on land, water, forests, and agriculture are often among the first to encounter environmental change and among those most severely affected by its consequences.

Across Africa and many other regions of the Global South, farmers face increasingly unpredictable rainfall patterns, declining harvests, depleted soils, disappearing species, and growing vulnerability to environmental shocks. These realities are no longer merely local experiences; they are manifestations of a global ecological crisis whose consequences transcend geographical, political, and economic boundaries. They therefore give rise to a fundamental question: How can humanity preserve, restore, and strengthen the conditions that make life possible and enable its flourishing?

This volume approaches that question from the conviction that the ecological crisis is not simply an environmental problem. It is also a profound theological challenge because it concerns humanity's relationship with God, neighbour, and the wider community of cre-

ation. At the same time, the crisis is social, economic, political, cultural, ethical, and spiritual. Scientific research remains indispensable for understanding the causes and consequences of ecological change. Yet questions of responsibility, justice, meaning, hope, and the future of life cannot be answered by scientific knowledge alone. They call for sustained dialogue among diverse forms of knowledge, including theology, ethics, ecological science, the social sciences, and the practical wisdom of communities whose lives are shaped by daily interaction with the natural world.

Figure 1. Author's illustration, produced with AI assistance and based on data from Pray – Love – Decarbonize (EKD-Schrift, 2026)



From a theological perspective, the ecological crisis has become a *status confessionis*. The accelerating destruction of the ecological conditions upon which all life depends confronts the Church with a challenge that touches both the credibility of its witness and the integrity of its discipleship. Care for creation, solidarity with vulnerable communities, and responsibility towards future generations can therefore no longer be regarded as peripheral concerns. They

belong to the very heart of Christian faith, discipleship, and public witness.

The title *Soil & Soul* captures the central vision of this volume. It brings into conversation two dimensions of existence that are often treated separately. Soil represents the material foundations of life: land, water, biodiversity, agriculture, food systems, and the ecological processes through which life is sustained. Soul points to the moral, spiritual, cultural, and theological dimensions through which human beings interpret their place within creation, cultivate responsibility, pursue justice, and seek meaning. The volume proceeds from the conviction that these dimensions are fundamentally inseparable. Ecological challenges cannot be reduced to technical problems requiring technical solutions, just as theology cannot be detached from the material realities upon which life depends. Sustainable futures require the integration of ecological understanding, ethical discernment, theological reflection, and practical action.

A foundational claim running throughout this volume is that the ecological crisis is fundamentally a crisis of relationships. It reflects distortions in the relationships between human beings and the natural world, among human communities themselves, between present and future generations, and ultimately between humanity and God. The ecological crisis is therefore not simply a failure of environmental management but a breakdown in the relational fabric that sustains life.

These fractured relationships manifest themselves in widening ecological, social, economic, and moral tensions. They become visible in patterns of economic growth pursued without regard for ecological limits; in development models that neglect planetary boundaries; in the pursuit of profit at the expense of human dignity and ecological integrity; in conflicts between individual interests and the common good; and in widening inequalities between affluent and vulnerable communities, as well as between present and future generations. Similar tensions emerge where extractivist forms of agricultural expansion undermine biodiversity, where local livelihoods are threatened by global environmental change, and where

technological capacity advances more rapidly than moral responsibility. The consequences extend well beyond environmental degradation. They affect food security, livelihoods, social cohesion, cultural continuity, economic stability, and ultimately the prospects of future generations. Ecological restoration therefore requires more than repairing damaged ecosystems. It also demands the renewal of values, institutions, practices, and relationships capable of sustaining just and life-giving communities within the wider household of creation.

Several contributions in this volume explore how ecological degradation becomes visible through acts of remembering. Communities frequently recognise environmental change by recalling forests that have disappeared, rivers that have diminished, soils that were once more fertile, and seasons that once followed more predictable rhythms. Such memories are not merely descriptive; they are also moral and interpretive. Ecological memory functions as a resource through which communities recognise environmental change, evaluate its moral significance, and discern appropriate responses. In this sense, memory creates a bridge between empirical observation, ethical reflection, and theological responsibility.

Ecological memory may, in turn, give rise to lament. Lament refuses to normalise ecological destruction and preserves the moral significance of what has been damaged or lost. Yet lament is not the final response. It can become the basis of responsibility, and responsibility can generate action. Ecological transformation emerges not only from scientific knowledge and technological innovation but also from processes of remembering, grieving, learning, and acting. The conceptual movement that guides much of this volume may therefore be summarised as follows:

Ecological Crisis → Ecological Memory → Lament → Responsibility → Action → Transformation → Earth's Habitability

Agriculture occupies a central place within this conversation because it is one of the primary ways through which human societies interact with the ecological systems that sustain life. Agricultural practices shape soils, water systems, biodiversity, food security,

livelihoods, and climate resilience. At the same time, agriculture occupies a significant place within the biblical imagination, from the Garden of Eden to the vision of a renewed creation. Themes of land, cultivation, harvest, nourishment, and stewardship recur throughout Scripture and illuminate fundamental theological questions concerning creation, responsibility, justice, and human flourishing. Despite this centrality, agriculture has often remained surprisingly marginal within theological reflection. This volume therefore seeks to address that gap by treating agriculture not only as an object of theological concern but also as a significant source of theological insight.

These discussions ultimately converge in the constructive proposal developed in the concluding chapter: **Agrartheology**. Agrartheology is presented as an emerging field of theological inquiry that takes agriculture seriously as a *locus theologicus*, a site from which theological knowledge may be generated as well as applied. It proceeds from the conviction that questions of land, food, cultivation, ecological sustainability, and human dependence are not peripheral to theology but integral to understanding humanity's relationship with God, neighbour, and creation. While explored more fully in the concluding chapter, Agrartheology serves throughout the volume as its constructive horizon, illuminating the deep interconnections between ecology, agriculture, and theology.

Taken together, the chapters gathered in *Soil & Soul* seek to contribute to the growing conversation on ecology, agriculture, and faith by exploring how theological reflection can engage the urgent challenges of ecological degradation while remaining attentive to the lived realities of communities whose lives are deeply intertwined with the land. The volume argues that sustaining Earth's habitability requires more than technological innovation or policy reform alone. It requires a transformation of relationships, values, practices, and imaginations. By bringing theology into conversation with agroecology, ecological science, and lived experience, this volume seeks to contribute to that transformative task and to the search for ways of living that are both ecologically sustainable and spiritually meaningful within the wider community of creation.

Structure and Overview of the Volume

The volume is organised into three interconnected parts that move from ecological diagnosis to theological interpretation and, finally, to practical and constructive responses. Together, the contributions bring theology, agroecology, agricultural science, development practice, and lived experience into conversation around a common concern: the future habitability of the Earth. While the contributors write from different disciplinary, cultural, and ecclesial contexts, they are united by a common interest in understanding the conditions that sustain life and in exploring pathways towards ecological renewal.

Part	Guiding Question	Primary Concern
Part I. Understanding the Ecological Crisis	<i>What is happening?</i>	Diagnosing ecological and agricultural realities
Part II. Biblical and Theological Foundations	<i>How do we interpret it?</i>	Theological, biblical, and ethical interpretation
Part III. Faith as a Transformative Power	<i>How do we respond?</i>	Ecological transformation in theory and practice

Part I: Understanding the Ecological Crisis

The opening section establishes the ecological and agricultural realities that frame the volume. Bringing together ecological memory, environmental science, agroecology, soil science, development studies, and food-security research, the contributors examine the conditions that increasingly threaten Earth's habitability while

identifying pathways towards more sustainable and resilient futures. Particular attention is given throughout to the experiences of smallholder farmers, whose observations, practices, and lived realities provide an indispensable lens through which environmental change becomes visible, meaningful, and morally significant.

The volume opens with **Brighton Katabaro's** exploration of ecological memory as a framework for understanding environmental degradation as a lived, moral, and theological reality. Drawing on communal testimony, the lived experiences of smallholder farmers, memories of environmental change, and biblical reflection, he argues that ecological degradation is experienced not merely as a scientific phenomenon but also as a disruption of relationships, livelihoods, cultural memory, and hope. Ecological memory is therefore more than an act of recollection. It becomes a resource for recognising loss, nurturing lament, cultivating moral responsibility, and inspiring ecological action. In doing so, the chapter establishes a conceptual thread that runs throughout the volume by linking ecological awareness with ethical agency and transformative practice.

Building on this diagnostic perspective, **Zipporah Mueni Maluvu** examines Earth's habitability through the lens of contemporary environmental science. Engaging discussions of planetary boundaries, climate change, biodiversity loss, IPCC assessments, and Shared Socioeconomic Pathways (SSPs), she demonstrates how ecological disruption has become measurable with unprecedented precision. At the same time, she highlights the magnitude of the challenges facing humanity and underscores the urgency of decisions that will shape future environmental trajectories. Scientific knowledge thus emerges not only as a diagnostic tool but also as an indispensable foundation for informed ethical, political, and practical responses.

The discussion then turns to agriculture as one of the principal arenas in which environmental change is experienced and contested. **Mireille Remesch** explores agroecology as both a scientific approach and a transformative social movement. While recognising its ecological, economic, and social potential, she argues that broader agroecological transformation remains constrained less by

technical limitations than by political, economic, and institutional structures that continue to favour industrial models of agriculture.

The importance of healthy soils as the foundation of resilient agricultural systems is explored by **Primitiva Andrea Mboyerwa**. Drawing on research and comparative case studies from East Africa and beyond, she demonstrates how locally adapted soil-management strategies can improve agricultural productivity, strengthen climate resilience, increase agricultural yields, and reduce environmental degradation and greenhouse-gas emissions. Her analysis highlights the central role of soils in sustaining both ecological systems and human livelihoods.

Questions of vulnerability and resilience are explored further by **Ursula Gröhn-Wittern**, who situates agricultural challenges within wider structures of inequality, governance, and rural development. Rather than treating climate impacts as isolated environmental events, she demonstrates that resilience requires not only technological innovation but also structural transformation, since ecological vulnerability is shaped by historical, political, and economic conditions.

Complementing this perspective, **Sabine Winkler** reflects on agricultural projects in Tanzania to illustrate the everyday realities confronting smallholder farmers. Drawing on practical initiatives, including the Grain Amaranth Project, she shows how local knowledge, innovation, education, and community engagement can strengthen food security while simultaneously drawing attention to the persistent structural obstacles that continue to constrain rural development.

The final contributions in this section move from diagnosis towards practical alternatives. **Kizito Mwajombe** presents the work of Sustainable Agriculture Tanzania (SAT) as a concrete example of agroecological transformation in practice. Assessing field experience in light of the High Level Panel of Experts' thirteen principles of agroecology, he demonstrates how agroecological principles can be translated into tangible ecological and social outcomes for soils, biodiversity, and rural livelihoods.

Sylvery L. B. Ishuza concludes the section by examining the relationship between agroecology and food security. Drawing on Tanzania's ASAN framework of availability, access, utilisation, and stability, he argues that sustainable food systems require more than increased production; they depend upon resilient relationships among people, communities, institutions, and the ecosystems upon which they depend.

Part II: Biblical and Theological Foundations

Having established the ecological and agricultural context of the crisis, the second section turns to the task of theological and ethical interpretation. How should contemporary environmental realities be understood in light of biblical, theological, and ethical traditions? Rather than offering abstract doctrinal reflection, the contributors recover theological resources capable of illuminating the moral, spiritual, and relational dimensions of today's ecological crisis. Although approaching this task from different perspectives, they share a common commitment to fostering responsibility, justice, stewardship, and care for creation.

Leita Ngoy opens this section by drawing on Ubuntu philosophy as a theological and ecological framework grounded in relationality, mutual care, and interdependence. In contrast to anthropocentric and individualistic conceptions of human flourishing, she proposes a vision in which the well-being of persons, communities, and the natural world is inseparable. Ubuntu thus emerges as a powerful resource for ecological restoration and social healing while offering a relational alternative to exploitative understandings of creation.

The relationship between theology and sustainable living is explored further by **Mimii Brown** through a reinterpretation of the manna narrative in Exodus 16. Brown develops a theology of sufficiency that challenges contemporary cultures of accumulation and overconsumption, as well as the productivist assumptions underlying modern economic systems. By emphasising gratitude, moderation, and trust in God's provision, she demonstrates how biblical

texts can contribute to reimagining human desires, economic behaviour, and ecological responsibility, thereby recovering sufficiency as an ecological virtue.

The question of humanity's vocation within creation receives particular attention in **Lechion Peter Kimilike's** study of Genesis 2:15. Challenging interpretations that legitimise domination over nature, he argues that humanity's calling is fundamentally one of cultivation and protection. Through a close engagement with the biblical text, Kimilike offers one of the clearest biblical articulations of stewardship, grounding ecological responsibility within the creation narratives themselves and providing an important foundation for ecological ethics.

Emmanuel Gladson Mwaikulu concludes the section by examining biblical perspectives on production, exchange, consumption, and the just distribution of resources. Bringing together themes of stewardship, accountability, justice, generosity, and responsibility, he develops a comprehensive biblical ethic that offers important theological resources for addressing contemporary ecological and economic challenges. His contribution demonstrates how biblical principles can inform more sustainable patterns of economic life while remaining attentive to questions of human dignity and social justice.

Collectively, the chapters in Part II challenge exploitative interpretations of creation and recover theological resources for imagining more sustainable and life-giving forms of human existence. They demonstrate that theology is not peripheral to ecological discourse but constitutes an indispensable partner in interpreting humanity's vocation within the wider community of creation.

Part III: Faith as a Transformative Power

The final section turns from interpretation to transformation. If ecological degradation is not merely a technical problem but also a moral, spiritual, and relational crisis, then religious communities, theological institutions, and faith traditions possess distinctive re-

sources for contributing to ecological renewal. The contributors explore how faith communities, church practices, community initiatives, and indigenous knowledge systems can inspire and sustain concrete responses to contemporary environmental challenges.

Hoyce Jacob Lyimo-Mbowe opens the section by examining faith as a transformative social force. Moving beyond understandings of religion as a private matter, she argues that faith communities possess significant capacities for shaping values, motivating both individual and collective action, strengthening resilience, and fostering ecological citizenship. Faith thus emerges as a powerful catalyst for social and environmental transformation, capable of mobilising communities in response to contemporary challenges.

A theological diagnosis of ecological degradation follows in **Faith K. Lugazia's** engagement with Martin Luther's concept of *incurvatus in se*. Employing the See-Judge-Act method, she interprets environmental destruction as a manifestation of distorted relationships between humanity, neighbour, creation, and God. Ecological crises therefore reveal deeper spiritual and moral disorders that require both structural reform and renewed forms of conversion, responsibility, and relational healing.

The practical dimensions of faith-based ecological engagement are illustrated through two institutional case studies. **Joygrace Shoo** examines the Church Climate Action Partnership (CCAP) as an example of collaborative ecological action involving churches and local communities. She demonstrates that environmental transformation is not only theologically warranted but also institutionally achievable through locally grounded programmes that strengthen climate resilience and environmental stewardship.

Katabaro complements this discussion through a case study of Karagwe University College (KARUCO), an institution established by the Evangelical Lutheran Church in Tanzania (ELCT), Karagwe Diocese. The chapter illustrates how a church-based institution can integrate sustainable agriculture, creation care, education, and community development within a coherent theological vision, thereby contributing to rural transformation.

The conversation is broadened further through an exploration of indigenous ecological wisdom. Drawing on the cosmology and lived practices of the Bahaya and Banyambo peoples of north-western Tanzania, Brighton Katabaro examines the ecological significance of African Traditional Religion. Sacred landscapes, customary taboos, and ancestral responsibility are presented not merely as cultural artefacts but as longstanding mechanisms of ecological stewardship, biodiversity conservation, and intergenerational justice. By bringing indigenous ecological knowledge into dialogue with contemporary environmental concerns, the chapter highlights indispensable resources for ecological imagination, ethical reflection, and environmental practice.

The volume concludes by bringing these diverse conversations into constructive dialogue. Drawing together insights from environmental science, agroecology, theology, church practice, and indigenous knowledge systems, **Katabaro** advances **Agrartheology** as an emerging field of theological inquiry. The proposal proceeds from the conviction that agriculture is not merely an object of theological reflection but also a *locus theologicus*; a privileged site from which theology may both learn and generate new forms of knowledge.

Questions of land, food, cultivation, dependence, sustainability, and human flourishing illuminate central dimensions of humanity's relationship with God, neighbour, and creation. Agrartheology is therefore presented as a constructive framework through which theology can engage more fully with the ecological realities that shape human life and the future habitability of the Earth. The concluding chapter also reflects on the implications of this proposal for theological education, church practice, public policy, and future interdisciplinary research.

Taken together, the contributions gathered in this volume do not offer a single solution to the ecological crisis. Rather, they invite readers into an ongoing interdisciplinary conversation in which scientific knowledge, theological wisdom, ethical commitment, indigenous insight, institutional transformation, and practical action

are brought into creative and mutually enriching dialogue. The future habitability of the Earth depends not upon technological innovation alone, but upon the renewal of the relationships, values, and practices that sustain life. By bringing ecology, agriculture, theology, and lived experience into sustained conversation, *Soil & Soul* seeks to contribute to that wider task of cultivating more just, resilient, and life-giving ways of inhabiting our common home.

PART I

UNDERSTANDING THE ECOLOGICAL CRISIS

Part I answers the volume's first question—*What is happening?*—and its eight chapters move deliberately from memory to measurement and back again. Katabaro's opening chapter establishes ecological memory as a moral archive through which Tanzanian farming communities interpret ecological loss; Maluvu situates those experiences within the broader scientific frameworks of planetary boundaries, climate change, and future development pathways; and the remaining six chapters examine what memory and measurement mean in practice—from the agroecological and soil-science foundations of sustainable agriculture, through the structural inequalities shaping everyday farming, to grounded accounts of agroecological transformation from the field and the classroom. Read together, the chapters suggest that no single perspective—scientific, structural, or experiential—is sufficient on its own.

1. The Groaning Earth: Ecological Memory, Lament, and Responsibility

BRIGHTON KATABARO

Abstract

Qualitative research with farming communities in Karagwe District, north-western Tanzania, grounds this chapter's development of the concept of ecological memory as a moral archive through which communities preserve environmental knowledge, agricultural experience, cultural identity, and spiritual meaning. It argues that ecological degradation is experienced not simply as environmental decline but as a rupture of relationships between people, place, and creation. Ecological memory enables communities to interpret environmental change in moral and theological terms, linking experiences of loss to lament, responsibility, and action. The chapter further demonstrates how remembering ecological loss can foster ecological justice, inspire restoration, and encourage faithful participation in God's care for creation.

Keywords: ecological memory; moral archive; lament; ecological justice; sustainable agriculture; climate change; creation care; African ecotheology.

1. Introduction

Paul's image of a creation "groaning" in expectation of redemption (Rom. 8:22) captures something of the contemporary ecological crisis. Across the world, communities experience the consequences of climate change, biodiversity loss, deforestation, soil degradation, freshwater scarcity, and declining agricultural productivity. Yet creation's groaning is not encountered only through scientific reports, climatic data, or satellite imagery. It is also encountered through memory: the memory of forests that once stood, springs

that once flowed throughout the year, species that have become rare, and agricultural seasons whose rhythms have grown increasingly uncertain. Such memories reveal that ecological degradation is not merely an environmental phenomenon. It is also a moral, cultural, and spiritual experience.

Scientific observation remains indispensable for understanding environmental change. Atmospheric carbon concentrations, rainfall records, biodiversity indicators, and satellite imagery provide essential tools for analysing ecological trends and informing public policy. Yet ecological crises are experienced not only through measurement and data. They are also experienced through memory, culture, spiritual imagination, and everyday agricultural practice. Scientific knowledge reveals how environmental systems change; ecological memory reveals how those changes are experienced, interpreted, and woven into the fabric of communal life.

This chapter argues that ecological memory functions as a **moral archive**: a socially preserved reservoir of environmental knowledge, agricultural experience, cultural identity, and spiritual meaning through which communities remember past ecological conditions, interpret present transformations, and discern responsibilities towards the land, their neighbours, and future generations. Ecological memory is therefore more than recollection. It is an interpretive and ethical resource through which communities recognise environmental decline, evaluate its significance, and respond accordingly. In this sense, ecological memory links knowledge with responsibility, memory with moral judgment, and remembrance with action.

The discussion draws on qualitative fieldwork conducted among smallholder farming communities in two contrasting Tanzanian contexts: Karagwe District in Kagera Region and Same District in Kilimanjaro Region. Across both regions, participants recalled disappearing forests, declining biodiversity, drying springs, increasingly barren hillsides, reduced agricultural productivity, and increasingly unpredictable rainfall patterns. Many referred specifically to the severe crop losses experienced during the 2024 growing season, when prolonged dry spells followed the onset of rains and undermined expectations of a successful harvest. Yet these rec-

ollections reveal more than environmental observation. Participants consistently described ecological degradation as a weakening of the relationships that connect people, land, water, seasons, crops, livestock, and future generations. Environmental decline was experienced not simply as resource depletion but as a disruption within a broader web of life.

This relational dimension is particularly significant for ecotheological reflection. Existing scholarship on farmers' perceptions of climate change has generally treated local testimony as data to be compared with meteorological records, assessing the accuracy of perception against instrumental measurement. Such studies have generated important insights and frequently demonstrate substantial convergence between local experience and scientific observation. Nevertheless, a different approach is adopted here. Rather than treating testimony primarily as perception to be validated or corrected, this chapter understands farmers' narratives as ecological, cultural, and theological knowledge. The concern is not whether local communities perceive environmental change accurately, but how environmental change is remembered, interpreted, and morally understood within contexts of lived ecological dependence.

This discussion also contributes to a growing body of African ecotheological scholarship that seeks to interpret ecological crisis through indigenous moral traditions and lived environmental experience. African theologians such as Laurenti Magesa, Jesse Mugambi, and others have emphasised the relational character of African understandings of community, creation, and moral responsibility. Comparatively less attention, however, has been given to memory as a theological category through which ecological loss is recognised and responsibility discerned. By developing the concept of ecological memory as a moral archive, this chapter extends these conversations beyond questions of stewardship and relationality to examine the role of remembrance itself in ecological ethics.

Three contributions follow from this argument. First, the chapter offers an empirically grounded account of how rural Tanzanian communities narrate and interpret environmental change. Second, it develops ecological memory as a transferable analytical concept by distinguishing its diagnostic, normative, and ethical dimensions.

Third, it demonstrates how ecological memory can move communities from the recognition of loss, through lament, towards constructive forms of ecological responsibility.

Two central questions guide the discussion: *How does communal ecological memory shape local understandings of environmental change? And how can ecological memory contribute to ecotheology and ecological responsibility?* To answer these questions, the discussion proceeds in three stages. First, it develops the concept of ecological memory as a moral archive and examines the environmental transformations remembered by participants. Second, it analyses the structural drivers of ecological decline identified within their testimonies. Third, it explores the movement from memory to lament and from lament to responsibility, arguing that ecological degradation is best understood as a form of relational rupture that calls for practices of restoration, care, and ecological justice.

Through this progression, the groaning of creation described in Romans 8 emerges not merely as a biblical metaphor but as a lived reality discernible in the memories and experiences of communities whose lives remain deeply intertwined with land, water, and seasonal rhythms. Ecological memory thus becomes more than a record of what has been lost. It functions as a moral and theological resource through which communities interpret environmental change, articulate its human and ecological consequences, and discern pathways towards renewed relationships with creation.

2. Methodology and Research Context

Agriculture remains the principal livelihood in both Karagwe District in Kagera Region and Same District in Kilimanjaro Region, rendering environmental change a lived reality experienced through its effects on food production, water availability, biodiversity, livestock, and household wellbeing. To examine how communities remember, interpret, and transmit environmental change, the research adopted a qualitative approach, enabling exploration of dimensions of ecological experience that are often inaccessible through climatic or economic datasets alone.⁶

Fieldwork was conducted in two contrasting agroecological regions of Tanzania. The first phase took place in Same District, Kili-manjaro Region, in October 2023, with support from Sabine Winkler in administering the questionnaire. Unlike the humid banana-coffee farming highlands of Karagwe, Same is a semi-arid agropastoral region where crop cultivation is commonly combined with livestock keeping. Eleven smallholder farmers, including Maasai agropastoralists, participated in the study. Using a structured questionnaire, the research explored farming histories, fertiliser and pest-management practices, water access and irrigation, market conditions, and perceptions of climate change.⁷

Building on these initial findings, further fieldwork was undertaken in Karagwe District, Kagera Region, between March and May 2026. Thirty-two participants contributed to this phase of the research, drawn from three complementary groups: smallholder farmers, ordained pastors of the Evangelical Lutheran Church in Tanzania (Karagwe Diocese), and participants in an online focus-group discussion exploring the collective dimensions of ecological memory. A questionnaire distributed through an ELCT Karagwe Diocese pastors' WhatsApp group generated responses from thirteen pastors, while fourteen smallholder farmers completed a farmer questionnaire. A further five church leaders participated in an online focus-group discussion. Together, these participants provided perspectives shaped by agricultural practice, pastoral ministry, and long-term engagement with rural communities. Farmer responses were recorded with the assistance of Victor Katabaro.

The inclusion of both Karagwe and Same enabled an exploration of whether ecological memory operates in similar ways across contrasting ecological settings. Although the two regions differ substantially in climate, agricultural systems, and environmental conditions, their comparison made it possible to examine whether communities facing different environmental realities share comparable ways of remembering, interpreting, and morally evaluating ecological change. Similarities emerging from both contexts suggest that ecological memory may extend beyond particular local circumstances and represent a broader feature of contemporary agrarian experience in Tanzania.

Table 1. Overview of Research Sites, Instruments, and Participants

Site/Region	Instrument	Participants	Date
Karagwe (Karagwe)	ELCT Pastors' Questionnaire	13 (5F, 8M)	10-11 May 2026
Karagwe (Karagwe)	Farmer Questionnaire	14 (8F, 6M)	March-May 2026
Online	Focus-Group Discussion	5 (2F, 3M)	May 2026
Same (Kilimanjaro)	Farmer Questionnaire	11 (6F, 5M)	October 2023
Total		43 (21F, 22M)	

Rather than pursuing statistical generalisation, the research seeks a deeper understanding of how particular communities remember, interpret, and evaluate environmental change within their lived contexts. Farmers in both districts completed a common questionnaire and were selected through random sampling, while pastors and focus-group participants were recruited purposively. The findings should therefore be understood as contextually grounded insights into experiences of ecological change rather than as representative of rural Tanzania as a whole.⁸

Data were analysed using broad grounded-theory principles. Responses were initially subjected to open coding and subsequently organised into thematic categories, including environmental change, biodiversity loss, soil fertility, pest management, water ac-

cess, irrigation, market structures, institutional support, and climatic variability. Particular attention was given not only to what participants remembered but also to how they interpreted environmental transformations and why certain changes were regarded as significant. The analysis proceeded inductively from participants' own descriptions before bringing the findings into dialogue with wider ecotheological and social-scientific scholarship.⁹ Participant testimony therefore functions not only as empirical evidence but also as a resource for theological reflection on lament, relationality, and ecological responsibility.

Born and raised in a smallholder farming family in Karagwe, I approach this research with personal ecological memories and experiences that informed both the fieldwork and its interpretation. These experiences facilitated a deeper appreciation of local environmental knowledge while requiring continuous critical self-reflection. Rather than seeking to eliminate positionality, the study recognises it as part of the interpretive dialogue between researcher, participants, and context.¹⁰ The inclusion of material from Same District provided an important comparative perspective that challenged assumptions rooted in the Karagwe context and strengthened the analysis. The theological reflections developed in the following sections should therefore be read as constructive interpretations grounded in empirical findings rather than as purely descriptive accounts.

3. Ecological Memory as a Moral Archive

Within resilience theory, ecological memory commonly refers to the capacity of ecosystems to retain biological diversity, ecological functions, and adaptive potential following disturbance. Through seed banks, soil organisms, vegetation patterns, and species interactions, ecosystems preserve traces of earlier ecological states that shape their capacity to recover and reorganise after disruption.⁹ While this ecological understanding remains important, it is insufficient for the purposes of the present chapter. It directs attention primarily towards ecosystems themselves and gives comparatively less attention to the communities whose lives, livelihoods, and identities are deeply intertwined with them.

Human communities also remember. Through sustained engagement with land, forests, rivers, animals, and seasonal cycles, people accumulate environmental knowledge that is preserved and transmitted through agricultural practices, oral traditions, rituals, storytelling, and everyday experience.¹⁰ Environmental change is therefore registered not only within ecosystems but also within collective memory. Communities compare present realities with remembered landscapes, remembered harvests, remembered rainfall patterns, and remembered relationships with the natural world. Ecological memory, as understood in this chapter, refers to this socially transmitted capacity to preserve, interpret, and communicate environmental knowledge across generations.

Understood in this way, the moral archive introduced above is more than a repository of facts. It is a living resource through which communities recognise environmental change, weigh it against remembered conditions, and discern what response it demands. Ecological memory, in other words, binds knowledge to responsibility, situates present judgment within past experience, and turns recollection into a basis for action.

Three interrelated dimensions are particularly important to the argument developed here: diagnostic knowledge, normative orientation, and ethical summons. Together, these dimensions explain how ecological memory moves communities from recognising ecological change to embracing ecological responsibility.

Diagnostic Knowledge

The first function of ecological memory is diagnostic. Memory provides communities with the temporal depth required to recognise environmental transformations that may remain invisible within shorter periods of observation. Ecological degradation rarely manifests itself as a single catastrophic event. More often, it unfolds incrementally through changing rainfall patterns, declining soil fertility, shrinking water sources, diminishing biodiversity, and gradual reductions in agricultural productivity. Such changes become intelligible only when viewed against a longer history of environmental experience.¹¹

Rob Nixon's concept of *slow violence* is particularly helpful in this regard. Environmental destruction frequently unfolds gradually and cumulatively, making it difficult to perceive within conventional frameworks of observation and public attention.¹² Ecological memory enables communities to recognise such changes by preserving knowledge of earlier ecological conditions against which present realities can be evaluated.

Participants repeatedly employed this comparative framework. They did not describe a single environmental disaster but rather a succession of gradual transformations: forests becoming smaller, springs yielding less water, familiar species appearing less frequently, soils becoming less productive, and seasonal patterns becoming increasingly unreliable. These changes acquired significance because participants remembered the conditions that had previously prevailed. Ecological memory thus functioned as a diagnostic resource, enabling environmental change to become visible within everyday experience.

This diagnostic dimension should not be understood as an alternative to scientific observation. Comparative studies of farmers' perceptions and meteorological records frequently reveal substantial convergence between local experience and measured environmental trends.¹³ Ecological memory is neither a substitute for scientific knowledge nor identical to it. Rather, science and memory illuminate different dimensions of the same reality. Scientific observation explains how environmental systems change; ecological memory reveals how those changes are experienced, interpreted, and woven into communal life. The two forms of knowledge are therefore best understood as complementary rather than competing, each illuminating dimensions of environmental change that the other cannot fully capture.

Normative Orientation

Ecological memory enables communities not only to recognise environmental change but also to evaluate it. Participants interpreted declining forests, changing rainfall patterns, and other ecological transformations against remembered experiences of environmental wellbeing, agricultural productivity, and social stability. In this

way, ecological memory preserves normative understandings of healthy landscapes, reliable seasonal rhythms, fertile soils, and appropriate relationships between people and the wider community of creation. Environmental change is therefore assessed not merely as difference but in terms of whether conditions have improved or deteriorated.¹⁴

Ecological memory should not, however, be confused with nostalgia. Participants did not portray the past as a lost golden age; they recalled droughts, crop failures, disease outbreaks, and food shortages alongside periods of abundance and ecological stability. The significance of ecological memory lies not in romanticising the past but in enabling critical comparison across time. It allows communities to identify environmental trajectories, make moral evaluations, and discern the implications of ecological change for present and future wellbeing.

Ethical Summons

The diagnostic and normative dimensions of ecological memory together lead to a third and ultimately decisive function: ethical responsibility. Ecological memory not only reveals environmental change and evaluates its significance but also calls communities to respond. This dynamic resonates with biblical traditions of remembrance, in which remembering is not a passive act of recollection but a practice of faithfulness that generates obligation and shapes present conduct.¹⁵ Memories of healthier forests, more reliable water sources, greater biodiversity, and more productive agricultural systems therefore become claims upon the present, revealing not only what has been lost but also what ought to be protected, restored, and sustained.

The concept of praxis further illuminates this process. As Freire argues, reflection cannot be separated from action; reflection without action becomes empty verbalism, while action without reflection lacks critical depth.¹⁶ Ecological memory operates in a similar manner. Once environmental decline has been recognised and interpreted, memory itself generates a demand for response. **Diagnosis seeks restoration, and knowledge calls forth responsibility.** Participants' testimonies frequently reflected this movement from

remembrance to action. Memories of environmental change were often accompanied by concern for future generations, support for reforestation and sustainable agricultural practices, attention to water conservation, and criticism of activities perceived to contribute to ecological degradation. Ecological memory thus functions not only as an archive of loss but also as a source of moral obligation. Remembering becomes an ethical act.

Ecological Memory, Community, and Moral Knowledge

These three dimensions reveal why ecological memory can appropriately be understood as a **moral archive**. Archives preserve knowledge across time, and ecological memory performs a similar function. The knowledge it preserves, however, is not merely factual. It encompasses moral judgments, cultural meanings, spiritual understandings, and practical forms of ecological wisdom accumulated through generations of lived experience.

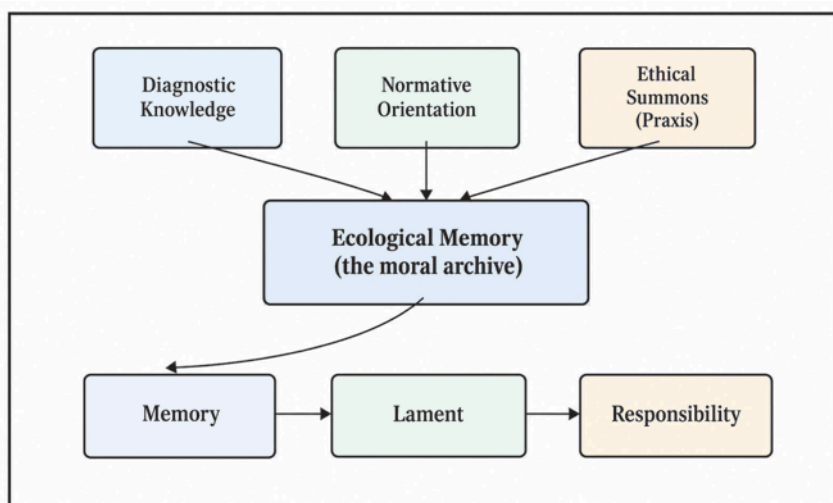
This understanding resonates strongly with African relational thought. Within many African traditions, knowledge is understood not as an individual possession but as a communal resource embedded in relationships and transmitted across generations.¹⁷ Ecological memory reflects precisely this communal character. Individuals remember, but they do not remember in isolation. Memory is sustained collectively through conversation, shared labour, agricultural practices, ritual, and storytelling. Communities thus become custodians of knowledge that no single individual could preserve independently.

Ecological memory therefore occupies a distinctive position at the intersection of past, present, and future. It preserves inherited knowledge, interprets present realities, and shapes responsibilities towards generations yet to come. Through this temporal movement, memory becomes more than recollection. It becomes a moral resource through which communities navigate ecological transformation and discern the demands of ecological justice.

Understanding ecological memory in this way also illuminates a further, and often overlooked, consequence of environmental deg-

radation. When ecosystems decline, communities lose not only species, habitats, and material resources but also elements of the knowledge, practices, and meanings associated with them. Ecological decline can therefore produce a parallel form of epistemic loss. As environmental relationships are weakened, the knowledge embedded within those relationships may likewise erode. The following section explores this dynamic by examining participants' memories of disappearing species, changing landscapes, and the gradual loss of the environmental knowledge bound to them.

Figure 1. Ecological Memory as a Moral Archive: The Movement from Recognition, through Lament, to Ecological Responsibility (developed by the author)



4. Memories of Environmental Change: Ecological Memory and Epistemic Loss

If ecological memory functions as a moral archive, it preserves more than recollections of past environmental conditions. It also

preserves knowledge embedded within particular landscapes, species, practices, and ecological relationships. Environmental decline therefore produces not only material loss but also forms of **epistemic loss**: the erosion of environmental knowledge, cultural practices, and symbolic meanings associated with the natural world. Species, forests, rivers, and landscapes are not merely biological realities; they are also repositories of memory through which communities interpret seasonal rhythms, agricultural practices, medicinal resources, and social life.¹⁸

Research on traditional ecological knowledge increasingly demonstrates that ecological decline and knowledge loss often occur simultaneously. As species disappear and environmental conditions change, local forms of knowledge associated with them become more difficult to transmit across generations.¹⁹ Ecological memory therefore performs a dual function. It preserves knowledge threatened by environmental change while simultaneously bearing witness to its erosion. Participants' recollections repeatedly revealed this dynamic. They remembered not only environmental transformations but also forms of knowledge, practice, and meaning that had become increasingly difficult to sustain.

Remembering Indigenous Forests and Fauna

Among the most vivid memories shared by participants were recollections of indigenous forests and the diverse species that once flourished within them, many of which are now rare or have disappeared from the local landscape. Respondents described areas formerly characterised by a rich variety of indigenous wild fruit trees, including *Eminazi*, valued for its edible fruits (*amanazi*), *Amankoroto*, and *Amanyambwita*. Participants also recalled *Emishyambya*, a light-coloured hardwood species highly valued for its durability and natural resistance to insect attack. These trees were remembered not merely as botanical resources but as integral elements of community life. They provided food, medicine, shade, and construction materials, while also serving as gathering places where social interaction and intergenerational knowledge exchange occurred. Their increasing rarity was therefore understood not simply as a loss of vegetation but as evidence of wider ecological and cultural transformation.

Several participants recalled that certain trees functioned as informal meeting places where elders resolved disputes and community members exchanged information. Their disappearance was consequently experienced not only as ecological change but also as the loss of cultural and social space. Forests existed not merely as collections of trees but as settings in which relationships between people and the natural world were cultivated, negotiated, and sustained.

Similar patterns emerged in participants' recollections of wildlife. Respondents identified species that were once common but are now rarely seen, including mammals such as *Echinyahamo* (a dog-sized nocturnal mammal remembered for repeatedly defecating in the same location, creating communal latrine sites) and *Echishegeshe* (porcupine), as well as birds such as *Kamushungushungu* (long-crested eagle), *Akanyamanja* (a finch-like songbird), *Akafunzi* (a small bright-red songbird), and *Ensindizi* (a species of owl). Participants also observed noticeable declines in butterflies, bees, and dragonflies, species widely recognised as indicators of ecological health and important contributors to pollination.²⁰

What participants remembered, however, extended beyond biological presence. Many species also occupied symbolic and cultural roles within local communities. The bird *Kamushungushungu*, for example, featured in a traditional saying: *Kamushungushungu, ndyafa anga ndyamelela?* ("Kamushungushungu, shall I die, or shall I live a long life?"). The direction from which its call was heard was interpreted as carrying symbolic significance. Such memories reveal that animals were not simply components of an ecosystem but participants in a broader cultural universe through which people interpreted the world around them. Their disappearance therefore represents a double loss. Biodiversity itself is diminished, but so too are the ecological indicators, medicinal knowledge, stories, proverbs, and symbolic meanings associated with particular species. Ecological decline thus becomes simultaneously biological, cultural, and epistemic. Species disappear, but so too do the stories, ecological indicators, medicinal knowledge, practices, and meanings through which communities have historically understood and inhabited their environments.

Water as the Memory of the Landscape

Discussions of environmental change repeatedly returned to the subject of water. Participants recalled springs, wetlands, streams, and small water sources that had once flowed throughout the year but now yielded substantially less water or had disappeared altogether. Such changes were commonly attributed to deforestation, agricultural expansion, population pressure, and increasingly irregular rainfall patterns. Water occupied a distinctive place within ecological memory because it connected multiple dimensions of environmental and social life. Forests protected springs, springs sustained agriculture, agriculture supported households, and households depended upon reliable access to water for everyday wellbeing. The disappearance of water sources therefore symbolised the weakening of an entire ecological system rather than the loss of a single environmental resource.

Several participants reported that reaching reliable water sources now requires considerably greater effort than in previous decades. Springs remembered as perennial have become seasonal, while some smaller streams cease flowing altogether during prolonged dry periods. Such observations correspond with wider concerns regarding changing hydrological conditions across East Africa and the vulnerability of rural communities that depend upon local water sources.²¹ Ecological memory was evident in the manner in which participants narrated these changes. Water scarcity was assessed not primarily through measurement but through comparison. Respondents remembered where streams once flowed, how long springs continued to run during the dry season, and how frequently water shortages occurred in the past. Memory thus functioned as the medium through which hydrological change became visible and meaningful.

More significantly, water functioned as a repository of ecological memory, preserving knowledge of the relationships linking forests, rainfall, soils, agriculture, and human wellbeing. The loss of water sources therefore signified more than hydrological change. It represented the disruption of ecological relationships upon which both livelihoods and communal memory depended.

Bare Hillsides and Changing Landscapes

Participants also recalled significant transformations in the physical appearance of the landscape itself. Hillsides once described as covered with grasses, indigenous vegetation, and moisture-retaining agricultural plots were increasingly characterised as bare, exposed, and vulnerable to erosion.

Respondents commonly attributed these changes to deforestation, agricultural expansion, population growth, and continuous cultivation. As landholdings became smaller and agricultural production intensified, opportunities for fallowing and ecological regeneration diminished. The resulting reduction in vegetation cover was associated with increased surface runoff, declining soil fertility, and reduced water infiltration. Unlike some forms of environmental change that become apparent only over extended periods, bare hillsides possess immediate visual force. Participants frequently described them as visible evidence of ecological disruption. Ecological memory therefore operated not only through recollections of vanished species or disappearing water sources but also through remembered landscapes. The contrast between formerly vegetated hillsides and present conditions provided a powerful interpretive framework through which broader environmental transformations could be understood.

From the perspective of ecological memory, landscapes function as archives of environmental history. Participants read the visible features of hillsides, forests, and cultivated fields against remembered conditions from earlier decades. The landscape itself became a text through which ecological change was interpreted and evaluated. Bare hillsides were not simply physical observations; they were moral and ecological signs indicating the deterioration of relationships between land, water, vegetation, and human communities.

Taken together, participants' memories of disappearing water sources and changing landscapes reveal how ecological memory operates as a diagnostic and normative resource. Memory enabled respondents not only to recognise environmental change but also to judge its significance. The landscape was remembered not merely for what it once contained, but for the relationships and

forms of wellbeing it sustained. Ecological degradation was therefore understood not simply as environmental decline but as the progressive unraveling of a web of relationships that linked people, land, water, and future generations

Figure 2. Bare hillsides in Karagwe District, illustrating the effects of vegetation loss, soil erosion, and land degradation (photograph by the author)



Agricultural Decline and Ecological Change

For many participants, the most tangible evidence of environmental change was found in agriculture. Respondents across different age groups contrasted remembered experiences of fertile soils, dependable harvests, and relatively predictable farming seasons with contemporary experiences of increasing uncertainty.

Several participants reported declining yields despite greater labour inputs and, in some cases, increased use of agricultural inputs. Soil fertility was frequently perceived to be weaker than in previous decades, while successful cultivation was seen as requiring considerably more effort than earlier generations had needed to invest. Participants attributed these changes to multiple interacting

factors, including soil degradation, shortened fallow periods, deforestation, population pressure, pests, and climatic variability.

Because agriculture remains central to household livelihoods in both Karagwe and Same, agricultural decline was rarely discussed as a purely economic issue. Instead, participants connected declining productivity to concerns about food security, family wellbeing, and the future prospects of younger generations. Ecological memory consequently preserved not only recollections of environmental conditions but also memories of what those conditions had enabled in terms of livelihood, social stability, and communal flourishing.

Seasons No Longer Follow Their Patterns

Perhaps the most frequently cited theme concerned the perceived loss of reliable seasonal rhythms. Older participants recalled organising agricultural activities around rainfall patterns regarded as relatively predictable. Planting decisions, crop selection, and labour allocation were coordinated according to expectations shaped by long experience of local climatic conditions.

Contemporary accounts presented a markedly different picture. Participants described rains arriving later than expected, ending earlier than anticipated, or being interrupted by prolonged dry spells. Others referred to episodes of unusually intense rainfall capable of damaging crops and accelerating soil erosion. Several participants referred specifically to the severe crop losses experienced during the 2024 growing season, when prolonged dry periods followed initial rains and undermined crops planted in anticipation of a successful harvest.²²

These perceptions broadly correspond with wider scientific assessments of increasing climatic variability across East Africa and its implications for rain-fed agriculture.²³ Yet what concerned participants most was often not the absolute quantity of rainfall but its unpredictability. Ecological knowledge accumulated over decades becomes increasingly difficult to apply when seasonal patterns are

perceived as unstable. Traditional indicators that once guided agricultural decision-making appear less reliable, creating uncertainty that extends beyond immediate crop production.

Importantly, participants did not portray the past as environmentally ideal. Earlier generations also experienced droughts, crop diseases, and occasional food shortages. What distinguished contemporary conditions was the perception that environmental uncertainty had become more frequent, more widespread, and more difficult to anticipate. Ecological memory therefore functioned not as nostalgia but as a framework of comparison through which participants interpreted cumulative environmental change over time.

Taken together, these memories reveal an understanding of environmental change that is profoundly relational. Forests, water, animals, soils, crops, and seasons were rarely remembered as isolated phenomena; rather, they were understood as interconnected elements within a larger ecological whole. Ecological memory therefore preserves not only knowledge of environmental change but also knowledge of the relationships through which environmental life is sustained. Environmental decline was interpreted not simply as the deterioration of individual resources but as the weakening of relationships linking land, water, biodiversity, agriculture, and human wellbeing.

At the same time, the testimonies demonstrate that ecological degradation entails more than material loss. As species disappear, landscapes change, and environmental relationships are disrupted, the knowledge embedded within them is also threatened. Ecological decline thus becomes a form of epistemic loss, eroding the environmental memory through which communities have historically understood, interpreted, and inhabited the world. The following section turns from remembered change to the structural forces participants identified as contributing to these transformations.

5. Structural Drivers of Ecological Decline

Participants did not merely remember environmental change; they also offered explanations for it. Their testimonies consistently identified a range of interconnected factors contributing to ecological degradation, including population pressure, land fragmentation, deforestation, declining soil fertility, climatic variability, water scarcity, agricultural challenges, market constraints, and uneven institutional support. Rather than attributing environmental decline to a single cause, participants understood it as the product of multiple pressures operating simultaneously and reinforcing one another. These explanations provide important insight into how local communities not only observe ecological change but also interpret its causes and identify possible pathways towards restoration.²⁴

The themes discussed below emerged inductively from the coding process outlined in Section 2 and illuminate how participants themselves understood the transformations described in the preceding section. Their accounts reveal that ecological degradation is rarely experienced as a single environmental problem. Instead, it is encountered as a convergence of ecological, economic, social, and institutional pressures whose effects accumulate over time and become visible in everyday agricultural life.

Population Growth and Land Fragmentation

Many participants associated environmental decline with increasing population pressure. Respondents observed that landholdings had become progressively smaller as family land was subdivided across generations. As plots decreased in size, opportunities for fallowing diminished and cultivation became increasingly continuous. Participants frequently linked these changes to declining soil fertility and growing pressure on forests and grazing lands. Several noted that cultivation had expanded onto steeper slopes and marginal lands that earlier generations had left uncultivated. Such observations are consistent with broader studies demonstrating that land fragmentation can intensify pressure on soil resources when

agricultural intensification is not accompanied by adequate conservation measures.²⁵

Importantly, participants did not suggest that population growth inevitably leads to environmental degradation. Rather, they described a situation in which increasing population pressure interacts with limited land availability, creating conditions that make sustainable land management more difficult. Ecological decline was therefore understood as emerging from the interaction of demographic and environmental pressures rather than from demographic growth alone.

Deforestation and Agricultural Expansion

Deforestation was among the most frequently cited explanations for environmental change. Participants associated forest clearance with declining rainfall reliability, biodiversity loss, soil erosion, and the disappearance of springs and wetlands. Forests were understood not merely as sources of timber or fuelwood but as essential components of ecological systems that sustain agriculture and water availability. Respondents attributed forest loss to several factors, including agricultural expansion, demand for fuelwood, charcoal production, timber harvesting, and the growth of human settlements. These observations accord with regional assessments that identify deforestation as a major driver of environmental change across many parts of Africa, particularly where rural livelihoods remain highly dependent upon natural resources.²⁶

Several participants also expressed concern about the replacement of indigenous tree species with fast-growing commercial species, particularly eucalyptus. Respondents frequently associated eucalyptus plantations with reduced water availability and declining spring flows. Whether every local observation can be independently verified is less important here than the consistency with which this perception emerged across interviews. Such testimony reveals a widespread concern regarding the ecological implications of monoculture and the tension between short-term economic gains and long-term ecological sustainability.

Soil Fertility and Agricultural Intensification

Concerns regarding soil fertility emerged repeatedly throughout the interviews. Participants commonly described soils as less productive than in previous decades and associated this decline with continuous cultivation, reduced fallow periods, erosion, and deforestation. Many respondents expressed a strong preference for manure and other organic inputs over chemical fertilisers. Several farmers independently described chemical fertiliser as *inachosha ardhi*—something that “exhausts” the soil over time. Organic manure, by contrast, was viewed as restoring soil fertility and sustaining agricultural productivity over longer periods.²⁷

A notable point of convergence emerged between Karagwe and Same. Farmers in both districts expressed similar concerns regarding long-term dependence on chemical fertilisers and comparable preferences for organic alternatives. Although respondents often acknowledged that chemical fertilisers could increase yields in the short term, many feared that continuous use contributed to declining soil quality in the longer term.

Whether these perceptions correspond precisely to agronomic assessments is less significant than what they reveal about farmers’ understandings of the relationship between soil, productivity, and sustainability. Ecological memory therefore shapes not only perceptions of environmental change but also evaluations of agricultural practices and their long-term consequences. In this respect, memory functions as a normative resource through which communities assess the sustainability of different forms of land use.

This local diagnosis invites a further, more explicit dialogue with agronomic science. Farmers’ description of chemical fertiliser as something that *inachosha ardhi* resonates with long-standing concerns within soil science regarding the effects of sustained synthetic-nitrogen use unaccompanied by organic-matter replenishment, including soil acidification and the depletion of soil microbial life on which fertility ultimately depends. Read in this light, the farmers’ moral vocabulary of “exhaustion” and the agronomist’s technical vocabulary of acidification and microbial decline may be understood as two idioms for the same underlying process rather than as competing explanations. Ecological memory, once again,

discloses through everyday moral language a reality that scientific measurement can also confirm, even where the two forms of knowledge draw on entirely different methods and evidentiary standards.

Pests, Disease, and the Limits of Adaptation

Participants also identified pests and diseases as significant challenges affecting agricultural productivity. Respondents in Karagwe frequently mentioned banana wilt disease (*mnyauko*) and termite infestation as recurring concerns. Several farmers reported that uprooting and destroying infected banana plants remained the principal available response, despite the obvious loss of crops and labour involved.²⁷ Many respondents described adaptation strategies that relied primarily on local knowledge rather than technological intervention. Particularly noteworthy was the widespread reluctance among Karagwe farmers to use chemical herbicides. One eighty-year-old farmer explicitly rejected herbicide use because of concerns about potential risks to children who played in cultivated fields. Such responses suggest that agricultural decisions are shaped not only by considerations of efficiency and productivity but also by perceptions of responsibility, safety, and long-term wellbeing.

These testimonies demonstrate that ecological vulnerability is not simply a matter of exposure to environmental change. It is also shaped by the availability, affordability, and perceived acceptability of potential responses. Adaptation is therefore not purely a technical challenge but also a social and moral one. Decisions concerning how to respond to pests, disease, and environmental uncertainty are informed by values, responsibilities, and locally grounded understandings of risk. Ecological memory contributes to these judgments by providing a framework through which communities evaluate both environmental change and the appropriateness of potential responses.

Climate Change and Climatic Variability

Participants frequently discussed climate change, although rarely in abstract global terms. Instead, climate change was described through its tangible consequences: delayed rainfall, prolonged dry spells, declining water availability, crop failure, and increasing uncertainty surrounding planting schedules. These observations broadly align with findings from the Intergovernmental Panel on Climate Change (IPCC), which identifies East African smallholder agriculture as particularly vulnerable to increasing climatic variability.²⁸ Yet participants often emphasised unpredictability rather than absolute declines in rainfall. Traditional ecological knowledge depends upon relatively stable relationships among seasons, crops, and environmental indicators. When these relationships become less reliable, ecological knowledge itself becomes more difficult to apply effectively.

Climate change therefore emerged not simply as an additional environmental stressor but as a force that amplifies existing pressures associated with land scarcity, declining soil fertility, and water insecurity. From the perspective of ecological memory, climatic variability is especially significant because it disrupts the environmental patterns upon which collective knowledge has long depended. As seasonal rhythms become less predictable, the accumulated wisdom derived from past experience becomes more difficult to translate into present agricultural practice.

Irrigation and Uneven Adaptive Capacity

Water scarcity was a recurring concern in both districts, although adaptive responses differed considerably between them. Several respondents in Same reported using irrigation from rivers, wells, or piped water systems to supplement increasingly unreliable rainfall. This was particularly evident among agropastoral households seeking to sustain both crops and livestock under semi-arid conditions.²⁹ By contrast, respondents in Karagwe generally reported continued reliance on rain-fed agriculture. None of the interviewed farmers described regular irrigation practices comparable to those reported in Same. This contrast illustrates what may be termed

adaptive asymmetry: communities do not experience environmental pressures on equal terms, nor do they possess equal access to adaptive resources.

Participants' experiences suggest that the effectiveness of adaptation depends not only on individual initiative but also on broader environmental, economic, and infrastructural conditions. Ecological responsibility therefore cannot be reduced to personal behaviour alone; it is also shaped by access to water, technology, financial resources, and institutional support. The capacity to respond to environmental change is unevenly distributed, and this unevenness significantly influences how communities experience ecological vulnerability. This asymmetry is not simply a function of climate. Same District's semi-arid conditions make irrigation more visibly necessary, but Karagwe's continued reliance on rain-fed cultivation also reflects decades of uneven infrastructural investment: differences in access to irrigation schemes, extension services, and capital between the two regions are not incidental but are shaped by broader patterns of public and ecclesial investment in agricultural infrastructure.²⁵ Adaptive capacity, in other words, is itself historically produced. Communities do not simply happen to have more or less access to water technology; that access reflects prior decisions about where roads, boreholes, and irrigation schemes have been built, and by whom. Reading adaptive asymmetry in this way reinforces the chapter's broader argument that ecological vulnerability cannot be reduced to environmental exposure alone.

Ecological Decline as a Convergence of Pressures

Taken together, these testimonies caution against monocausal explanations of environmental degradation. Participants consistently understood ecological decline as the product of multiple interacting pressures rather than a single environmental or human cause. Population pressure, land fragmentation, deforestation, declining soil fertility, climatic variability, water scarcity, market inequalities, and institutional weaknesses were repeatedly described as interconnected challenges whose effects reinforce one another.

This insight carries important implications for ecological ethics. If environmental degradation emerges through the convergence of

ecological, social, economic, and political pressures, then responses limited to individual behaviour change will remain insufficient. Meaningful ecological transformation requires attention not only to personal responsibility but also to the wider structures that shape environmental possibilities and constraints. Research on environmental attitudes similarly suggests that pro-environmental values are most likely to translate into effective action when supported by appropriate social, economic, and institutional conditions.³⁰

Participants' explanations reinforce a central argument of this chapter: ecological degradation is experienced relationally. Environmental decline was understood not as the breakdown of a single component within the environment but as the cumulative weakening of relationships linking forests, water, soils, crops, livelihoods, and community wellbeing. The causes of environmental degradation were therefore perceived as interconnected, and ecological problems were frequently interpreted as symptoms of broader disruptions within the relationships that sustain life.

Recognition of these disruptions generates more than explanation alone. Awareness of ecological decline gives rise to concern, grief, moral reflection, and a search for meaning. Ecological memory, by preserving knowledge of what has been lost and what ought to be sustained, moves communities beyond diagnosis towards evaluation and response. It is to this movement, from memory and diagnosis towards lament and moral responsibility, that the next section now turns.

The following poem offers a different mode of theological reflection. Drawing on the Hebrew *adamah* (earth or ground), it gives voice to the land itself, expressing the grief, memory, and hope that emerge from the experiences explored in this chapter. By personifying the earth as *Adama*, the poem serves as a bridge between ecological diagnosis and the theology of lament developed in the section that follows.

Adama Weeps

*Adama sits, her face wet with tears;
calls, but who will listen?
Her cry rises upon the wind,
only to fall against closed ears.
Once she wore forests as a crown,
Eminazi whispering through the branches,
roots reaching deep into the memory of the land,
water singing beneath her skin.
Children walked gently upon her body,
reading the language of birds and seasons,
trusting the rhythm of rain and soil,
held within the quiet promise of life.
Now her hills stand bare,
her rivers grow silent,
her veins run dry.
The springs remember, yet they no longer flow.
Still, Adama waits.
She waits for hands that remember,
for hearts that return,
for communities willing to walk gently once more.
She waits for those who will hear her weeping
not as the end of the story,
but as a summons:
to remember, to lament, to restore.
For hope begins in remembrance,
and healing begins when memory
becomes responsibility.
Then forests shall rise again,
water shall find its ancient paths,
and the songs of birds will return to the hills.
Adama waits for that day—
the day when memory becomes care,
care becomes justice,
and justice becomes life renewed.
(Brighton Katabaro, 2025)*

6. From Memory to Lament

Awareness of environmental change is never morally neutral. Once ecological decline is recognised and interpreted through ecological memory, it evokes emotional, spiritual, and ethical responses. Among the most significant of these responses is lament. In biblical tradition, lament is neither passive resignation nor emotional despair. Rather, it is the truthful naming of suffering before God and community, refusing to conceal loss or accept it as inevitable.³¹ Lament preserves the moral significance of what has been damaged and prevents destruction from becoming normalised.

This function is particularly important in the context of ecological degradation. Environmental decline often unfolds gradually, making it possible for communities to adapt to worsening conditions without fully recognising their cumulative significance. Forests disappear incrementally, water sources diminish slowly, species become rare over generations, and agricultural productivity declines season by season. Nixon's notion of *slow violence* captures precisely this tendency for environmental destruction to remain socially and politically obscured.³² Lament interrupts this process of normalisation by rendering ecological loss morally visible and ethically significant.

Participants' testimonies frequently displayed characteristics associated with lament, even when the language employed was not explicitly theological. Respondents spoke with sadness about disappearing forests, concern over declining water sources, anxiety regarding agricultural uncertainty, and worry for future generations. Their accounts reflected more than technical observations of environmental change. They revealed emotional attachment to places, species, and ecological relationships whose erosion was experienced as a form of loss.

Recent scholarship on climate emotions provides a useful framework for interpreting these responses. Research increasingly recognises grief, anxiety, distress, and mourning as understandable responses to environmental degradation rather than irrational reactions requiring correction.³³ Ecological grief, in particular, has been described as the emotional response that accompanies the loss of

ecosystems, species, landscapes, and environmental relationships.³⁴ Participants' testimonies in both Karagwe and Same can be interpreted within this broader context. Their concerns were not signs of pessimism but expressions of profound attachment to ecological realities perceived to be under threat.

This experience may be described more precisely through Glenn Albrecht's concept of *solastalgia*: the distress produced not by displacement from a home environment but by the transformation of that environment while one remains within it.¹¹ Solastalgia captures something distinct from the grief associated with migration or exile. It is the disorientation that arises when familiar landscapes, species, and ecological rhythms change in ways that undermine one's sense of belonging. Read alongside biblical lament, solastalgia and theological grief illuminate the same experience from different perspectives. The former names it as a psychological response to environmental change; the latter understands it as a truthful and faithful response before God and community. Together, they suggest that the sorrow expressed by participants is neither pathology nor sentimentality, but a coherent and morally significant response to ecological loss.

Joanna Macy offers a particularly illuminating interpretation of such grief. She argues that sorrow for a damaged forest, disappearing species, or declining river reflects recognition of humanity's interconnectedness with the wider community of life.³⁵ From this perspective, ecological grief is not evidence of weakness but of relationship. One grieves because one belongs. Environmental loss wounds because the wellbeing of people and the wellbeing of the natural world are experienced as inseparable.

This insight resonates strongly with participants' accounts. Respondents rarely discussed environmental change solely in terms of resource availability or economic productivity. Forests were remembered as places of social interaction and cultural meaning; springs were remembered as sources of communal wellbeing; fertile land was remembered as enabling flourishing households and secure livelihoods. Consequently, ecological decline was experienced as something more profound than material scarcity. It represented the disruption of relationships that communities considered essential to life.

Importantly, lament should not be confused with nostalgia. As noted earlier, participants did not portray the past as environmentally perfect. Earlier generations also experienced drought, crop disease, and food shortages. Lament does not arise from the loss of a flawless past. Rather, it emerges from the recognition that relationships once experienced as life-giving and dependable are becoming increasingly fragile. It is therefore directed not towards an imagined golden age but towards a future perceived to be under threat.

Lament also possesses a critical function. By naming ecological loss as loss, communities resist interpretations that reduce nature to a collection of exploitable resources. Lament implicitly affirms that forests, rivers, soils, seasons, and non-human creatures possess value beyond their immediate utility. To grieve their degradation is already to acknowledge that their disappearance matters. In this sense, lament becomes an act of moral resistance against ecological indifference. Yet lament is not the final stage of the argument developed in this chapter. Biblical lament characteristically moves beyond grief towards questions of justice, responsibility, and hope. It does not merely describe suffering; it seeks restoration.³⁶ Ecological lament performs a similar function. By preserving the significance of ecological loss, it creates the conditions under which communities can imagine and pursue alternative futures. Lament therefore serves as a bridge between memory and responsibility. It transforms ecological awareness into moral concern and prepares the ground for action.

Ecological memory reaches one of its fullest ethical expressions in lament. By preserving the significance of what has been lost, lament prevents ecological degradation from becoming morally invisible and opens the possibility of responsibility, restoration, and hope. The testimonies examined throughout this chapter suggest that ecological degradation matters not only because it threatens economic livelihoods or environmental sustainability, but because it disrupts relationships that communities regard as fundamental to flourishing. To understand why such disruption provokes grief and concern, a deeper account of those relationships is required. The next section therefore examines ecological crisis as a form of relational rupture and explores its implications for ecological ethics and theology.

7. Relational Rupture: The Ethical Implications of Ecological Loss

Participants' testimonies suggest that ecological degradation is experienced as something more profound than declining productivity, disappearing species, or reduced water availability. While such changes have obvious material consequences, participants consistently described them in relational terms. Forests were remembered as places of gathering and belonging; springs as sources of communal life; fertile soils as enabling household security and intergenerational continuity. Ecological decline therefore emerged not merely as environmental deterioration but as a rupture of the relationships that sustain both human and non-human flourishing.

Human beings do not exist in isolation but within networks of relationship: with one another, with the land, and with the wider community of creation.³⁷ Within many African worldviews, wellbeing is fundamentally relational. Ecological damage therefore cannot be reduced to resource depletion alone; it represents a weakening of the relationships that make life possible. Participants repeatedly described environmental change in ways consistent with this understanding. Forests were valued not simply for timber or fuelwood but because they protected springs, moderated local climate, sheltered biodiversity, and contributed to communal wellbeing. Water sources were remembered not merely as physical resources but as elements within a wider web connecting land, agriculture, households, and future generations. Environmental decline was thus interpreted through relationships rather than through isolated ecological indicators.

The testimonies from Same District broaden this relational picture further. Several respondents, including Maasai agropastoralists, described environmental pressures not only in relation to crop production but also in relation to livestock. Concerns about declining rainfall, shrinking grazing areas, and unreliable water sources were closely tied to the wellbeing of cattle, goats, and sheep whose survival depends upon ecological conditions.³⁸ Ecological memory in Tanzania therefore encompasses diverse forms of belonging to the land, including both agrarian and pastoralist relationships.

Such testimonies invite a deeper theological reflection on the ways human beings perceive and relate to the natural world. Sallie McFague's distinction between the "arrogant eye" and the "loving eye" is particularly illuminating. Drawing on Marilyn Frye's earlier formulation, McFague argues that the arrogant eye views the world primarily in terms of utility, assessing beings according to their usefulness to the observer. By contrast, the loving eye recognises other beings as possessing their own integrity, value, and significance.³⁹

Several of the drivers of ecological decline discussed in the previous section can be interpreted through this distinction. Forest clearance driven solely by short-term extraction, cultivation practices that prioritise immediate gain over long-term sustainability, or approaches that treat land and water as resources to be exploited rather than relationships to be sustained exemplify an instrumental mode of engagement. Participants' memories, however, frequently reflected something closer to what McFague describes as the loving eye. Recollections of named springs, culturally significant birds, medicinal trees, and communal spaces beneath forest canopies reveal relationships characterised not merely by use but also by familiarity, dependence, and care.

Ecological memory therefore preserves evidence of relationships that have been weakened or disrupted. The grief expressed by participants arises not only because resources are becoming scarce but because the patterns of relationship through which communities have historically understood and inhabited the world are under strain. Ecological loss matters because the relationships through which life flourishes matter. A similar vision appears within biblical theology. Hosea 4:1-3 offers a striking example in which moral disorder and ecological suffering are inseparably linked. The text describes a situation in which human unfaithfulness is accompanied by environmental decline: the land mourns, its inhabitants languish, and even wild animals, birds, and fish suffer the consequences.⁴⁰ Ecological disruption is thus presented not as an isolated environmental event but as evidence of fractured relationships extending throughout creation.

The apostle Paul's depiction of creation groaning in Romans 8:22 similarly presents creation as bound together within a shared

drama of suffering and hope. Creation is not portrayed as a passive backdrop to human redemption but as an active participant in the longing for renewal.⁴¹ The groaning of creation therefore signifies more than physical deterioration. It expresses a condition of broken relationship awaiting restoration.

Ecological crisis may therefore be understood as a form of relational rupture operating at multiple levels simultaneously. It disrupts relationships between people and land, communities and water sources, present and future generations, humanity and non-human creatures, and ultimately humanity and God. The significance of ecological degradation lies not only in what is lost materially but also in the relationships weakened through that loss.

This understanding carries important implications for ecological ethics. If environmental degradation is fundamentally relational, then responses confined to technological solutions will always remain incomplete. Technical interventions are necessary and often indispensable, but they cannot by themselves heal damaged relationships. Ecological restoration must also involve renewed attentiveness to creation, practices of care, forms of reconciliation, and commitments to ecological justice capable of restoring the relational fabric upon which flourishing depends. Ecological responsibility therefore begins not with mastery over nature but with the recovery of right relationship. The central question is not simply how environmental damage can be mitigated but how communities might participate in the restoration of relationships damaged by ecological decline. It is to this constructive task that the final section now turns.

8. Ecological Responsibility: Biblical Foundations

If memory discloses environmental change and lament names its loss, responsibility constitutes the necessary third movement. Memory alone cannot heal degraded landscapes, nor can lament by itself restore damaged relationships. Both find their fulfilment in practices of care, stewardship, justice, and restoration through which communities respond to what they have remembered and mourned. Ecological responsibility thus emerges not as an optional

ethical addition but as the practical consequence of ecological memory itself.

Biblical theology offers substantial resources for understanding such responsibility. The creation narratives portray humanity as occupying a distinctive place within creation, not as its owner but as its caretaker. In Genesis 2:15, the human being is placed in the garden “to till it and keep it,” language that conveys both cultivation and protection.⁴² Human authority over creation is therefore framed not as domination but as entrusted responsibility. The earth remains God’s possession, while human beings exercise delegated stewardship within it.

This perspective is reinforced throughout Scripture. Psalm 24:1 declares that “the earth is the Lord’s and all that is in it,” locating human use of land, water, and resources within a framework of accountability rather than unrestricted ownership.⁴³ Land, forests, rivers, animals, and crops are not merely commodities available for exploitation; they belong within a created order whose ultimate source and sustainer is God. Ecological responsibility therefore begins with humility. Human beings are participants within creation before they are managers of it. The New Testament extends this vision further. In Romans 8:22, creation is portrayed as groaning together in anticipation of redemption. Ecological suffering is thus neither irrelevant to the biblical narrative nor external to God’s redemptive purposes. Creation participates in the drama of salvation and awaits renewal alongside humanity.⁴⁴ To care for creation is therefore to participate, however imperfectly, in God’s concern for the flourishing of the whole created order.

Colossians 1:15-20 deepens this theological perspective by presenting Christ as the one through whom all things were created and through whom God purposes to reconcile all things to himself.⁴⁵ The scope of reconciliation extends beyond individual human salvation to embrace the wider creation. Ecological responsibility can therefore be understood as participation in a ministry of reconciliation that seeks the healing of damaged relationships within the created order.

This biblical trajectory mirrors the movement developed throughout the chapter. Ecological memory remembers what has been entrusted; lament names what has been damaged; responsibility seeks its restoration. The three dimensions belong together. Memory without responsibility risks becoming sentiment. Responsibility without memory risks becoming detached from the lived realities of communities. Lament serves as the bridge linking recognition of loss with commitment to renewal.

Recent practical theology has similarly emphasised the inseparability of reflection and action. Jeane Peracullo argues that ecological concern becomes ethically meaningful only when it takes practical form, moving beyond sentiment towards transformative practice.⁴⁶ This insight echoes Paulo Freire's understanding of praxis discussed earlier. Reflection and action belong together; ecological responsibility emerges when concern for creation becomes embodied in decisions, institutions, and communal practices.

Joanna Macy and Chris Johnstone's *Work That Reconnects* offers a helpful framework for describing this movement. Their approach proceeds through four moments: gratitude, honouring pain for the world, seeing with new eyes, and going forth into action.⁴⁷ Although developed outside explicitly Christian theology, this sequence closely parallels the movement traced in this chapter. Communities remember the gifts of creation, lament ecological degradation, reinterpret their relationship to the natural world, and commit themselves to restorative action.

Ecological Responsibility in Practice

The testimonies gathered in Karagwe and Same suggest several practical expressions of ecological responsibility.

First, responsibility involves protecting and restoring indigenous forests. Participants consistently associated forest conservation with water security, biodiversity protection, soil preservation, and agricultural wellbeing. Reforestation initiatives should therefore prioritise ecological restoration rather than simply increasing tree cover through monoculture plantations.⁴⁸

Second, responsibility includes protecting watersheds, springs, wetlands, and other water sources upon which rural livelihoods depend. Because participants repeatedly linked declining water availability to broader ecological change, water conservation emerges as both an environmental and a social priority. Such efforts are particularly significant for women and households whose daily well-being depends upon reliable access to water.⁴⁹

Third, participants' strong preference for organic soil-management practices highlights the importance of approaches that maintain long-term soil fertility. Whether through manure application, composting, agroecological methods, or erosion-control measures, ecological responsibility requires sustained attention to the health of the soil upon which future productivity depends.⁵⁰

Fourth, responsibility extends beyond ecological interventions alone. Testimonies from both districts indicate that ecological vulnerability is shaped by market conditions, institutional support, and access to agricultural knowledge. Strengthening farmer cooperatives, improving extension services, supporting locally appropriate irrigation infrastructure, and promoting fairer market arrangements are therefore also forms of ecological responsibility. Environmental sustainability cannot be separated from economic and social justice.

Churches likewise have an important role to play. Given their extensive presence within rural communities, they can contribute through environmental education, theological formation, advocacy, tree-planting initiatives, watershed protection, and the cultivation of ecological awareness rooted in biblical faith. Such activities represent practical ways of connecting discipleship with creation care and translating theological conviction into communal practice.

Ultimately, ecological responsibility is not directed solely towards present needs. Participants repeatedly expressed concern for future generations whose wellbeing will be shaped by decisions made today. Ecological memory extends across generations, preserving knowledge received from ancestors and transmitting responsibility to descendants. Responsibility is therefore inherently intergenerational. To care for forests, water, soil, and biodiversity is also to care for those who will inherit them.

Viewed in this light, ecological responsibility is best understood not simply as environmental management but as a form of faithfulness. It seeks to repair relationships damaged by ecological degradation and to sustain conditions under which human and non-human communities alike may flourish. Memory, lament, and responsibility thus emerge as interconnected dimensions of ecological discipleship: memory remembers what has been entrusted, lament grieves what has been damaged, and responsibility participates in the ongoing work of creation's healing.

9. Conclusion

This chapter has argued that ecological memory functions as a moral archive through which communities preserve, interpret, and evaluate environmental change across generations. Drawing on qualitative research conducted in Karagwe and Same Districts, it has shown that ecological degradation is experienced not only through declining forests, diminishing water sources, soil degradation, biodiversity loss, and agricultural uncertainty, but also through the erosion of ecological knowledge and the weakening of the relationships that sustain communal life.

Three dimensions of ecological memory have been identified. As diagnostic knowledge, it enables communities to recognise environmental change across time. As normative orientation, it provides a framework for evaluating ecological wellbeing and decline. As an ethical summons, it calls communities to respond through practices of care, restoration, and responsibility. Ecological memory therefore moves communities from recognition, through lament, towards action.

The chapter has further argued that ecological crisis is best understood as a form of relational rupture. Environmental degradation weakens relationships between people and land, communities and water sources, present and future generations, humanity and non-human creation, and ultimately humanity and God. Ecological responsibility consequently requires more than technical solutions alone. It calls for the restoration of relationships characterised by care, stewardship, justice, and reconciliation.

The chapter contributes to ecotheology in two principal ways. First, it offers an empirically grounded account of how rural Tanzanian communities remember, interpret, and morally evaluate environmental change. Second, it develops ecological memory as a transferable analytical concept for understanding the relationship between environmental loss, moral evaluation, and ecological responsibility. By framing ecological memory as a moral archive, the discussion extends ecotheological reflection beyond questions of stewardship alone towards the moral and theological significance of remembrance itself.

The findings also carry practical implications. Protecting forests and water sources, supporting sustainable agricultural practices, strengthening local institutions, and recognising the environmental knowledge embedded within local communities all emerge as essential dimensions of ecological responsibility. Such responsibility cannot be reduced to individual behaviour alone but must also address the social, economic, and institutional conditions that shape environmental possibilities and constraints.

The image of creation groaning in Romans 8 has framed the argument throughout this chapter. In Karagwe and Same, that groaning is heard not only through scientific indicators but also through communal memory itself. Ecological memory enables communities to recognise creation's distress, lament its losses, and respond with responsibility. In this sense, remembrance becomes a form of ecological attentiveness through which communities participate in the ongoing work of creation's healing. Memory remembers what has been entrusted, lament grieves what has been damaged, and responsibility seeks the restoration of relationships upon which the flourishing of creation depends.

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2. The Earth's Habitability at Crossroads: *Ecological Realities and Future Pathways*

ZIPPORAH MUENI MALUVU

Abstract

The ecological realities and possible futures confronting contemporary civilisation are examined here, with particular attention to the widening gap between humanity's stated climate ambitions and the measurable reality of planetary boundary transgression. Drawing on the Planetary Boundaries framework, the IPCC Sixth Assessment Report (AR6), and the Shared Socioeconomic Pathways (SSPs), it evaluates three potential trajectories: business-as-usual, sustainable transition, and regenerative restoration. The chapter identifies agriculture as both a significant driver of ecological degradation and one of the sectors most vulnerable to its consequences. A biblical-theological perspective provides a moral framework for interpreting these challenges and discerning pathways towards ecological responsibility, resilience, and justice.

Keywords: climate change; planetary boundaries; biodiversity loss; sustainability; ecological resilience; food systems; agroecology; climate adaptation; environmental stewardship; ecological justice.

1. Introduction

Earth stands at a crossroads. The biophysical foundations of life—water availability, climatic stability, biodiversity, and soil fertility—are under unprecedented pressure. Six of the nine planetary boundaries have now been transgressed, indicating that humanity

has moved beyond the Earth's safe operating space in multiple critical Earth-system processes (Richardson et al. 2023; Rockström et al. 2009; Steffen et al. 2015). Global mean temperature has already risen by approximately 1.2°C above pre-industrial levels, while recent observations confirm that the warming trend continues to intensify (IPCC 2023; WMO 2024). Those communities bearing the most severe consequences have contributed least to causing the crisis. The ecological crisis is therefore not only an environmental challenge but also a profound crisis of global justice.

A crossroads represents a moment of decision at which divergent pathways emerge. Earth remains habitable, but that habitability is under mounting and accelerating pressure. Alternative futures remain possible, yet the window for meaningful action is narrowing as the ecological conditions that sustain human civilisation continue to deteriorate. The defining question of our time is therefore not whether the conditions for life are changing—the scientific evidence is unequivocal—but how humanity might sustain a planet that remains safe, just, and habitable for present and future generations.

2. Earth's Habitability: Scientific Foundations

Earth in the Habitable Zone

Earth is the only known planet within our solar system's habitable zone to support complex and self-sustaining life. The concept of a habitable zone refers to the range of orbital distances around a star within which liquid water can persist on a planetary surface, thereby creating conditions conducive to life. Earth's location within this zone is a necessary but not sufficient condition for habitability. Long-term habitability also depends upon the stability of atmospheric composition, climatic regulation, and ecological processes (Kasting 2010).

Four interrelated biophysical conditions make such habitability possible:

- **Climatic stability**, maintained in part through the natural greenhouse effect. Without greenhouse gases, Earth's average surface temperature would be approximately -18°C rather than the current global average of around 15°C (IPCC 2021).
- **The availability of liquid water**, sustained through the interaction of atmospheric pressure and surface temperature.
- **Healthy ecosystems and biodiversity**, which regulate atmospheric chemistry, nutrient cycling, and soil fertility.
- **A life-supporting atmosphere**, providing oxygen for respiration, carbon dioxide for photosynthesis, and an ozone layer that protects life from harmful ultraviolet radiation.

These conditions constitute the foundation of human civilisation rather than merely its environmental backdrop. They are objective biophysical realities that cannot be negotiated away or fully replaced through technological intervention. Their degradation produces consequences that may be difficult, costly, or impossible to reverse.

A Crossroads: The Defining Question

A crossroads is a point of decision at which divergent futures become possible. Earth remains habitable, but that habitability is increasingly threatened by accelerating ecological pressures. Alternative pathways remain open, but they require urgent, coordinated, and systemic action. Delay narrows available options and increases the risks of irreversible environmental change.

Human responses to these pressures are already visible in patterns of migration, displacement, resource competition, and adaptation. Yet the future is not predetermined. The pathways ahead will be shaped by collective decisions concerning energy systems, food production, economic development, governance, and environmental stewardship. The future, in significant measure, depends upon the path humanity chooses.

A Crossroads: The Defining Question

A crossroads is a point of decision where divergent pathways open. Earth remains habitable — but that habitability is under mounting and accelerating pressure. The ‘other path’ remains available. But the choice must be made urgently, universally, and systemically, because the conditions that make both paths possible are themselves eroding under the pressure of delayed action. Migration, displacement, and the search for new areas of settlement already mark the human response to this pressure. The future is not predetermined; it is the path we choose.

3. Planetary Boundaries Framework

Ecological realities are the objective biophysical conditions and processes upon which life depends. They include the laws governing photosynthesis, hydrological cycles, biodiversity, atmospheric chemistry, and the finite availability of natural resources. These realities exist whether or not humanity acknowledges them.

The Planetary Boundaries framework (Rockström et al. 2009; Steffen et al. 2015), developed by the Stockholm Resilience Centre, provides a means of assessing humanity’s impact on these life-support systems. The framework identifies nine critical Earth-system processes and proposes quantitative thresholds beyond which the risk of abrupt, non-linear, or irreversible environmental change increases significantly. Together, these boundaries define a **safe operating space** for humanity.

The most recent global assessment indicates that six of the nine planetary boundaries have now been transgressed, signalling growing risks to Earth-system stability and resilience while narrowing the safe operating space available for human societies (Richardson et al. 2023). Because these boundaries are deeply interconnected, transgression in one domain frequently amplifies risks in others. Effective responses therefore require integrated rather than sectoral approaches to environmental governance.

The central implication is clear: humanity must learn to operate within the ecological limits of a finite planet. Long-term flourishing depends not on overcoming nature but on working within and alongside the Earth's life-support systems.

PLANETARY BOUNDARY		STATUS (2023–2025)	KEY INDICATOR / EVIDENCE
	Climate Change	 High Risk	 CO ₂ > 420 ppm; warming > 1.2°C
	Biosphere Integrity	 High Risk	 Species extinction rate 10–1000× natural level
	Land-System Change	 Increasing Risk	 Forest loss beyond safe thresholds
	Freshwater Change	 High Risk	 Disrupted river flows and soil moisture
	Biogeochemical Flows	 High Risk	 Nitrogen & Phosphorus overload
	Novel Entities	 High Risk	 Plastics, chemicals in global systems
	Ocean Acidification	 Emerging Risk	 Declining carbonate saturation
	Stratospheric Ozone	 Recovering	 Gradual recovery via Montreal Protocol
	Atmospheric Aerosols	 Regionally Critical	 Local pollution hotspots

Table 1. Current Status of the Nine Planetary Boundaries (compiled by the author from Richardson et al. 2023).

Overall, six of the nine planetary boundaries have now been transgressed, underscoring the urgent need for coordinated global action to restore Earth's resilience and safeguard the habitability of the planet.

4. Increasing Temperatures and the Ambition Gap

The Temperature Record

Even an increase of 1–2°C in global average temperature is sufficient to alter rainfall patterns, accelerate glacier loss, warm the oceans, and disrupt agricultural systems on a planetary scale. Earth's mean surface temperature has already risen by approximately 1.2°C above pre-industrial levels (IPCC 2018). The urgency

of this warming is compounded by the non-linear character of climate impacts: consequences do not increase proportionally with temperature. The difference between 1.5°C and 2.0°C of warming is not merely incremental; it may mark the difference between severe ecological stress and the crossing of critical tipping points, including large-scale ice-sheet destabilisation and disruptions to global rainfall systems. Every fraction of a degree therefore matters.

The temperature record itself is unequivocal. Global mean surface temperature has increased from approximately 13.7°C during the pre-industrial baseline period (1850–1900) to about 14.9–15.0°C in the present era, representing a rise of roughly 1.2°C in little more than a century and a half (IPCC 2018). Although this increase may appear modest in absolute terms, its ecological consequences are profound because it affects the energy balance of the entire Earth system. The resulting changes are already evident in rising sea levels, more frequent extreme weather events, shifts in ecological ranges, and increasing pressures on food production systems.

The Ambition Gap

Ambition refers to the determination to achieve a desired goal. The ambition gap is the distance between what governments and societies have committed themselves to achieving and what is actually being realised in practice. Recent assessments indicate that the principal challenge is no longer a lack of scientific knowledge but the persistent gap between political commitments and implementation. Despite increasingly ambitious national pledges, current policies remain insufficient to achieve the temperature goals established under the Paris Agreement, leaving a substantial emissions gap that continues to widen (UNEP 2023; UNFCCC 2023).

The Paris Agreement, adopted at COP21 in December 2015 and ratified by 195 Parties, established two central objectives: to hold global warming well below 2°C above pre-industrial levels and to pursue efforts to limit warming to 1.5°C. Nationally Determined Contributions (NDCs) are intended to reflect progressively increasing levels of ambition over time. Yet successive assessments indi-

cate that the aggregate effect of current NDCs, even if fully implemented, would still place the world on a pathway towards approximately 2.4–2.7°C of warming by the end of the century. This gap is not primarily a failure of knowledge. It is a failure of implementation, political will, and moral commitment.

5. Climate and Agriculture: A Dual Crisis

Agriculture occupies a central position within the climate crisis because it functions simultaneously as both a contributor to and a victim of environmental change. As a contributor, the agricultural and land-use sector accounts for approximately 21–37 per cent of global greenhouse gas emissions. Agricultural expansion remains the principal driver of deforestation, while the widespread use of synthetic nitrogen fertilisers has disrupted biogeochemical cycles on a planetary scale. As a victim, agriculture is increasingly exposed to droughts, floods, heatwaves, emerging pests and diseases, and disruptions to global supply chains. These pressures reduce crop productivity, undermine soil fertility, and increase food-price volatility. For many communities in the Global South, they translate directly into food insecurity and heightened livelihood vulnerability.

The IPCC identifies land systems as both significant contributors to climate change and among the most important opportunities for mitigation through sustainable land management, ecosystem restoration, and climate-resilient agriculture (IPCC 2019). Similarly, the Food and Agriculture Organization argues that resilient agri-food systems are indispensable for ensuring food security, rural livelihoods, and ecological sustainability under changing climatic conditions (FAO 2021; FAO et al. 2023).

Building resilient food systems is therefore a critical priority. Approaches such as Climate-Smart Agriculture and agroecological practices—including agroforestry, conservation agriculture, and push–pull technology—offer pathways towards systems that are simultaneously more productive, more resilient, and more environmentally sustainable. Rather than representing a trade-off, mitigation and adaptation can often reinforce one another, generating benefits for both people and ecosystems.

From an ecological perspective, food systems stand at the intersection of several planetary boundaries, including climate change, biodiversity loss, freshwater use, and biogeochemical flows. Transforming agriculture is therefore not merely a sectoral challenge but a prerequisite for maintaining the ecological foundations upon which human societies depend.

6. Three Future Pathways and the Shared Socioeconomic Pathways (SSPs)

Scientists use scenarios not as predictions but as projections of plausible futures shaped by present decisions. The future remains open, and different pathways emerge according to choices concerning energy, land use, governance, technology, consumption, and international cooperation. Three broad trajectories are particularly relevant.

The first is a **business-as-usual pathway**, characterised by continued dependence on fossil fuels, inadequate climate action, ongoing biodiversity loss, and increasing pressure on planetary boundaries. Under such conditions, environmental degradation intensifies, climate impacts become more severe, and the risk of crossing irreversible tipping points increases substantially.

The second is a **sustainable transition pathway**, in which coordinated policy interventions, technological innovation, international cooperation, and improved environmental governance succeed in stabilising climatic and ecological systems. This pathway broadly corresponds to the more sustainable SSP scenarios frequently examined in climate assessments. It emphasises decarbonisation, ecological protection, social inclusion, and long-term resilience.

The third is a **regenerative restoration pathway**. Here humanity moves beyond merely reducing environmental harm and actively participates in restoring ecosystems, rebuilding biodiversity, enhancing soil fertility, regenerating water systems, and strengthening ecological resilience. Rather than seeking sustainability alone, this pathway aims for the renewal of the Earth's life-support sys-

tems while supporting human wellbeing and prosperity. It represents the most ambitious and arguably the most just of the available futures.

These pathways should not be understood as fixed alternatives but as ideal types that illuminate possible directions of development. The central question is therefore not whether the future will change, but what kind of future humanity is willing to create. The ecological realities described throughout this chapter leave little room for delay. The choice is increasingly between transformation by design and transformation imposed by ecological crisis.

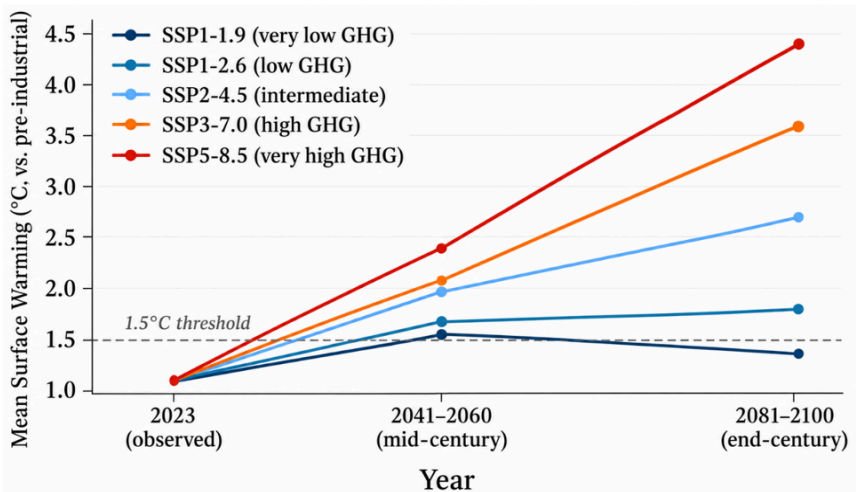


Figure 1. Estimated Global Mean Surface Temperature Change Relative to the Pre-industrial Period. Source: IPCC, *Climate Change 2023: Synthesis Report (AR6, 2023)*.

Only under **SSP1–1.9**, which requires global CO₂ emissions to reach net zero by approximately 2050, does limiting warming to 1.5°C remain plausible. By contrast, **SSP2–4.5**, which broadly reflects current policy trajectories, is associated with approximately 2.7°C of warming by 2100. The choice between these futures is being made now through the policy, governance, and investment decisions of the present decade. Recent Earth-system assessments further demonstrate that delaying mitigation substantially increases the

likelihood of crossing additional planetary tipping points, whereas early and sustained action preserves greater opportunities for ecological resilience, sustainable development, and the maintenance of Earth's life-support systems (Richardson et al. 2023).

7. Global South Perspectives: Five Strategic Pillars

The Global South should not be viewed merely as a victim of the ecological crisis. Communities across Africa, Asia, Latin America, and the Pacific manage approximately 40 per cent of the world's remaining intact terrestrial ecosystems (IPBES 2019). Their knowledge systems, environmental practices, and institutional traditions embody important resources for ecological transformation that are often undervalued within dominant industrial models of development. Five strategic pillars help to illuminate the transformative potential emerging from these contexts.

Indigenous Knowledge Stewardship

The first pillar is indigenous knowledge stewardship. Indigenous worldviews frequently understand nature not as a resource to be exploited but as a living reality embedded within relationships of reciprocity and responsibility. Such perspectives preserve forms of ecological wisdom accumulated across generations. Examples include the management of sacred forests, community-led mangrove restoration, traditional terracing systems, and the work of initiatives such as the Green Belt Movement. These approaches demonstrate that ecological restoration is often rooted in long-standing cultural traditions and place-based knowledge.

Agroecology and Food Sovereignty

The second pillar is agroecology. Agroecological approaches pursue food sovereignty by working with natural ecological processes rather than against them. Practices such as agroforestry, push-pull technology, conservation agriculture, and diversified farming sys-

tems seek to restore soil fertility, strengthen water retention, enhance biodiversity, and improve resilience to climatic shocks. Agroecology therefore contributes simultaneously to food security, ecological sustainability, and rural livelihoods (Altieri 1995; Gliessman 2015).

Inclusive Circularity

The third pillar is inclusive circularity. Across many countries of the Global South, informal waste sectors already recover, reuse, and recycle substantial quantities of material that would otherwise enter landfills or pollute ecosystems. Formal recognition and support for these activities can promote both environmental sustainability and social justice. Community recycling initiatives, local repair enterprises, and circular resource flows create employment opportunities while reducing environmental pressure.

Knowledge Equity and Transdisciplinarity

The fourth pillar is knowledge equity and transdisciplinarity. Sustainable solutions require dialogue between scientific knowledge and local experience rather than privileging one at the expense of the other. Indigenous and local knowledge systems should be treated as partners in the production of environmental understanding. Examples include sand-dam construction in south-eastern Kenya, participatory plant-breeding programmes, and community-based resource management initiatives. Such approaches illustrate how local and scientific knowledge can complement one another in addressing environmental challenges.

Resilience and Wellbeing

The fifth pillar is the cultivation of resilience. Rather than measuring success primarily through economic consumption, resilience-oriented approaches prioritise wellbeing, adaptive capacity, and ecological sustainability. Local water-harvesting systems, community solar networks such as M-Kopa, and digital tools used to monitor illegal logging demonstrate how innovation can emerge from

local contexts. Resilience is therefore not merely the capacity to absorb shocks but also the capacity to transform systems in ways that enhance both human and ecological flourishing (IPBES 2019).

Taken together, these five pillars suggest that the Global South offers more than examples of vulnerability. It also provides important resources for imagining and implementing pathways towards social, ecological, and economic transformation.

8. The Faith–Science Interface

Earth's ecological crisis is not merely a technical problem; it is also a moral and spiritual one. The ambition gap discussed earlier reflects not primarily a deficit of knowledge but a deficit of moral formation—the capacity to sustain responsibility, accountability, and long-term commitment in the face of complex challenges. Human development research similarly suggests that contemporary environmental crises arise as much from failures of governance, equity, and institutional responsibility as from deficiencies in scientific understanding alone (UNDP 2022).

Scripture provides a moral framework for interpreting the ecological realities described above and for motivating an adequate response. Psalm 24:1 offers a foundational theological claim: *“The earth is the Lord’s, and everything in it.”* Human beings therefore relate to creation not as owners but as stewards. Our future depends upon recovering the vocation of keeping and caring for the garden rather than exercising domination over it.

Four interrelated themes are particularly significant.

Creation Care

The first is creation care. Genesis 2:15 portrays humanity as called to “till and keep” the garden, combining cultivation with attentive protection. This mandate confronts the contemporary reality that six of the nine planetary boundaries have already been transgressed. The ecological crisis may therefore be understood as a failure of *shamar*—the biblical responsibility to guard and preserve

what has been entrusted. Creation care calls for restorative stewardship expressed through agroecology, ecosystem restoration, and sustainable resource management.

Justice

The second theme is justice. Amos 5:24 proclaims: *“Let justice roll down like waters, and righteousness like an ever-flowing stream.”* This vision challenges a world in which communities in the Global South often experience the gravest consequences of ecological degradation despite contributing least to its causes. Climate justice therefore requires more than technological solutions. It calls for equitable climate finance, meaningful loss-and-damage mechanisms, and international commitments grounded in responsibility and solidarity.

Prophetic Warning

A third theme is prophetic warning. Hosea 4:1–3 describes a land that mourns and a creation suffering under human unfaithfulness. The text resonates powerfully with contemporary ecological realities, including biodiversity loss, climate change, and ocean degradation. Prophetic warning calls communities to recognise the consequences of ecological irresponsibility and to pursue rapid and far-reaching decarbonisation as an expression of covenantal faithfulness to creation.

Covenant

The fourth theme is covenant. In Genesis 9:16, God’s covenant extends beyond humanity to encompass all living creatures. This universal covenant challenges economic and industrial systems that degrade ecosystems and undermine the regenerative capacities of the Earth. To honour the covenant today is to participate in protecting forests, oceans, climate systems, and biodiversity as part of God’s ongoing care for creation.

Together, these themes—creation care, justice, prophetic warning, and covenant—call the church to move beyond observation towards action. The ecological crisis is, at its deepest level, a failure of the vocation to keep and care for creation. These biblical themes point towards the recovery of that vocation through faithful and transformative practice.

9. Mitigation and Adaptation Strategies by Domain

Improving Earth’s habitability requires the simultaneous pursuit of mitigation and adaptation. Mitigation seeks to address the drivers of planetary-boundary transgression by reducing greenhouse-gas emissions and other environmental pressures. Adaptation seeks to strengthen the resilience of human and ecological systems in response to changes that are already occurring.

These approaches are complementary rather than competing. The same agroecological practices that reduce agricultural emissions may also enhance soil fertility, improve water retention, strengthen biodiversity, and increase resilience to climatic variability. Effective responses therefore generate co-benefits across multiple dimensions of sustainability.

Table 2 presents an integrated framework for mitigation and adaptation across the six planetary-boundary domains that presently face the greatest levels of stress.

Table 2. Mitigation and Adaptation Strategies by Domain (compiled by the author from FAO 2013; IPBES 2019; and IPCC AR6 2023).

Domain	Mitigation (Reducing Drivers of Change)	Adaptation (Building Resilience)
Climate and Energy	Transition to renewable energy; improve energy efficiency; reduce fossil-fuel dependence	Coastal protection; climate-resilient infrastructure; climate-resilient cities
Food and Land Systems	Sustainable agriculture; agroecology; reduced food waste; lower-emission diets	Drought-resistant crops; diversified farming systems;

		climate-resilient food systems
Freshwater Systems	Protect wetlands; improve water-use efficiency; sustainable watershed management	Desalination; rainwater harvesting; improved urban and rural water systems
Biosphere Integrity	Protect and restore habitats; expand conservation areas; prevent deforestation	Seed banks; species recovery programmes; support for ecological adaptation
Ocean Health	Reduce greenhouse-gas emissions; reduce plastic pollution; promote sustainable fisheries	Protect mangroves, coral reefs, and coastal ecosystems; strengthen coastal resilience
Pollution and Waste	Reduce waste generation; promote a circular economy; minimise hazardous pollutants	Environmental remediation; filtration technologies; ecosystem restoration and clean-up

10. Climate Justice and Sustainable Choices

Climate Justice

Climate justice places equity, responsibility, and human rights at the centre of climate decision-making and action. Four principles are particularly important.

First, the protection of biodiversity is inseparable from the protection of Indigenous Peoples' rights. Indigenous communities manage or have customary stewardship over some of the world's most ecologically significant territories, and securing their land rights is widely recognised as essential for both ecological conservation and social justice. Justice and environmental sustainability therefore cannot be separated.

Second, the principle of **Common but Differentiated Responsibilities (CBDR)** recognises that while all nations share responsibility for addressing climate change, historically high-emitting indus-

trialised countries bear a greater obligation because of their disproportionate contribution to cumulative greenhouse-gas emissions.

Third, **intergenerational justice** requires that future generations are not forced to bear the consequences of environmental decisions made today. Children and young people, who have contributed least to the ecological crisis, will experience many of its most severe long-term impacts. Climate action is therefore an obligation not only to present populations but also to those yet to come.

Fourth, mechanisms addressing **loss and damage** should be understood as matters of justice rather than charity. Communities already experiencing irreversible climate-related losses require meaningful support, and the operationalisation of loss-and-damage financing represents an important expression of global responsibility and solidarity.

These principles reflect the integrated vision of the **2030 Agenda for Sustainable Development**, which understands poverty reduction, environmental sustainability, social justice, and climate action as mutually reinforcing dimensions of human flourishing (United Nations 2015). Climate justice therefore extends beyond emissions reduction to encompass questions of equity, participation, responsibility, and human dignity.

11. The SDGs and Sustainable Development

Humanity faces a choice between contrasting development pathways. On one path lies unsustainable development, characterised by resource depletion, ecological degradation, widening inequalities, and escalating climate risks. On the other lies sustainable development, in which economic progress is pursued alongside environmental protection, social inclusion, and intergenerational responsibility.

The Sustainable Development Goals (SDGs) provide a comprehensive framework for navigating this transition. Several goals are particularly relevant to climate action and agricultural sustainability. **SDG 2 (Zero Hunger)** and **SDG 13 (Climate Action)** function as

core priorities, while **SDG 6 (Clean Water and Sanitation)** and **SDG 15 (Life on Land)** address the ecological resources upon which food production depends. **SDGs 1, 7, 8, and 17** further support this agenda through poverty reduction, access to clean energy, sustainable economic opportunities, and international partnership.

Taken together, these goals demonstrate that climate action, food security, ecological sustainability, and social development are not competing objectives but interconnected dimensions of a shared development agenda.

12. Improving Habitability: Systemic Change at Three Levels

Environmental sustainability cannot be achieved through policy or technology alone. It requires systemic transformation operating simultaneously at multiple levels of society.

At the **community and individual level**, important contributions include responsible consumption, sustainable lifestyle choices, local adaptation strategies, community resilience initiatives, and the preservation of indigenous and local ecological knowledge. These actions strengthen adaptive capacity and foster environmental responsibility from the ground up.

At the **government level**, sustainability depends upon effective environmental legislation, carbon pricing mechanisms, protection of land and resource rights, investment in climate adaptation, and the fulfilment of climate-finance commitments. Public policy plays a crucial role in creating the institutional conditions necessary for large-scale transformation.

At the **business and industry level**, sustainability requires production systems that internalise ecological costs, reduce waste, respect human rights throughout supply chains, and embrace principles of circularity and resource efficiency. Corporate decision-making has significant implications for emissions, biodiversity, resource use, and environmental justice.

These three levels must operate in mutual reinforcement rather than isolation. Individuals, governments, and businesses each possess distinct responsibilities, yet lasting transformation depends upon their interaction. Recent global resource assessments similarly conclude that the transformation of production and consumption systems represents one of the greatest opportunities for simultaneously improving human wellbeing and reducing environmental pressures (UNEP 2024).

Ultimately, improving Earth's habitability requires more than isolated interventions. It demands coordinated action capable of aligning economic activity, social wellbeing, and ecological integrity within the limits of a finite planet.

13. Sustainable Choices: Production, Consumption, and Lifestyles

Translating ambition into reality requires change not only at the level of international agreements and national policies but also in the everyday practices of individuals, households, institutions, and businesses. Sustainable development depends upon decisions regarding what is produced, how it is produced, what is consumed, and how resources are used. Sustainable production seeks to minimise environmental impacts through efficient resource use, renewable energy, circular-economy principles, and environmentally responsible supply chains. Sustainable consumption involves reducing waste, choosing lower-impact products and services, conserving energy and water, and supporting production systems that promote ecological and social wellbeing.

Lifestyle choices likewise play an important role. Travel behaviour, dietary preferences, housing decisions, patterns of consumption, and participation in community initiatives all influence environmental outcomes. While individual actions alone cannot resolve the ecological crisis, they contribute to broader cultural transformations that support systemic change. The goal is not merely to consume less but to live differently—within ecological limits while

promoting human wellbeing, social justice, and environmental sustainability. Sustainable choices therefore represent practical expressions of ecological responsibility in everyday life.

Table 3. Sustainable Production, Consumption, and Lifestyle Choices, developed by the author and aligned with SDG 12 (Responsible Consumption and Production)

Category	Key Commitments
Sustainable Production	Efficient use of natural resources, including water, land, and energy; transition to renewable energy sources that reduce dependence on fossil fuels and lower pollution; waste reduction through circular-economy practices of reuse, repair, and recycling; and climate-smart agricultural approaches that integrate mitigation, adaptation, and productivity.
Sustainable Consumption	Purchasing only what is needed and reducing food waste; choosing durable, repairable, and environmentally responsible products with minimal packaging; supporting businesses committed to sustainable practices; and reusing and recycling materials before disposal.
Sustainable Life-styles	Translating sustainability commitments into everyday practice by reducing food waste and conserving water and energy; supporting local food systems and community-based agriculture; choosing businesses that uphold fair supply chains and ecological standards; and aligning personal and collective actions with the principles of sustainable development.

14. Conclusion: From Ambition to Action

Earth stands at a critical crossroads—between ecological degradation and sustainability, between ambition and implementation, and between exploitation and responsible stewardship. The evidence is clear: the future habitability of our planet, and the wellbeing of future generations, depend on the actions taken today. While ambitious sustainability goals are already in place, the central challenge

lies in translating these aspirations into concrete and systemic action. Humanity must learn to operate within planetary boundaries, working in harmony with ecological realities rather than in opposition to them.

Collective global action is essential. Integrated, forward-looking solutions must replace fragmented and short-term responses. Bridging the gap between scientific knowledge, political commitments, and practical implementation has become one of the defining challenges of contemporary environmental governance (UNEP 2023; UNFCCC 2023). Climate-resilient agriculture, which combines scientific innovation with Indigenous and local knowledge systems, offers more effective, sustainable, and culturally appropriate adaptation strategies. Equally, robust environmental policies, strong institutions, and effective governance are indispensable prerequisites for transformative change. By embracing sustainability, innovation, and international cooperation, humanity can choose a path-way that secures a resilient, equitable, and habitable Earth for all.

Ultimately, our future depends upon rediscovering our role as custodians of the garden—living in relationship with creation rather than seeking dominion over it.

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3. Agroecology: Opportunities and Challenges

MIREILLE REMESCH

Abstract

Agroecology has emerged as a critical framework for rethinking agriculture and food systems in response to ecological degradation, climate change, and persistent social and economic inequalities. This chapter examines agroecology as a science, a set of practices, and a social movement, tracing its origins in the Global South and its development through international frameworks such as the FAO's Ten Elements of Agroecology. It highlights the ecological, social, and economic benefits of agroecological approaches while analysing the contrast between their transformative role in the Global South and their relatively limited adoption in Germany. Drawing on examples from Sub-Saharan Africa and Brazil, the chapter argues that agroecology represents a dynamic process of socio-ecological transformation with significant potential to advance sustainable and equitable food systems.

Keywords: agroecology; sustainable agriculture; food sovereignty; climate change; social justice; Global South; smallholder farmers; food systems

1. Agroecology as Science, Practice, and Movement

Agroecology is best understood as an integrative framework that combines science, agricultural practice, and social movement within a single analytical perspective. Rather than treating agriculture as a purely technical activity, it situates food production within broader ecological, social, economic, and political contexts.¹ This holistic approach has gained increasing prominence in response to

the shortcomings of industrial agriculture, which has contributed significantly to climate change, biodiversity loss, soil degradation, and persistent inequalities across food systems.²

Crucially, agroecology extends beyond technical innovation. It is closely associated with the right to food, food sovereignty, gender equity, and democratic participation.³ Its distinctive character lies in its integration of ecological sustainability with a strong commitment to social justice. In this sense, agroecology represents not merely an alternative set of agricultural practices but a broader transformation of the relationships that shape food systems and govern human interactions with the natural environment.

2. Origins in the Global South: Agroecology as Resistance

Agroecology emerged primarily in the Global South as a response to the adverse consequences of industrial agriculture, particularly for smallholder farmers, Indigenous communities, and rural women.⁴ These groups have frequently borne the costs of ecological degradation while deriving few of the benefits associated with industrial agricultural systems. A significant milestone in the consolidation of agroecology as a global movement was the International Forum for Agroecology, held in Nyéléni, Mali, in 2015.⁵ Participants from more than eighty countries articulated a shared vision of agroecology as a form of resistance to extractivist and profit-driven models of agricultural production. The resulting declaration emphasised access to land, collective rights, the protection of the commons, and a relational understanding of the environment, often expressed through concepts such as “Mother Earth”.⁶

In countries such as Brazil and India, agroecology has evolved into a politically grounded social movement that challenges multinational agribusiness and monocultural production systems.⁷ It promotes approaches rooted in local knowledge, biodiversity, and long-standing relationships between communities and their environments. This relational perspective resonates strongly with broader ethical and theological traditions that understand the

Earth not as a commodity to be exploited but as a shared inheritance sustained through reciprocal relationships and responsibility.

3. Conceptual Framework: The Ten Elements of Agroecology

The Food and Agriculture Organization of the United Nations (FAO) has provided a comprehensive articulation of agroecology through its Ten Elements, complemented by the thirteen principles developed by the High Level Panel of Experts on Food Security and Nutrition (HLPE).⁸ Together, these frameworks provide both practical guidance and a normative foundation for agroecological transformation. The Ten Elements comprise diversity, synergies, efficiency, resilience, recycling, the co-creation and sharing of knowledge, human and social values, culture and food traditions, responsible governance, and circular and solidarity economies.⁹ These elements are not merely descriptive; they also embody an ethical orientation that integrates ecological sustainability with social justice.

As such, agroecology is shaped not only by technical practices but also by core values, including cooperation, reciprocity, and responsibility. It offers a framework through which food systems can be reoriented towards long-term sustainability, resilience, and equitable participation.

Figure 1. The FAO's Ten Elements of Agroecology.



4. Benefits of Agroecological Approaches

The benefits of agroecology are multidimensional and mutually reinforcing. Ecologically, it enhances soil health, protects water resources, and promotes biodiversity through diversified farming systems and reduced dependence on external inputs. It contributes to both climate change mitigation and adaptation by increasing carbon sequestration, reducing greenhouse gas emissions, and strengthening resilience to climatic shocks.¹⁰

Socially, agroecology strengthens the autonomy and adaptive capacity of smallholder farmers by reducing dependence on costly ag-

ricultural inputs and volatile global markets. It also promotes gender equity by improving women's access to resources, participation in decision-making processes, and economic opportunities.

Economically, agroecology supports local value creation and strengthens resilient regional markets. It prioritises short supply chains and locally embedded food systems that are often better able to withstand external shocks and global disruptions.¹¹ Importantly, these ecological, social, and economic benefits should not be understood as separate outcomes; rather, they constitute interconnected and mutually reinforcing dimensions of a more sustainable and equitable food system.

5. Agroecology in Germany

The reception of agroecology in Germany illustrates the challenges that arise when it is adopted primarily as an academic and policy framework rather than as a broader social movement. While agroecological principles are receiving increasing attention within scientific and policy circles, they have not developed into a cohesive movement comparable to those found in many countries of the Global South.

Many farmers already employ agroecological practices without explicitly identifying them as such, while the concept itself is frequently conflated with organic agriculture. In some cases, concerns have been raised that agroecology's broader and less standardised framework could dilute established organic certification systems. This situation highlights an important insight: the transformative potential of agroecology depends not only on technical knowledge and ecological practices but also on collective organisation, social mobilisation, and political engagement. Without these dimensions, its capacity to drive systemic change is likely to remain fragmented and limited.

6. Agroecology as a Transformative Process

Agroecology should be understood not as a fixed model but as a dynamic process of socio-ecological transformation. It operates across multiple scales, from individual farms and local communities to national agricultural systems and global food networks, and involves a diverse range of actors, including farmers, researchers, policymakers, and social movements.

This transformative process contributes to sustainability by addressing environmental and social challenges simultaneously. It also draws attention to dimensions of agricultural systems that are often overlooked, including labour conditions, gender relations, and cultural practices. Moreover, agroecology enhances local resilience by supporting diversified production systems and strengthening regional food networks. In the context of climate change, it provides locally adapted strategies that respond to specific ecological conditions while also contributing to broader mitigation efforts.

7. Agroecology in Practice: Sub-Saharan Africa and Brazil

The practical implementation of agroecology varies across regions, reflecting diverse social, ecological, and institutional contexts. In Sub-Saharan Africa, agroecology has demonstrated considerable potential for strengthening community resilience and local autonomy. Women frequently play a central role in these initiatives by organising cooperatives, establishing local markets, and promoting sustainable agricultural practices. Such activities contribute not only to economic empowerment but also to social cohesion and community development.

In Brazil, agroecology has evolved into a highly organised social movement. Organisations such as the Landless Workers' Movement (MST), CAPA, CEAGRO, and ASSESOAR support agroecological transitions through education, advocacy, technical assistance, and access to resources. Collectively, these organisations address

issues of land rights, knowledge exchange, and participatory governance, demonstrating the transformative potential of agroecology when implemented as both a practical approach and a political project.

8. Towards Transformation: Networks, Education, and Policy Coherence

Realising the full potential of agroecology requires coordinated action across multiple levels. Three priorities are particularly important.

First, education is essential for expanding understanding of agroecology among researchers, practitioners, policymakers, and the wider public. Increased awareness can help bridge the gap between theory and practice.

Second, networks must be strengthened to connect stakeholders across sectors and regions. Such collaboration facilitates knowledge exchange, collective action, and the scaling-up of successful initiatives.

Third, coherent policy frameworks are required to support agroecological transitions. This includes aligning agricultural, environmental, and social policies, as well as creating incentives that encourage sustainable practices. Without such policy coherence, agroecological initiatives are likely to remain fragmented, isolated, and difficult to sustain over the long term.¹¹

9. Conclusion

Agroecology offers a comprehensive framework for transforming food systems through the integration of ecological sustainability, social justice, and economic resilience. Its strength lies in its holistic approach and its capacity to reshape relationships between people, nature, and systems of production. The contrast between its trans-

formative role in many parts of the Global South and its more limited adoption in contexts such as Germany demonstrates that agroecology's effectiveness depends not only on scientific knowledge and agricultural practice but also on collective organisation, political engagement, and social mobilisation. As global environmental challenges continue to intensify, agroecology stands out as a promising pathway towards more sustainable, resilient, and equitable food systems. It offers not only technical solutions but also a broader reimagining of humanity's relationship with the Earth. In this respect, agroecology resonates strongly with ethical and theological perspectives that emphasise stewardship, responsibility, and care for creation, while providing a practical framework for addressing the interconnected challenges of the twenty-first century.

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4. Soil and Agroecology

PRIMITIVA ANDREA MBOYERWA

Abstract

Soil forms the foundation of agroecological farming systems and is central to their productivity, resilience, and sustainability. This chapter examines the pivotal role of soil within agroecology, understood both as a scientific discipline and as a social movement that promotes sustainable, resilient, and biodiverse food systems. It explores the principal soil-related functions upon which agroecological practices depend, including soil health and biodiversity, soil fertility, water retention and erosion control, carbon sequestration, reduced soil compaction, nutrient cycling, and the recognition of soil as a living system. Drawing on case studies and success stories from Tanzania, Kenya, and a comparative field trial in Oregon, United States, the chapter demonstrates how locally adapted agroecological soil management practices can improve yields, reduce input costs, and lower greenhouse gas emissions. At the same time, it highlights the persistent gap between agricultural research institutions and small-scale farmers in the dissemination and adoption of agroecological knowledge.

Keywords: soil; agroecology; soil health; soil fertility; carbon sequestration; smallholder farmers; extension services; Tanzania

1. Introduction: Soil, Agroecology, and Its Principles

Soil is the loose, unconsolidated material that covers the Earth's surface. It is a complex mixture of organic matter, minerals, gases, liquids, and living organisms that supports plant growth and sustains terrestrial ecosystems. Soil provides essential ecosystem ser-

vices, including nutrient cycling, water storage and filtration, carbon sequestration, and habitat provision for an immense diversity of organisms.

Agroecology, in turn, is both a scientific discipline and a set of agricultural practices, as well as a social movement. It applies ecological principles to agricultural production systems with the aim of creating sustainable, resilient, and productive farming systems while minimizing dependence on external inputs. Agroecology emphasizes the interconnectedness of environmental, economic, and social dimensions of food systems and promotes farming methods that work in harmony with nature.

Soil occupies a central position within agroecology. As an approach to farming, agroecology integrates ecological principles into agricultural practices to promote sustainable, resilient, and biodiverse food systems. It emphasizes the importance of healthy soils not only for crop production but also for the broader ecosystem services that soils provide, including carbon sequestration, water filtration, nutrient cycling, and biodiversity conservation.

Tanzania illustrates this diversity particularly well. The country's soils vary considerably in both type and fertility, ranging from the fertile volcanic soils of the northern highlands to the sandy and clay-rich soils of the central plateau. This variation shapes both the opportunities and the challenges faced by smallholder farmers across different regions. Sustainable soil management is therefore critical to maintaining agricultural productivity and ensuring long-term food security.

2. The Role of Soil in Agroecology

Soil underpins agroecological farming in several interconnected ways. Each of the dimensions discussed below reflects a distinct function that soil performs within an agroecological system. Together, they demonstrate why soil health is regarded as the foundation rather than merely an outcome of sustainable agricultural practice.

Soil Health and Biodiversity

Soil biodiversity, including microorganisms such as bacteria, fungi, and earthworms, is fundamental to agroecology. These organisms decompose organic matter, cycle nutrients, and contribute to the formation and maintenance of soil structure. By enhancing below-ground biodiversity, agroecological practices create farming systems that are more resilient to pests, diseases, and climate variability. Practices such as crop rotation, cover cropping, and polyculture encourage a diverse soil microbiome and contribute to improved soil health. A biologically active soil supports plant growth through complex interactions between roots and soil organisms, resulting in improved nutrient availability and enhanced ecosystem resilience.

Soil Fertility

Agroecology relies on organic amendments, including compost, manure, mulch, and natural fertilizers, rather than synthetic chemical inputs, to maintain and enhance soil fertility. These practices increase soil organic carbon, improve soil structure, and supply essential nutrients to crops. Whereas conventional farming systems often deplete soil fertility over time through intensive monocropping and excessive reliance on external inputs, agroecological approaches seek to regenerate and sustain fertility. This creates a more durable and environmentally sound farming system. Healthy crops grown on mulched and organically enriched soils often demonstrate improved growth and productivity when compared with crops growing on degraded and nutrient-deficient land.

Water Retention and Erosion Control

Healthy soils possess a greater capacity to retain water, a characteristic that is particularly important in areas affected by drought or irregular rainfall. Agroecological practices such as reduced tillage, cover cropping with legumes, and the use of organic mulches improve soil structure, increase water infiltration, and reduce surface runoff. These measures also help prevent soil erosion, a major cause of land degradation and declining agricultural productivity.

By improving soil cover and stability, agroecology reduces erosion caused by both wind and water through techniques such as mulching, contour farming, terraces, and the use of zai pits or planting basins that capture and concentrate scarce rainfall around plant roots.

Carbon Sequestration

Agroecology places strong emphasis on maintaining and increasing soil organic carbon. Soils represent one of the world's largest carbon sinks and therefore play a vital role in mitigating climate change by capturing and storing atmospheric carbon dioxide. Practices such as agroforestry, cover cropping, compost application, and reduced tillage can substantially increase the amount of carbon stored in soils. Agroforestry systems, for example, combine trees and crops on the same land, generating additional biomass that contributes organic matter and enhances carbon storage both above and below ground.

Reducing Soil Compaction

Conventional farming systems that rely heavily on mechanization often contribute to soil compaction, which restricts root development and reduces water infiltration. Compacted soils also limit oxygen availability and negatively affect soil biological activity. Agroecology promotes practices such as minimum tillage and controlled soil disturbance to preserve soil structure and reduce compaction. By limiting deep ploughing and excessive mechanization, agroecological systems maintain open soil pores, thereby improving water movement, root penetration, and overall soil function.

Nutrient Cycling

Agroecological systems promote closed-loop nutrient cycles in which nutrients are continuously recycled within the farm, reducing dependence on synthetic fertilizers. This is achieved through practices such as composting, mulching, green manuring, and the

integration of livestock into farming systems. The underlying objective is to strengthen interactions between soil organisms, plants, and animals so that nutrients remain within the system. Efficient nutrient cycling minimizes losses, improves fertilizer-use efficiency, and maintains long-term soil fertility.

Soil as a Living System

Agroecology views soil not as an inert growing medium but as a dynamic and living ecosystem. Soil consists of diverse communities of organisms that interact in complex and mutually beneficial ways. These interactions drive decomposition, nutrient release, soil formation, and ecosystem stability. Maintaining the balance of these biological communities through holistic farming practices is essential for sustaining soil fertility, ecosystem health, and agricultural productivity over the long term. A living soil is therefore at the heart of agroecological farming.

3. Key Agroecological Soil Management Practices

Several core practices are commonly found across agroecological systems and form the foundation of sustainable soil management.

Cover Cropping

Cover cropping involves growing legumes, grasses, or brassicas during fallow periods to prevent erosion, improve soil structure, suppress weeds, and enhance nitrogen fixation. Cover crops also contribute organic matter that improves soil fertility and water retention.

Crop Rotation and Polyculture

Crop rotation involves alternating different crops over time, while polyculture involves cultivating multiple crops together within the

same production system. Both practices improve soil health, diversify production, reduce pest and disease pressure, and enhance nutrient cycling.

Reduced Tillage and No-Till Farming

Reduced tillage and no-till farming minimize soil disturbance, helping preserve soil structure and protect soil organisms. These practices conserve moisture, reduce erosion, lower fuel consumption, and enhance carbon sequestration.

Composting

Composting recycles organic materials into nutrient-rich soil amendments. The process improves soil fertility, increases microbial diversity, enhances soil structure, and supports sustainable nutrient management.

Agroforestry

Agroforestry integrates trees into agricultural landscapes to improve soil quality, reduce erosion, increase carbon sequestration, and promote biodiversity. Trees also provide shade, fuelwood, timber, fodder, fruits, and additional sources of income for farming households.

4. Case Studies and Success Stories

Tanzania: Using Locally Available Inputs

In the village of Banyibanyi in Kongwa District, Tanzania, a farmer named Emmanuel improved productivity on his half-hectare farm by relying on inputs that were already available locally. His approach involved the use of organic pesticides and tea manure, providing an alternative to the costly inorganic inputs on which he had previously depended. The outcome was a productive and thriving farm that generated higher yields at significantly lower cost.

This example demonstrates how agroecological methods can outperform more expensive conventional approaches under small-holder farming conditions.¹

Kenya: Bokashi, Super Magro, and Ash Brew

In Kenya, a range of farmer-led soil restoration practices has centred on the use of bokashi, Super Magro, and ash brew. Bokashi is a method of converting food waste and other organic materials into a nutrient-rich soil amendment that improves soil fertility and structure. Super Magro is an organic biofertilizer produced through the decomposition of plant and animal materials combined with other nutrient sources. Together with ash brew, these low-cost amendments provide farmers with practical tools for restoring degraded soils using resources that are largely produced on the farm itself rather than purchased externally.²

Comparative Field Trial: USDA-ARS, Oregon, United States

A further example comes from research conducted by the United States Department of Agriculture's Agricultural Research Service (USDA-ARS) in Oregon. Researchers compared greenhouse gas emissions from two cropping systems: a mixed clover-wheat system and a wheat monoculture. Soil-based greenhouse gas samples were collected using chambers installed in each plot. The study found lower greenhouse gas emissions in the mixed cropping system, alongside reduced nitrogen fertilizer requirements. These findings suggest that crop diversification can generate significant environmental benefits and reinforce a core principle of agroecology: that greater biodiversity within agricultural systems can improve ecological performance while reducing reliance on external inputs.³

These examples demonstrate that agroecological soil management is effective across diverse ecological, economic, and institutional contexts. Whether implemented through farmer innovation or scientific experimentation, agroecological approaches contribute to improved soil health, reduced dependence on external inputs, and enhanced environmental sustainability.

5. Challenges and Opportunities

Despite growing recognition of the benefits of agroecology, several challenges continue to limit its widespread adoption. One major constraint is the gap between agricultural research institutions and smallholder farmers. Valuable research findings and innovations often fail to reach farming communities due to weak extension services, limited resources, and inadequate knowledge dissemination mechanisms.

In addition, some farmers face difficulties adopting agroecological practices because of labour requirements, limited access to training, and short-term economic pressures. Agricultural policies in many countries continue to favour conventional input-intensive systems, creating barriers to the expansion of agroecological alternatives.

Nonetheless, important opportunities exist. Increasing concern about climate change, soil degradation, biodiversity loss, and food insecurity has stimulated growing interest in sustainable farming approaches. Strengthening farmer-to-farmer learning networks, participatory research, extension services, and supportive agricultural policies can facilitate broader adoption of agroecological soil management practices.

Investment in farmer education, locally adapted technologies, and collaborative research will be critical for building resilient agricultural systems capable of meeting future food security challenges.

6. Conclusion

Soil is the cornerstone of agroecology. By adopting farming practices that work with, rather than against, the natural biological, chemical, and physical processes of the soil, agroecology helps maintain healthy, fertile, and resilient soils. These practices not only improve agricultural productivity but also enhance ecosystem health, strengthen climate resilience, and contribute to the broader goal of sustainable food systems.

The case studies from Tanzania and Kenya, together with evidence from scientific research in the United States, demonstrate that agroecological soil management can generate substantial environmental, economic, and social benefits. Through the enhancement of soil biodiversity, nutrient cycling, carbon sequestration, water retention, and ecological resilience, agroecology provides practical pathways towards sustainable agricultural development.

Healthy soils are therefore both the foundation and the enduring legacy of agroecological farming. Ensuring their protection and restoration will be essential for achieving food security, environmental sustainability, and rural livelihoods for future generations.

Endnotes

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5. Agriculture and Climate Change in Africa: Vulnerabilities, Structural Challenges, and Pathways toward Resilience

URSULA GRÖHN-WITTERN

Abstract

Agriculture remains a cornerstone of African economies and livelihoods, yet it is increasingly threatened by climate change, environmental degradation, demographic pressures, and persistent structural inequalities. This chapter examines the vulnerability of African agriculture within a broader socio-ecological context, arguing that environmental challenges cannot be understood solely as technical problems but must also be linked to historical legacies, unequal economic structures, and policy constraints. Drawing on development research and experiences from across the African continent, the chapter demonstrates that resilience requires more than technological adaptation alone. Sustainable agricultural futures depend on integrated approaches that combine ecological restoration, agroecological practices, institutional reform, social justice, and meaningful community participation. Such approaches are essential for strengthening adaptive capacity, enhancing food security, and promoting long-term environmental and socio-economic sustainability.

Keywords: Africa; climate change; agriculture; resilience; food security; adaptation; agroecology; sustainability; environmental justice; rural development.

1. Introduction

Agriculture occupies a central and multifaceted role in African societies. Beyond its contribution to national economies, it provides livelihoods, food security, cultural identity, and social stability for millions of households. Approximately sixty per cent of Africa's population depends directly or indirectly on agriculture for income and subsistence.¹ In many countries, smallholder farmers produce the majority of domestically consumed food while sustaining rural economies and local communities.

Despite its importance, African agriculture faces unprecedented challenges. Climate change, environmental degradation, biodiversity loss, water scarcity, demographic pressures, and persistent structural inequalities are placing increasing strain on agricultural systems.² These pressures interact with long-standing development challenges, including inadequate infrastructure, limited market access, land fragmentation, policy inconsistencies, and unequal integration into global economic systems.

The combined effect is increasing vulnerability across agricultural systems, threatening both productivity and rural livelihoods. Droughts, floods, pest outbreaks, and increasingly unpredictable rainfall patterns are disrupting food production across the continent with growing frequency and severity. Communities that have historically relied on relatively stable environmental conditions are now confronted with heightened uncertainty and risk.³ Yet vulnerability is not evenly distributed. Some communities possess greater resources, stronger institutions, more secure land tenure arrangements, and more effective adaptation strategies than others. Understanding the future of African agriculture therefore requires moving beyond purely environmental explanations to examine the broader social, economic, political, and historical factors that shape resilience and vulnerability.

This chapter argues that climate change acts as a threat multiplier, intensifying existing inequalities, exacerbating social and economic vulnerabilities, and exposing structural weaknesses within agricultural systems.⁴ It further argues that sustainable agricultural futures cannot be achieved through technological adaptation alone.

Rather, resilience depends upon integrated approaches that combine ecological restoration, agroecological innovation, institutional reform, social justice, and community participation. Only by addressing both environmental pressures and their underlying structural drivers can African agriculture build the adaptive capacity necessary to meet the challenges of the twenty-first century.

2. Climate Change and African Agricultural Systems

Agricultural production across much of Africa remains highly dependent on climatic conditions. Unlike highly industrialised agricultural systems that rely extensively on irrigation, mechanisation, and external technological inputs, much of African agriculture continues to depend primarily on seasonal rainfall. This dependence makes agricultural production particularly sensitive to climate variability and climatic extremes. Even relatively small changes in rainfall patterns, temperature regimes, or seasonal timing can have significant consequences for crop yields, livestock productivity, and rural livelihoods.

Across the continent, farmers increasingly report:

- delayed onset of seasonal rainfall,
- shorter growing seasons,
- prolonged and more frequent droughts,
- intense rainfall events,
- increased flooding, and
- growing pest and disease pressures.⁵

These observations are corroborated by scientific evidence documenting significant shifts in climatic patterns across many African regions. Rising temperatures, changing precipitation regimes, and increasing weather variability are already affecting agricultural productivity and are projected to intensify throughout the twenty-first century. The impacts are particularly severe in rain-fed farming systems, where limited access to irrigation and climate-resilient technologies constrains adaptive capacity.

The consequences extend far beyond the agricultural sector itself. Reduced agricultural productivity affects household incomes, food availability, nutritional outcomes, educational opportunities, and overall community well-being. In many African countries, where agriculture remains a major source of employment and economic activity, agricultural shocks often generate broader economic disruptions that extend to local markets, public finances, and national development trajectories.

Climate change should therefore be understood not merely as an environmental challenge but as a multidimensional development issue with profound economic, social, and political implications. Its effects reinforce existing vulnerabilities and threaten progress towards poverty reduction, food security, and sustainable development. Understanding these impacts requires consideration not only of physical environmental changes but also of the social and institutional contexts within which agricultural production takes place.

3. Historical Legacies and Structural Vulnerabilities

Contemporary agricultural vulnerabilities in Africa cannot be fully understood without examining their historical origins. The agricultural systems found across much of the continent today have been shaped by centuries of social, political, and economic transformation, including the profound influence of colonial rule.

Colonial administrations frequently prioritised export-oriented production systems designed to supply external markets with cash crops such as cocoa, coffee, cotton, tea, and groundnuts. In many regions, indigenous farming systems and local food production were marginalised in favour of agricultural models that served imperial economic interests. Land allocation policies, taxation systems, labour arrangements, and infrastructure investments were often structured to facilitate resource extraction rather than local development.⁶

The consequences of these historical processes continue to influence agricultural development across the continent. Many countries inherited patterns of unequal land distribution, dependence on commodity exports, limited economic diversification, and insufficient investment in domestic food systems. Such structural conditions have often persisted beyond independence, shaping contemporary agricultural policies and development trajectories.

These historical legacies continue to shape present-day vulnerabilities and constrain adaptive capacity. Dependence on a narrow range of export commodities can expose economies to market volatility, while unequal access to land and resources limits opportunities for many rural households. Inadequate infrastructure, weak extension services, and limited investment in agricultural research further reduce the ability of farming systems to respond effectively to environmental change.

Climate change therefore does not operate in isolation. Rather, it interacts with pre-existing structural inequalities and institutional weaknesses, magnifying their effects and exposing underlying vulnerabilities. Droughts, floods, and other climatic shocks often affect populations that are already disadvantaged by poverty, insecure land tenure, limited access to financial services, or inadequate public support. Vulnerability is thus produced through the interaction of environmental hazards and social conditions.

Recognising these structural dimensions is essential for developing effective adaptation strategies. Efforts to strengthen resilience must address not only climatic risks but also the broader political and economic factors that shape exposure, sensitivity, and adaptive capacity. Sustainable agricultural transformation therefore requires both environmental adaptation and structural reform.

4. Food Security and the Challenge of Rural Poverty

Food security remains one of the most pressing development challenges facing many African countries. Despite substantial agricul-

tural potential and significant improvements in some regions, millions of people continue to experience chronic food insecurity, undernutrition, and vulnerability to food system shocks.⁷

Several interconnected factors contribute to this persistent challenge.

Low Agricultural Productivity

Many smallholder farmers continue to face constraints that limit productivity. Access to improved seeds, agricultural extension services, credit, irrigation infrastructure, agricultural technologies, and reliable markets remains inadequate in many rural areas.⁸ These limitations reduce productivity and constrain opportunities for agricultural investment and innovation.

Environmental Degradation

Declining soil fertility, soil erosion, deforestation, and land degradation reduce agricultural productivity and undermine long-term sustainability. As natural resources become depleted, farmers often face declining yields and increasing production risks.

Market Instability

Price volatility, poor transportation infrastructure, weak market integration, and fluctuating input costs undermine household income security. Smallholder farmers frequently encounter difficulties accessing profitable markets and receiving fair prices for their produce.

Climate Variability

Droughts, floods, heatwaves, and irregular rainfall patterns increasingly disrupt agricultural production. Climatic shocks not only reduce harvests but also increase uncertainty, making long-term planning more difficult for farming households.

Dependence on External Commercial Inputs

Many agricultural systems have become increasingly dependent on commercial hybrid seeds, synthetic fertilisers, and other purchased inputs. While such inputs can increase yields under certain conditions, they also expose farmers to rising costs and market fluctuations. In some contexts, excessive dependence on external inputs may contribute to declining soil health and increased economic vulnerability.

Policy and Governance Challenges

Agricultural policies do not always prioritise food security and the needs of smallholder farmers. In some cases, policy frameworks continue to favour export-oriented production systems and integration into global commodity markets, sometimes at the expense of local food systems and rural development objectives.

Together, these factors create reinforcing cycles of ecological, economic, and social vulnerability that are often difficult to break. Reduced productivity contributes to lower incomes, limiting farmers' ability to invest in improved practices, which in turn perpetuates poverty and environmental degradation.

Food insecurity in this context cannot be viewed as a purely agricultural problem. Rather, it reflects the interaction of environmental pressures, economic constraints, social inequalities, and institutional conditions. Addressing food insecurity therefore requires integrated approaches that combine agricultural development, poverty reduction, environmental sustainability, social protection, and inclusive governance. Such approaches are essential for building resilient food systems capable of supporting both present and future generations.

5. Environmental Degradation and Ecological Decline

Climate change is not the only environmental challenge confronting African agriculture. Across many regions, agricultural systems are

simultaneously affected by deforestation, soil erosion, biodiversity loss, declining water availability, desertification, and land degradation. These environmental pressures often interact with one another, amplifying their impacts and deepening agricultural vulnerability.⁹ The cumulative effect is the gradual weakening of the ecological foundations upon which agricultural production depends.

Deforestation provides a particularly clear example of these interconnected environmental pressures. Forest ecosystems perform numerous ecological functions that support agriculture, including regulating water cycles, protecting soils, conserving biodiversity, and storing carbon. When forests are cleared for agricultural expansion, fuelwood, or commercial extraction, these ecosystem services are diminished. The resulting loss of vegetation cover frequently leads to increased soil erosion, reduced water retention, and greater susceptibility to drought and flooding.

Soil degradation represents another major challenge. Healthy soils provide essential nutrients, support biological activity, store water, and contribute to crop productivity. However, continuous cultivation, overgrazing, deforestation, and unsustainable land-management practices can deplete soil fertility and accelerate erosion. As soils lose their productive capacity, farmers often face declining yields and increasing reliance on external inputs, further exacerbating economic and environmental pressures.

Biodiversity loss also poses significant risks to agricultural resilience. Diverse ecosystems support pollination, natural pest control, nutrient cycling, and genetic resources that are essential for adaptation to changing environmental conditions. The simplification of agricultural landscapes and the degradation of natural habitats reduce these ecological functions and increase vulnerability to climatic and biological shocks.

Similarly, growing water scarcity is becoming a critical concern in many parts of Africa. Population growth, increasing demand for water, environmental degradation, and climatic changes are placing mounting pressure on water resources. Reduced water availability affects both crop production and livestock systems, while also increasing competition among agricultural, domestic, and industrial users.

Environmental sustainability should therefore be recognised as a fundamental prerequisite for long-term agricultural resilience and food security. Without the restoration and protection of ecological systems, productivity gains are likely to remain temporary and increasingly vulnerable to future environmental shocks. Sustainable agricultural development must therefore be rooted in the conservation and regeneration of the natural resource base upon which farming ultimately depends.

6. Building Agricultural Resilience

Resilience may be defined as the capacity of individuals, communities, institutions, and socio-ecological systems to anticipate, absorb, adapt to, and recover from shocks and stresses while maintaining essential functions and pursuing sustainable development. Within agriculture, resilience involves strengthening the ability of farming systems to cope with climatic variability and environmental change while sustaining productivity, livelihoods, and ecological integrity.

A number of approaches have emerged as particularly important for building resilience in African agricultural systems.

Agroecology

Agroecological approaches seek to work with natural ecological processes rather than against them. By enhancing biodiversity, improving soil health, promoting nutrient cycling, and reducing dependence on external inputs, agroecology strengthens both environmental sustainability and adaptive capacity. Agroecological practices frequently include crop diversification, intercropping, composting, agroforestry, mulching, and biological pest management. These approaches can improve resilience while supporting food security and rural livelihoods.

Agroforestry

The integration of trees into agricultural systems offers multiple benefits. Trees improve soil fertility, enhance water infiltration, reduce erosion, sequester carbon, and provide additional sources of food, fuel, fodder, and income. Agroforestry systems are often more resilient to climatic variability than simplified monoculture systems because they diversify production and strengthen ecological functions.¹⁰

Climate-Smart Agriculture

Climate-smart agriculture encompasses a range of practices designed to achieve three interconnected objectives: increasing agricultural productivity, strengthening adaptation to climate change, and reducing greenhouse-gas emissions where possible. Such practices may include improved crop varieties, conservation agriculture, efficient water management, and climate-informed farm planning.

Sustainable Water Management

Given the growing importance of water scarcity, effective water management is critical for agricultural resilience. Rainwater harvesting, irrigation improvements, watershed conservation, groundwater recharge, and water-efficient farming practices can help reduce vulnerability to drought and improve the reliability of agricultural production.

Indigenous and Local Knowledge

Indigenous and local knowledge systems represent valuable resources for adaptation and innovation. Many farming communities possess extensive experience in managing climatic variability, conserving natural resources, and maintaining productive landscapes under challenging environmental conditions. Local knowledge often complements scientific understanding and can contribute substantially to the design of context-specific adaptation strategies.

Diversification and Risk Reduction

Diversification is one of the most effective strategies for reducing agricultural risk. Farmers who cultivate multiple crops, integrate livestock production, or engage in complementary income-generating activities are often better able to withstand environmental and economic shocks. Diversification spreads risk and reduces dependence on any single crop, market, or source of income.

The most sustainable pathways forward are those that integrate technological innovation, scientific research, and community-based knowledge systems. Resilience emerges most effectively when farmers, researchers, governments, and civil society organisations collaborate in developing locally appropriate solutions that address both environmental and social challenges.

7. Institutions, Policy, and Transformation

Resilience cannot be achieved through farm-level interventions alone; it also requires supportive institutions, effective governance, and coherent policy frameworks. While farmers play a central role in adaptation and innovation, the broader institutional environment strongly influences their ability to respond to environmental change and pursue sustainable livelihoods.

Governments have critical responsibilities in supporting agricultural transformation through:

- infrastructure development,
- investment in agricultural research and innovation,
- provision of climate information services,
- agricultural extension programmes,
- market regulation and oversight,
- access to finance and insurance,
- land-tenure security, and
- enforcement of environmental protection measures.

These functions are essential for enabling farmers to improve productivity, adopt sustainable practices, and strengthen resilience. Agricultural transformation is therefore not solely a matter of individual decision-making but also of institutional support and public investment.

Regional and international cooperation is equally important. Many environmental challenges—including climate change, water management, pest outbreaks, and biodiversity conservation—transcend national boundaries and require coordinated responses. Collaboration among governments, research institutions, development organisations, and regional bodies can facilitate knowledge sharing, resource mobilisation, technological innovation, and policy harmonisation.

Effective policy frameworks must integrate climate adaptation, food security, environmental conservation, and rural development into coherent and mutually reinforcing strategies. Fragmented policy approaches are often ill-equipped to address the complex and interconnected challenges confronting agricultural systems. Policies that focus exclusively on productivity growth, for example, may overlook environmental sustainability or social equity, thereby creating new vulnerabilities over time.

In this context, resilience should be understood not only as a technical objective but also as a political and institutional one. Long-term transformation depends upon governance capacity, policy coherence, democratic participation, and sustained commitment to sustainable development goals. Institutions that are transparent, accountable, and responsive to local needs are better positioned to support resilient and inclusive agricultural development.

8. Toward Sustainable and Just Agricultural Futures

The future of African agriculture depends not only on increasing productivity but also on strengthening sustainability, equity, and resilience. Meeting the challenges of the twenty-first century re-

quires moving beyond narrowly economic conceptions of agricultural development towards approaches that recognise the interconnected nature of environmental, social, and economic systems.

A just and sustainable agricultural future requires ecological restoration, sustainable land management, farmer participation, gender equity, youth engagement, fair market access, and supportive public policy.¹¹ It also requires recognising farmers not merely as beneficiaries of development initiatives but as active agents of innovation, adaptation, and transformation.

Smallholder farmers in particular possess extensive knowledge derived from long-term interactions with local environments. Their understanding of soils, crops, weather patterns, water resources, and ecological relationships often represents a valuable resource for sustainable development. When combined with scientific research and technological innovation, this knowledge can contribute significantly to resilience, productivity, and environmental sustainability.¹²

Inclusive agricultural futures must also address structural inequalities that affect women, young people, Indigenous communities, and socially marginalised groups. Across many African societies, women play central roles in food production, processing, and household nutrition, yet they frequently face barriers to land ownership, credit, training, and decision-making processes. Similarly, young people often encounter limited opportunities in rural areas despite their potential contributions to agricultural innovation and economic development.

Equity is not only a moral imperative but also a practical prerequisite for resilient and sustainable agricultural systems. Societies that exclude significant portions of their populations from access to resources, opportunities, and decision-making processes are less capable of responding effectively to environmental and economic challenges. Ultimately, sustainable agriculture requires a fundamental shift from short-term production goals towards long-term ecological stewardship, social inclusion, and economic resilience. Such a transition is essential not only for safeguarding food security but also for securing broader development objectives and enhancing human well-being.

9. Conclusion

African agriculture stands at a critical crossroads. Climate change, environmental degradation, biodiversity loss, water scarcity, and persistent structural inequalities pose significant challenges to food security, rural livelihoods, and sustainable development. Yet these challenges also create opportunities for innovation, transformation, and renewal.

This chapter has demonstrated that agricultural vulnerability in Africa cannot be explained solely in environmental terms. Rather, it is shaped by the interaction of ecological pressures, historical legacies, socio-economic inequalities, and institutional conditions. Climate change acts as a threat multiplier, intensifying existing vulnerabilities and exposing structural weaknesses within agricultural systems.

Building resilient agricultural systems requires more than technological adaptation alone. It demands ecological restoration, agro-ecological innovation, institutional reform, social inclusion, equitable development, and meaningful community participation. Successful adaptation depends on recognising the interdependence of environmental sustainability, economic opportunity, and social justice.

The future of African agriculture will be determined not only by the ability to increase agricultural productivity but also by the capacity to strengthen resilience, protect ecosystems, and create more equitable and sustainable food systems. Farmers, communities, governments, researchers, and international partners all have important roles to play in this process.

To a significant extent, the future sustainability and habitability of the planet are linked to the success of agricultural transformation in Africa. Strengthening resilience and promoting sustainable agricultural systems are therefore not merely regional priorities but global responsibilities. The choices made today will shape the capacity of future generations to secure food, sustain livelihoods, and thrive within the ecological limits of a changing world.

Building resilient agricultural systems requires more than technological adaptation. It demands ecological restoration, institutional reform, social justice, and active community participation. Sustainable agriculture must therefore be understood not only as a means of food production but as a foundation for human well-being and environmental stewardship. The future habitability of the Earth is closely linked to the future of African agriculture. Strengthening resilience and promoting sustainable agricultural systems are therefore not merely regional priorities but global responsibilities.

Endnotes

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6. Subsistence Farming and Food Security: Experiences from Agricultural Projects in Tanzania

SABINE WINKLER

Abstract

Nearly two decades of field experience in Tanzania inform a practitioner's perspective on subsistence farming and food security. Based on the author's work as an agricultural project consultant with the Pare and Mwanga Dioceses between 2006 and 2024, it offers a first-hand account of the opportunities and challenges facing smallholder farmers in rural Tanzania. Particular attention is given to the interconnected issues of land tenure insecurity, limited agricultural knowledge and extension services, climate variability, water scarcity and irrigation, market access, and constrained financial resources. The chapter combines personal observations with practical examples from development initiatives implemented in collaboration with local communities. These include irrigation projects designed to enhance resilience to drought, the promotion of agroecological approaches that reduce dependence on costly external inputs, and a long-running Grain Amaranth nutrition project on the Pare Diocese farm that has sought to improve both household nutrition and livelihood security. Through these experiences, the chapter illustrates how locally adapted, community-based interventions can contribute to food security, strengthen resilience, and support sustainable rural development in the face of growing environmental and socio-economic challenges.

Keywords: subsistence farming; food security; smallholder farmers; Tanzania; irrigation; land tenure; agroecology; Grain Amaranth; rural development; Pare Diocese

1. Introduction

This chapter draws on my professional background in agriculture and economics and on nearly two decades of development work in Tanzania. Before moving to Tanzania in 2006, I spent sixteen years managing a church administrative office. I initially worked in Njombe, in southern Tanzania, where I served as a treasurer for four years. Thereafter, I moved to the Kilimanjaro Region and began working as a project consultant for the Pare Diocese.

From 2017 to 2019, I served as a project consultant for the Evangelical Lutheran Church in the Democratic Republic of Congo. Following this assignment, I returned to northern Tanzania and resumed my work with the Pare and Mwanga Dioceses, which became separate dioceses in 2016. Although officially retired since 2021, I continue to support both dioceses on a voluntary basis. Over the course of my work, I designed, supported, monitored, and evaluated numerous projects in the fields of education, health, agriculture, nutrition, water supply, and environmental conservation. Most of these initiatives aimed to improve household food security, strengthen rural livelihoods, and enhance the resilience of smallholder farming systems.

Capacity building and knowledge transfer formed a central component of this work. I therefore conducted a wide range of training seminars and workshops covering project planning and sustainability, nutrition and food security, bio-intensive agriculture, agricultural marketing strategies, and the introduction of appropriate technologies, including the construction and operation of biogas plants. These experiences provided valuable insights into both the challenges and the opportunities facing smallholder farmers in Tanzania. The observations presented in this chapter are therefore grounded in long-term practical engagement with rural communities and agricultural development projects.

2. Agriculture in Tanzania: Some Facts

Tanzania covers an area of approximately 947,300 square kilometres and remains predominantly an agricultural country. Agriculture is the backbone of the national economy and the principal source of livelihood for much of the population. More than 80 per cent of Tanzanians depend directly or indirectly on agriculture for income, employment, and food security. The sector is dominated by smallholder farmers, who cultivate approximately 95 per cent of the country's agricultural land on farms typically ranging from 0.9 to 3 hectares in size.

The principal food crops grown in Tanzania include maize, rice, cassava, sweet potatoes, pulses, bananas, vegetables, sugar cane, and oilseed crops such as sunflower and oil palm. These crops are fundamental to national food security and household nutrition. Increasing domestic production of food crops remains important for reducing dependence on imports and improving rural livelihoods.

Tanzania is also a significant producer of export crops, particularly coffee, tea, sisal, cashew nuts, fruits, vegetables, and cut flowers. These commodities generate valuable foreign exchange earnings and contribute significantly to the national economy. However, dependence on international commodity markets also exposes farmers and the broader economy to fluctuations in global prices and demand. Smallholder farming remains the dominant production system throughout the country, and subsistence agriculture continues to characterise many rural areas. Despite the sector's importance, agricultural productivity remains relatively low in many regions as a result of limited access to irrigation, agricultural inputs, extension services, finance, infrastructure, and reliable markets.

In response to these challenges, the Tanzanian government launched the **Kilimo Kwanza** ("Agriculture First") initiative in 2009. The programme sought to accelerate the transformation of agriculture from a predominantly subsistence-based activity into a modern and commercially oriented sector. Its objectives included improving productivity, encouraging private-sector investment,

strengthening agricultural value chains, and creating closer partnerships between government institutions, farming communities, and agricultural enterprises.

Nevertheless, the transition towards commercial agriculture has remained uneven. While some farmers have successfully increased production and market participation, many smallholders continue to face significant constraints related to land access, water availability, finance, technology, and market integration. These challenges are further compounded by climate variability, environmental degradation, and rapid population growth.

Tanzania's population increases by approximately 1.8 million people each year, creating growing demand for food, water, energy, housing, and employment. This demographic growth places increasing pressure on agricultural land and natural resources. Ensuring food security for a growing population while maintaining environmental sustainability therefore remains one of the country's most pressing development challenges.

3. Listening to Smallholder Farmers: Five Key Challenges

Through the many seminars and training programmes I facilitated over the years, I engaged with a wide range of smallholder farmers and gained valuable insight into their livelihoods, agricultural practices, and daily challenges. Together with Dr. Brighton Katabaro, I also conducted numerous interviews with farmers from different regions of Tanzania. These conversations provided opportunities to learn about how farming households secure their livelihoods, the constraints they face, and their own ideas and aspirations for strengthening agriculture and improving food security.

The challenges most frequently identified by farmers can be grouped into five interrelated themes:

- Availability of agricultural land and secure land ownership;

- Limited knowledge of modern and alternative farming methods;
- Dependence on rainfall and inadequate irrigation systems;
- Restricted access to markets; and
- Limited access to financial services and credit.

Availability of Agricultural Land and Secure Land Ownership

Access to land remains one of the most important concerns for many smallholder farmers. Historically, land allocation was managed within village communities and often based on customary rights passed down through families. Although such systems continue to play an important role, they have not always ensured equal access to land. In particular, customary practices have frequently limited women's ability to acquire, inherit, or dispose of land independently, despite formal legal provisions guaranteeing equality.

To address these challenges, the Tanzanian government enacted the Village Land Act in 1999. The legislation sought to strengthen land tenure security by enabling rural households to obtain recognised land-use rights that could be documented and transferred to future generations. However, implementation proved challenging, prompting the government to introduce the Strategic Plan for the Implementation of the Land Acts in 2006.

Secure land tenure remains a central pillar of the Kilimo Kwanza ("Agriculture First") strategy aimed at modernising Tanzania's agricultural sector. Despite these efforts, surveying and registering land—particularly small plots cultivated by smallholder farmers—often remains expensive and inaccessible. As agricultural investment increases, securing farmers' land rights becomes ever more important. Secure tenure not only protects farmers from potential displacement but also encourages long-term investment in soil conservation, irrigation infrastructure, and sustainable land management. In addition, formal land titles can provide access to credit, enabling farmers to invest in improved production and increase their yields.

Limited Knowledge of Modern and Alternative Farming Methods

Tanzania's agricultural extension system relies on village-based extension officers, commonly known as *bwana shamba*, who are responsible for providing advice and training to farmers. However, many farmers regard these services as inadequate. Regular field visits are often infrequent, practical support is limited, and some extension officers lack training in newer agricultural approaches, agroecological methods, and emerging technologies.

As a result, many farmers continue to have limited access to reliable and up-to-date information. Traditional extension systems are frequently overstretched, leaving farmers without sufficient guidance to address changing environmental conditions, declining soil fertility, and evolving market demands.

The issue of seeds illustrates these challenges particularly clearly. In the past, many farmers saved seed from their own harvests. Although local varieties often produced lower yields, they were generally well adapted to local environmental conditions and formed an important part of agricultural biodiversity. In recent decades, commercial seed companies have expanded their presence in Tanzania, promoting improved and hybrid varieties designed to increase productivity under specific conditions.

However, purchasing decisions are often made without adequate guidance regarding soil conditions, rainfall patterns, or local growing environments. Moreover, rising seed prices are frequently accompanied by increased reliance on chemical fertilisers and pesticides, creating additional financial burdens for smallholder farmers. Where these inputs are used without appropriate soil-management practices, soil degradation and erosion may become more severe over time.

For these reasons, organisations such as the Tanzania Organic Agriculture Movement have advocated reforms to seed regulations, arguing that current frameworks often favour commercial seed suppliers while placing local seed systems at a disadvantage. They also emphasise the importance of preserving seed diversity and strengthening farmer-managed seed systems. As one researcher

from Sokoine University of Agriculture has argued, sustainable increases in productivity can be achieved not only through imported hybrids but also through the continued improvement and conservation of indigenous seed varieties.

During my work in Tanzania, I became acquainted with several NGOs that seek to address these challenges through practical training, demonstration farms, and farmer-to-farmer learning. These organisations play an important role in complementing public extension services and promoting sustainable agricultural practices. Their focus extends beyond increasing yields to include environmental stewardship, soil health, and long-term resilience.

Among the approaches promoted are Bio-Intensive Agriculture (BIA) and agroecology. Bio-Intensive Agriculture is a form of organic farming that focuses on maintaining soil fertility and nurturing living soils. It seeks to balance soil organisms, nutrients, and plants while using crop rotation, composting, and intensive planting methods to maximise productivity in an environmentally sustainable manner.

Agroecology similarly promotes farming systems that work in harmony with natural ecological processes. By emphasising biodiversity, soil health, local knowledge, and reduced dependence on external inputs, agroecology offers pathways towards more resilient and sustainable food systems.

I have worked closely with several organisations promoting these approaches, including Sustainable Agriculture Tanzania (SAT), with whom we have collaborated on a project to modernise livestock management among Maasai communities in Ruvu. We have also maintained close cooperation with ECHO in Arusha and with a Dutch development organisation, both of which provide valuable training opportunities for farmers and agricultural practitioners.

Another concern frequently raised during my fieldwork is the continuing deforestation of mountain areas in order to create additional agricultural land. Such practices often accelerate soil erosion, particularly where cultivation takes place on steep slopes without the construction of terraces or other conservation measures. Continued deforestation not only degrades local ecosystems but also undermines long-term agricultural productivity by reducing water

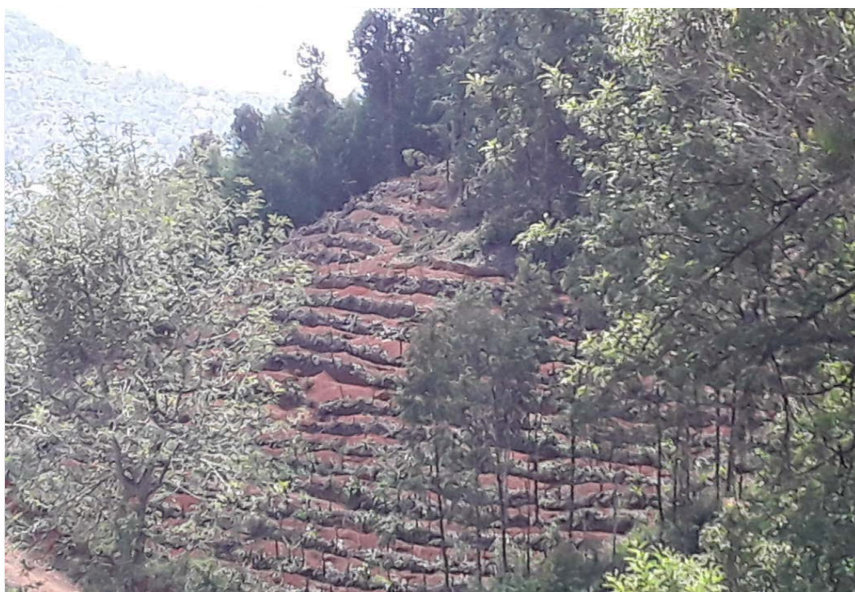
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retention, biodiversity, and ecosystem resilience. In my view, stronger regulation and more effective enforcement by agricultural and environmental authorities are needed to address this challenge.

Figure 1. Agricultural land cleared on a steep slope without erosion-control structures such as terraces. The exposed soil surface and remaining plant debris increase vulnerability to surface run-off, soil erosion, and long-term loss of soil fertility. Photo: Sabine Winkler.



Figure 2. Severe soil erosion on a slope in the South Pare Mountains following deforestation for agricultural expansion. The loss of vegetation cover has increased surface run-off, contributing to gully formation, soil degradation, and declining land productivity. Photo: Sabine Winkler.



Dependence on Rainfall and the Variety of Irrigation Methods

Extreme weather events, particularly droughts and water shortages, have become increasingly common in recent years. As rainfall patterns grow more erratic and less predictable, reliance on rain-fed agriculture poses significant risks for smallholder farmers. Crop production increasingly depends not only on the total amount of rainfall received but also on its timing and distribution throughout the growing season.

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Many smallholder farms lack access to reliable irrigation infrastructure. During the particularly dry years of 2021 and 2022, numerous farmers were unable to cultivate parts of their land or experienced severe reductions in crop yields. Such conditions have serious implications for household food security and rural livelihoods, highlighting the urgent need for improved water-management strategies.

Irrigation therefore plays a crucial role in strengthening agricultural resilience and reducing vulnerability to climate variability. Figures 5–8 illustrate several irrigation systems commonly found within the Pare and Mwanga Dioceses. The most widespread method is a gravity-fed canal system that diverts water from springs and streams in the mountains to agricultural fields located on the slopes and surrounding plains. These traditional canal networks have supported farming communities for generations and continue to provide an important source of water during periods of limited rainfall.

However, growing pressure on water resources, combined with increasing climatic variability, is creating new challenges for the maintenance and sustainability of these irrigation systems. Strengthening water management and expanding access to efficient irrigation technologies will therefore be essential for ensuring future agricultural productivity and food security in the region.

Figure 3. Farmland near Same, Tanzania, photographed in 2022 following a prolonged drought. The poor vegetation cover and limited crop growth illustrate the vulnerability of rain-fed agriculture to rainfall variability and climate change. Photo: Sabine Winkler.



Figure 4. Drought-cracked soil on the Maasai plains near Ruvu, Tanzania, illustrating the severe effects of prolonged dry conditions on rangelands and agricultural production. Photo: Sabine Winkler.

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Figure 5. Gravity-fed irrigation canal on the Pare Diocese farm. Water diverted from mountain springs is distributed to surrounding agricultural fields, helping farmers maintain production during periods of limited or unreliable rainfall. Photo: Sabine Winkler.



In many areas, the operation and maintenance of these irrigation systems are overseen by village water committees. These committees are responsible for allocating water among farmers, monitoring its distribution, and ensuring the maintenance of canals and related infrastructure. Farmers typically pay an annual contribution based on the size of their holdings to support these activities.

In recent years, particularly in Maasai pastoral areas, farmers have increasingly invested in wells and boreholes as alternative water sources. Water extracted from these sources is pumped through channels or pipelines to surrounding fields, enabling cultivation even where rainfall is unreliable and surface water is scarce. Such investments have become increasingly important as communities seek to adapt to growing climate variability and recurrent drought conditions.

Figure 6. Hand-dug well equipped with a motor pump for irrigation in the Maasai area of Ruvu. Groundwater extracted from the well provides an alternative water source for crop production during periods of low or unpredictable rainfall. Photo: Sabine Winkler.



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Figure 7. Well water being pumped through irrigation channels onto a cultivated field in Ruvu. This system enables agricultural production during periods of low rainfall and reduces dependence on rain-fed cultivation. Photo: Sabine Winkler.



In the South Pare Mountains lies one of Tanzania's major ginger-producing areas. Irrigation in this region is carried out primarily

through sprinkler systems, as ginger cultivation requires substantial amounts of water throughout the growing season.

As water demand increases, conflicts over access to irrigation water have become more common, particularly during years of below-average rainfall. In some cases, large amounts of water are diverted through pipes to sprinkler systems, reducing the flow available to farmers who depend on traditional canal-based irrigation. These tensions highlight the growing competition for scarce water resources and the challenges of managing irrigation equitably under conditions of increasing climate variability.

Another irrigation method that is becoming more widespread is drip irrigation. In my view, this technology will continue to gain importance because it delivers water directly to plant roots, reduces water losses through evaporation, and uses available water more efficiently than many conventional irrigation systems. In regions facing increasing water scarcity, drip irrigation may offer an important pathway towards more sustainable and climate-resilient agricultural production.

As droughts become more frequent and rainfall patterns increasingly unreliable, access to irrigation is becoming ever more important for agricultural resilience. Yet for many smallholder farmers, the cost of investing in pumps, pipes, storage facilities, and other irrigation infrastructure remains prohibitively high. Expanding access to affordable finance and appropriate irrigation technologies will therefore be essential for strengthening food security and adaptation to climate change.

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Figure 8. Drip-irrigation system on a church farm in Kimbeimbe, Democratic Republic of the Congo. This example illustrates a water-saving technology that offers valuable inspiration for strengthening climate resilience and improving water-use efficiency among smallholder farmers. Photo: Hubert Metzger.



3.4 Limitations in Access to Markets

Access to markets remains one of the most significant challenges facing smallholder farmers. Because most farming households first retain part of their harvest for household consumption, only surplus produce is available for sale. The relatively small quantities marketed by individual farmers often make direct access to larger buyers economically unfeasible. As a result, agricultural products are commonly sold through intermediaries or *agri-dealers*, who collect produce from multiple farmers and arrange transport and marketing.

While this system allows farmers to access markets that might otherwise remain out of reach, it also limits their bargaining power and reduces the share of value they receive from their produce. Fragmented value chains make it difficult for producers to establish direct relationships with buyers, processors, or exporters, leaving many farmers dependent on middlemen who capture a significant share of the value generated along the marketing chain.

Various initiatives have been introduced to address these challenges. In Same District, for example, the agricultural authorities have established a WhatsApp-based communication platform through which farmers can advertise produce for sale, identify potential buyers, and exchange market information. Such initiatives can improve transparency and reduce information barriers, although their impact remains limited by broader structural constraints.

Seasonal overproduction represents an additional challenge. When large numbers of farmers harvest the same crop at the same time, markets can become oversupplied, leading to dramatic price declines. Ginger provides a clear example. Under normal market conditions, farmers may receive between 900 and 1,200 Tanzanian shillings per kilogram. During peak harvest periods, however, prices can fall to between 300 and 500 shillings per kilogram, substantially reducing farmers' incomes.

These difficulties have led many farmers to advocate the formation or revitalisation of cooperatives as a means of strengthening their negotiating position, improving market access, and increasing their share of market returns. However, establishing and managing effective cooperatives remains challenging and requires strong leadership, trust, transparency, and organisational capacity.

Same District provides an instructive example. The district produces approximately 70 per cent of Tanzania's ginger output and is therefore a key centre of national production. In 2015, President Jakaya Kikwete inaugurated a ginger-processing facility in Mamba that was initially operated by a farmers' cooperative. However, the venture subsequently collapsed. Although the factory was expanded and equipped with new machinery in 2021, it had still not become operational by 2024. This case highlights the difficulties

that farmer organisations often face in maintaining effective management and ensuring the long-term sustainability of collective enterprises.

A further example emerged in 2022, when I received a promising export enquiry from South Africa for substantial quantities of ginger. Unfortunately, the opportunity could not be realised because of organisational weaknesses, limited coordination, and insufficient commitment among stakeholders. Such experiences illustrate that market access depends not only on production capacity but also on collective action, product quality, organisational effectiveness, and the ability to meet both domestic and international market standards. Strengthening these capacities remains an important challenge for the future development of smallholder agriculture.

3.5 Access to Sources of Finance

For many smallholder farmers, limited financial resources represent a significant barrier to agricultural development. Accessing formal credit is often difficult because banks generally require secure land tenure, ownership documentation, or long-term lease agreements that can serve as collateral. Consequently, formal loans are more readily available to farmers engaged in commercial agriculture than to those operating primarily at a subsistence level.

Many rural households therefore rely on alternative sources of finance. These include Savings and Credit Cooperative Societies (SACCOS), microfinance institutions, informal savings groups, and loans obtained from family members or friends. While these mechanisms provide important financial support, they are often insufficient to fund larger investments such as irrigation systems, agricultural machinery, storage facilities, or other technologies that could increase productivity and resilience.

Financial constraints are further compounded by low agricultural productivity, climate-related uncertainty, fluctuating market prices, and the physically demanding nature of farming. As a result, fewer young people see smallholder agriculture as an attractive livelihood. At the same time, rising levels of education and changing

aspirations are creating demand for a more modern, profitable, and technologically advanced agricultural sector.

Recognising these challenges, the Tanzanian government launched the **Building a Better Tomorrow (BBT)** initiative under the Ministry of Agriculture. The programme aims to attract young people to agriculture and agribusiness while strengthening the long-term productivity and sustainability of the sector. It is based on the recognition that youth engagement will be essential for future agricultural growth and food security.

The initiative focuses on three main areas:

- **Training:** Equipping more than 200,000 young people with modern agricultural knowledge and skills, including climate-smart farming practices and agribusiness management.
- **Internships:** Providing practical experience through placements on established farms and within agribusiness enterprises.
- **Mentorship and coaching:** Supporting youth-led agricultural enterprises through guidance from experienced farmers, agricultural specialists, and business advisers.

Implementation began in 2024 with an initial cohort of 56 young participants undertaking a four-month training programme before receiving access to land and further support. Although still at an early stage, the initiative offers an encouraging model for strengthening youth participation in agriculture. By promoting innovation, entrepreneurship, and modern agricultural practices, it has the potential to contribute significantly to rural employment, food security, and the future transformation of Tanzanian agriculture.

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Figure 9. Grain Amaranth demonstration plot on the Pare Diocese farm. Established as part of a long-running nutrition and food-security initiative, the plot provides practical training in amaranth cultivation while promoting a nutrient-rich crop with the potential to improve household nutrition and livelihoods. Photo: Sabine Winkler.



Figure: 10: Amaranth and other agricultural products being sorted, dried, and packaged for sale. Post-harvest processing helps improve product quality, reduce losses, and increase market value.

Figure 11. Grain Amaranth flour and bread offered for sale in the Pare Diocese shop in Same. By supporting local processing and marketing, the project demonstrates how agricultural production can be linked to value addition, income generation, and improved nutritional outcomes for farming households. Photo: Sabine Winkler.



4. Conclusion

Looking back over these years of working alongside Tanzanian smallholder farmers, what stays with me most is their resilience—their willingness to keep farming, adapting, and searching for solutions, even as land access, rainfall patterns, markets, and finance remain uncertain. Smallholder farmers will remain at the heart of Tanzania's food system for decades to come. Supporting and strengthening this resilience is therefore essential not only for agricultural production but also for food security, rural livelihoods, and sustainable development.

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Achieving this will require secure land tenure, effective knowledge transfer, climate adaptation, environmental protection, improved access to markets and finance, and nutrition-sensitive agriculture such as the Grain Amaranth project. Above all, lasting progress depends on genuine partnerships built on trust, mutual learning, and respect for local knowledge.

It is in this spirit that I have shared these experiences—not as definitive answers, but as lessons learned over many years of working alongside Tanzanian farming communities. The future of Tanzania's agriculture will ultimately depend on the knowledge, determination, and innovation of its farmers. I hope that the experiences presented here may contribute, however modestly, to strengthening agriculture, improving food security, and enhancing the livelihoods of rural families.

Endnotes

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7. Agroecology in Practice: The Work of Sustainable Agriculture Tanzania

KIZITO MWAJOMBE

Abstract

Agroecological transformation in practice is the focus here, examined through the work of Sustainable Agriculture Tanzania (SAT), an organisation based in Morogoro that supports smallholder farmers in the transition towards ecologically sound, socially just, and economically viable farming systems. SAT's activities are organised around four interrelated pillars: dissemination of knowledge, application and marketing, research, and networking. The chapter analyses these activities through the framework of the thirteen agroecological principles articulated by the High Level Panel of Experts on Food Security and Nutrition (HLPE). Drawing on field observations, project outcomes, and organisational experience, it demonstrates how agroecological approaches can generate positive ecological, economic, and social outcomes for farming communities. The chapter argues that agroecology represents not merely a set of agricultural practices but a comprehensive framework for building resilient, sustainable, and equitable food systems.

Keywords: agroecology; Sustainable Agriculture Tanzania; smallholder farmers; Tanzania; food systems; soil health; biodiversity; land governance; participation; HLPE

1. Introduction: Sustainable Agriculture Tanzania and the Vision of Agroecological Transformation

Sustainable Agriculture Tanzania (SAT) is a non-governmental organisation based in Morogoro that promotes agroecological approaches to farming as a pathway towards sustainable livelihoods,

environmental conservation, and resilient food systems. The organisation works towards a clear vision: that the majority of farmers adopt recognised agroecological methods in order to improve their livelihoods, conserve the environment, and reduce pressure on natural resources.¹

This vision is pursued through four interrelated pillars of activity. The first pillar, dissemination of knowledge, focuses on strengthening farmers' capacities through hands-on engagement with farmer groups in their villages, structured training programmes at SAT's Farmer Training Centre, and a monthly farming magazine that extends the organisation's reach well beyond the communities with which it works directly.

The second pillar, application and marketing, addresses the entire agroecological value chain, from production and processing to packaging, marketing, and consumer awareness. Through this work, SAT seeks not only to support farmers in adopting agroecological practices but also to strengthen market opportunities for organic and sustainably produced food.

The third pillar, research, is conducted in collaboration with farmers, universities, and other partners. This participatory approach generates demand-driven knowledge that responds to the needs and realities of smallholder farming systems while contributing to the continuous improvement of agroecological practices.

The fourth pillar, networking, focuses on sharing SAT's experience and knowledge with stakeholders, practitioners, policymakers, and researchers at national and international levels. By facilitating exchange and dialogue, SAT seeks to contribute to broader processes of agricultural transformation and sustainable food-system development.

Rather than presenting SAT's activities as a collection of isolated interventions, this chapter analyses them as an integrated system of agroecological practice. The analysis is organised around the thirteen agroecological principles articulated by the High Level Panel of Experts on Food Security and Nutrition (HLPE) in its 2019 report on agroecological and other innovative approaches for sustainable food systems.² These principles provide a widely recognised analytical framework for assessing whether agricultural

practices are genuinely agroecological in character and implementation.

The HLPE framework identifies thirteen interrelated principles of agroecology: recycling, input reduction, soil health, animal health, biodiversity, synergy, economic diversification, co-creation of knowledge, social values and diets, fairness, connectivity, land and natural-resource governance, and participation. Together, these principles highlight the ecological, social, economic, and political dimensions of sustainable food systems and emphasise the importance of addressing them in an integrated manner rather than in isolation.

Drawing on more than a decade of field experience, SAT provides a valuable case study of how agroecological principles can be translated into practice and what outcomes emerge when they are implemented in an integrated and systematic way. The organisation's experience demonstrates that agroecology is not merely a collection of farming techniques but a holistic approach that seeks to strengthen ecological sustainability, economic viability, social well-being, and community resilience. The chapters that follow examine how SAT's work contributes to each of the thirteen agroecological principles and what lessons can be drawn for the future development of sustainable food systems in Tanzania and beyond.

2. Ecological Principles in Practice

Recycling

SAT promotes backyard and kitchen gardens that make deliberate use of recycled materials. Water bottles are repurposed for simple drip-irrigation systems, while sacks, tyres, and bags are reused as planting containers and seedbeds. Organic materials, including kitchen waste, farmyard manure, crop residues, and mulch, are composted and returned to the soil to enhance fertility and improve soil structure.

The outcomes of these practices have been substantial and well documented. Participating households reported a 61 per cent reduction in input costs and a 59 per cent reduction in water consumption. Additional benefits included improved adaptation to climate variability, more balanced household diets, and enhanced soil health resulting from the sustained application of compost and organic matter. In this context, recycling is not merely a low-cost strategy; it represents a fundamental agroecological principle that closes nutrient and resource cycles at the household level, reduces waste, and decreases dependence on external inputs that many smallholder farmers struggle to afford.

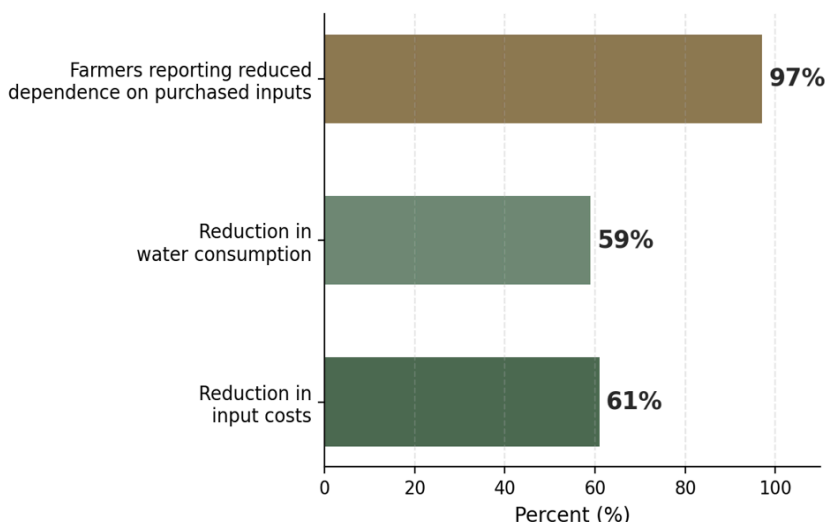
Input Reduction

Closely linked to recycling is the principle of input reduction. SAT promotes a range of ecological approaches to pest and soil management that minimise reliance on synthetic agricultural inputs. These include intercropping, trap cropping, crop rotation, good farm hygiene, and effective weed management, as well as the conservation of beneficial insects and other natural enemies of crop pests as forms of biological control.

To improve soil fertility, SAT encourages the integration of agroforestry species and the use of green manures, both of which contribute nutrients to the soil while enhancing long-term soil health. These practices enable farmers to maintain productivity without becoming dependent on costly synthetic fertilisers and pesticides.

The documented outcomes include the conservation of biodiversity, a 61 per cent reduction in production-input costs, and significantly lower dependence on purchased agricultural chemicals. Particularly noteworthy is the finding that 97 per cent of participating farmers reported an improved capacity to farm successfully without relying on chemical inputs. This result suggests that input reduction, when supported through training, demonstration plots, and farmer-to-farmer learning, is not simply an aspirational goal but a realistic and achievable pathway towards more resilient and sustainable farming systems.

Figure 1. Measured economic, environmental, and social outcomes of SAT's recycling and input-reduction practices, including reduced input costs, lower water use, improved soil health, and enhanced resilience.



Soil Health

SAT promotes soil regeneration through a combination of agroecological practices, including the cultivation of leguminous crops, shrubs, and trees within agroforestry systems, as well as composting, green manuring, and the application of animal manure. These practices enhance soil fertility, stimulate microbial activity, improve water retention, and support the long-term productivity of agricultural land.

The documented outcomes include improved soil fertility, healthier crops, enhanced soil biological activity, and improved water quality. Central to SAT's approach is the understanding that soil is a living ecosystem rather than an inert growing medium. The goal is therefore not simply to maintain crop production but to nurture the biological processes that sustain fertility, resilience, and ecosystem health over time.

Animal Health

Within agroecology, livestock are viewed as an integral component of farming systems rather than as a separate enterprise. SAT's work promotes improved pasture establishment, management, and conservation, alongside the use of botanical remedies for animal health, semi-intensive and free-range livestock production systems, and natural breeding practices.

These interventions contribute to more stable feed supplies, improved disease resistance, better animal welfare, and healthier livestock populations. By integrating livestock management with soil fertility, crop production, and natural-resource management, SAT strengthens the ecological connections that underpin sustainable farming systems.

Biodiversity

Biodiversity occupies a central place in SAT's agroecological approach. At the Farmer Training Centre, training in agroforestry and permaculture is complemented by active efforts to collect, preserve, and multiply traditional seed varieties. These initiatives help safeguard agricultural biodiversity while supporting farmer-managed seed systems and reducing dependence on external seed sources.

SAT also promotes the establishment of beneficial hedges, companion planting, and diversified farming systems that provide habitats for pollinators and natural enemies of crop pests. The outcomes include improved ecosystem functioning, protection of beneficial insects, conservation of soil organisms, preservation of traditional crop varieties, and enhanced soil health. In this context, biodiversity is understood not merely as a conservation objective but as a productive resource that contributes directly to resilience, food security, and sustainable agricultural production.

Synergy

A defining characteristic of agroecology is its emphasis on the interactions among different components of the farming system. SAT promotes these synergies by encouraging the integration of crops, livestock, trees, soils, and water-management practices within a single system.

A particularly significant example is SAT's Farmers and Pastoralists Collaboration Initiative, which seeks to reduce resource-based conflicts by promoting cooperation and ecological complementarity. Crop residues can be used as livestock feed, while livestock manure contributes to soil fertility, creating mutually beneficial relationships between farming and pastoral communities. The resulting outcomes include strengthened circular local economies, improved ecological linkages, more efficient resource use, and reduced conflict between different land users.

3. Economic and Knowledge Principles in Practice

Economic Diversification

Economic resilience is strengthened when farming households rely on multiple sources of income rather than a single commodity or enterprise. SAT promotes diversified farm enterprises that complement one another while encouraging value addition through processing, packaging, and marketing activities.

In addition, SAT supports village savings and lending schemes that increase access to financial resources and strengthen household investment capacity. These interventions contribute to improved livelihoods, greater income stability, and reduced vulnerability to market fluctuations and climatic shocks. By combining diversification with local entrepreneurship, SAT helps farmers build economically resilient farming systems.

Co-Creation of Knowledge

Knowledge generation within agroecology is a collaborative process. Rather than viewing farmers as passive recipients of information, SAT promotes participatory learning and research approaches that recognise farmers as active contributors to innovation.

Through farmer-to-farmer exchanges, demonstration plots, participatory research, and collaboration with researchers and educational institutions, local knowledge is combined with scientific expertise. This process produces solutions that are locally relevant, socially acceptable, and environmentally sustainable. It also strengthens farmers' confidence, adaptive capacity, and ownership of agricultural innovations.

4. Social and Governance Principles in Practice

Social Values and Diets

Agroecology is concerned not only with production but also with the social and cultural dimensions of food systems. SAT promotes healthy and diversified diets while recognising the importance of local food traditions, cultural identity, and community well-being.

By encouraging the production and consumption of diverse crops, agroecological farming systems contribute to improved nutrition, dietary diversity, and household food security. These efforts strengthen the connection between sustainable agriculture and human health.

Fairness

Fairness is a fundamental principle of agroecology. SAT seeks to improve livelihoods through fair market relationships, premium prices for agroecological products, and opportunities for farmer participation within its social enterprise activities.

These initiatives help improve farmer incomes, enhance livelihood security, and create more equitable relationships within food systems. Fairness is therefore understood not only in economic terms but also as a matter of social justice and dignity.

Connectivity

Strong relationships between producers, consumers, organisations, and communities are essential for sustainable food systems. SAT strengthens these connections through local markets, farmer networks, participatory guarantee systems, and knowledge-sharing platforms.

These activities build trust, improve market access, facilitate learning, and support collective action. Connectivity also strengthens social capital, which is itself an important component of resilience.

Land and Natural Resource Governance

Secure access to land and natural resources forms the foundation of sustainable agricultural development. SAT therefore supports land-tenure security, including the acquisition of Certificates of Customary Right of Occupancy (CCROs), while also promoting sustainable natural-resource management practices.

These efforts help reduce land-related conflicts, improve long-term investment in agricultural land, and strengthen the sustainable use of natural resources. Secure land rights are particularly important for smallholder farmers because they enhance both economic security and adaptive capacity.

Participation

Participation lies at the heart of SAT's approach. Farmers are actively involved in planning, implementation, learning, and decision-making processes through farmer groups, cooperatives, and community organisations.

Such structures strengthen local ownership, improve accountability, and increase the relevance and effectiveness of development interventions. Participation also enhances productivity, leadership capacity, and market engagement, ensuring that agricultural transformation remains rooted in the priorities and experiences of farming communities themselves.

5. Conclusion: Agroecology as an Integrated System

SAT's experience demonstrates that agroecology is most effective when implemented as an integrated system rather than as a collection of individual techniques. Its ecological, economic, social, and governance dimensions reinforce one another, creating farming systems that are more resilient, productive, and sustainable. As this chapter has shown, agroecological practices can improve soil health, conserve biodiversity, reduce dependence on external inputs, strengthen livelihoods, and enhance food security.

At the centre of this transformation are farmers themselves. SAT's experience confirms that successful agroecology depends on recognising farmers as innovators, knowledge holders, and agents of change. Agroecology is therefore more than a technical approach to farming; it is a participatory process that links environmental stewardship, economic resilience, social justice, and community empowerment. In the face of climate change, biodiversity loss, and food insecurity, such integrated approaches will be increasingly important for the future of sustainable food systems in Tanzania and beyond.

Endnotes

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8. Agroecology and Food Security: Concepts, Practices, and Lessons from Tanzania

SYLVERY L. B. ISHUZA

Abstract

Promoting agroecology and food security in Tanzania requires coordinated action across farming systems, food markets, and public policy. This chapter examines ecology, agriculture, agroecology, and food security as interconnected concepts and argues that, for many smallholder households, “improvement” may be a more realistic goal than strict “sustainability.” Using the ASAN framework—adequacy, safety, accessibility, and nutrition—it explores the multiple dimensions of food security and introduces a household-level “coefficient of food security” to analyse decisions about consumption and sale. Drawing on examples from Morogoro and Kagera, the chapter shows how agroecological practices can strengthen food security while improving the resilience of smallholder livelihoods.

Keywords: agroecology; food security; ASAN framework; coefficient of food security; sustainability; smallholder farmers; Tanzania

1. Introduction

It is a premise of this chapter that, in addressing complex challenges such as agroecology and food security, action-oriented and policy-relevant intervention is more valuable than descriptive statements of intent alone. Promoting agroecology and food security is, in other words, a task for practice as much as for argument. Yet action of this kind cannot proceed without conceptual clarity:

agroecology and food security are frequently invoked as though their meaning were self-evident, when in fact each term carries specific technical content that shapes what “promoting” them should actually involve.

This chapter therefore proceeds in two movements. It first clarifies the terminology on which the rest of the argument depends—ecology, agriculture, agroecology, sustainability, and food security—drawing particular attention to the ASAN framework and to the limits of “sustainability” as a description of smallholder practice. It then turns to the question of what can concretely be done, by farmers, food-chain actors, and policymakers alike, to promote agroecology and food security together, drawing on examples from Tanzanian smallholder agriculture, including the Kagera and Morogoro regions.

2. Defining the Key Concepts

Talking productively about agroecology and food security requires a shared understanding of the terms involved and of how they relate to one another. The five concepts addressed here—ecology, agriculture, agroecology, sustainability, and food security—are not synonyms for a single underlying idea; each names a distinct dimension of the relationship between farming communities and the land on which they depend.

2.1 Ecology

Despite its several competing definitions, ecology can usefully be understood as the biological science that studies the processes influencing the distribution and abundance of living organisms, and the relationships between those organisms and their physical environment. Understood this way, ecology is not a purely theoretical discipline: human beings, as living organisms, have continually interacted with their physical environment through concrete practices—ranging from the establishment of heavy industry in the developed economies of the Global North, to the cutting of trees for poles, timber, and firewood, and the conduct of agriculture for food

and income, particularly among smallholder households in the rural areas of African countries, including Tanzania.

2.2 Agriculture

Agriculture, in turn, is the practice of cultivating land to produce food and income. Globally, agriculture has taken two broad forms: subsistence farming, practised predominantly by smallholder farmers in developing countries, including Tanzania, whose primary objective is household food consumption; and commercial farming, practised at larger scales in many developed economies, whose primary objective is profit.

Both forms have contributed to environmental change and greenhouse-gas emissions, albeit through different mechanisms. Gaseous emissions associated with highly industrialised production systems are prominent in many developed countries, while slash-and-burn land clearance remains common in some developing regions, including parts of Tanzania. Food production as a whole is estimated to account for approximately thirty per cent of global greenhouse-gas emissions.¹

2.3 Agroecology

Agroecology may be defined as a form of farming that works with nature rather than against it while protecting biodiversity and ecological functioning. It is one of the foundational approaches to sustainable agriculture and emphasises the use of good agricultural practices, including intercropping, crop rotation, organic farming, agroforestry, species diversification, seed management, seasonal synchronisation, soil and land management, and stress management. Each of these practices is discussed further in section 3 below.

2.4 From Sustainability to Improvement

Sustainability is conventionally understood as the capacity to support a given process continuously over time. On this understanding,

the good agricultural practices described above should be maintained across seasons and generations, provided the necessary support remains available. The decisive question, however, is what that support actually requires. Capital, labour, agricultural inputs, secure land access, and reliable markets are frequently limited and intermittent rather than continuously available to smallholder households. Achieving sustainability in the strict sense is therefore often difficult unless the continuous availability of these means can genuinely be assured.

For many smallholder contexts, “improvement” may therefore be a more realistic term than “sustainability”, recognising that progress is often incremental and dependent on resources that are not always available. The concept allows for meaningful advancement in farming practices and livelihoods without implying a guarantee of continuity that many households cannot reasonably secure.

2.5 Food Security and the ASAN Framework

Food security is conventionally understood as the condition of having physical and economic access to adequate, safe, accessible, and nutritious food. In this chapter, food security is organised around four constitutive facets, summarised through the ASAN framework:

- Adequacy
- Safety
- Accessibility
- Nutrition

A fifth commonly cited facet, stability, is not treated separately in this chapter. Rather, it is understood as already reflected within the dimensions of adequacy and accessibility, rather than constituting a distinct dimension in its own right.²

3. Promoting Agroecology through Good Agricultural Practices

Promoting agroecology requires that education in good agricultural practice reach every relevant actor: smallholder farmers, policymakers, local leaders, and the wider range of operators along the agricultural value chain. The practices elaborated below are not a menu from which a single technique might be selected in isolation; their cumulative adoption is what constitutes an agroecological transition.

Intercropping

Intercropping involves planting more than one crop on the same piece of land and is one form of mixed cropping. Its advantages deserve to be shared widely among agricultural actors and policymakers alike. First, it spreads risk against crop failure and maximises the productivity of scarce land resources. This is particularly important in African countries, including Tanzania, where customary inheritance systems often result in very small landholdings. Second, intercropping can increase pest mortality by encouraging pest dispersal and creating habitats for beneficial organisms that naturally control pest populations.³ Third, it improves soil fertility through the incorporation of crop residues and mulch.

Crop Rotation

Crop rotation involves the alternation of different crops over successive seasons. The practice reduces crop losses caused by crop-specific pests and diseases while improving soil structure and fertility. By providing varied organic materials to soil organisms, crop rotation also enhances microbial activity and increases soil organic matter, thereby improving water retention and overall soil health.

Soil and Land Management

Good soil and land management requires attention to the composition of soil as a system consisting of solids, liquids, and gases.⁴ Soil management practices should seek to maintain the functional balance among these components so that plant growth, microbial activity, and water retention can occur effectively. Land itself serves multiple purposes, including agricultural production, forestry, grazing, mining, settlement, and tourism. Sustainable land management is therefore essential not only for agricultural productivity but also for broader environmental stewardship.

Organic Farming

Organic farming relies primarily on biological nutrient sources such as green manure, animal manure, compost, and crop residues. These materials, once decomposed, supply nutrients required for plant growth while supporting long-term soil health and ecological functioning. Organic farming also places particular emphasis on intercropping, crop rotation, biodiversity conservation, and the promotion of healthy biological cycles. By working with natural processes, organic approaches seek to maintain productivity while reducing dependence on external inputs.

Seed Management

Seeds constitute the foundation of agricultural production. Effective seed management therefore involves identifying and obtaining seed from reliable sources, whether farmer-saved seed, certified commercial seed, or seed supplied through research institutions. Appropriate seed treatment further improves germination and reduces vulnerability to pests and diseases during the earliest stages of crop development.⁵

Seasonal Synchronisation

Successful crop production requires careful attention to seasonal conditions. Different climatic periods are associated with different

pest and disease pressures, making the timing of planting and harvesting critically important. For example, maize planted late in the growing season is often particularly vulnerable to maize-streak virus. Aligning cropping activities with favourable environmental conditions therefore contributes significantly to productivity and risk reduction.

Crop and Species Diversification

Climate adaptation frequently involves crop diversification, greater use of water-management technologies, improved management of pests and diseases, and enhanced agrobiodiversity.⁶ Examples of diversification can be found throughout Tanzania. In Morogoro municipality, some farmers have shifted from maize cultivation—which typically requires approximately three months to mature—to the production of *Amaranthus*, which can mature within one month under irrigated conditions. The crop is sold in local markets, generating income that can subsequently be used to purchase staple foods. Other farmers diversify through flower production. In Arusha, flowers are cultivated largely for export markets, while in Morogoro they are often produced for domestic markets associated with weddings, funerals, and other social occasions. Both examples demonstrate how diversification can strengthen livelihoods while reducing vulnerability to environmental and economic shocks.

Agroforestry

Agroforestry involves the deliberate integration of trees with crops and, in some cases, livestock. Trees provide shade, reduce wind damage, improve soil fertility, and contribute to ecological stability. In Tanzania, coffee-based systems, banana-based farming systems, and a variety of indigenous tree species are commonly integrated into agroforestry arrangements. The practice is especially visible in many parts of the Kagera Region, where agroforestry has become an established component of local farming systems rather than an experimental innovation.

4. Operationalising ASAN

Promoting food security requires that education on the ASAN dimensions reaches smallholder farmers, policymakers, local leaders, and other actors throughout the food chain.

Food adequacy requires sufficient quantities of food to be available. This depends on increasing agricultural production while reducing post-harvest losses through improved storage and handling practices.

Food safety requires that food be handled, processed, transported, and stored in ways that prevent contamination and protect human health. Food processors and traders must observe appropriate standards of cleaning, sorting, cooking, and storage, while governments are responsible for establishing and enforcing regulatory safeguards.

Food accessibility requires the removal of barriers that prevent people from obtaining the food they need. Such barriers include poor transport infrastructure, restrictions on food movement, high food prices, and low household incomes. Improving roads, reducing transport costs, facilitating food distribution, and increasing incomes are therefore important measures for strengthening access to food.

Food nutrition requires that food provides the nutrients necessary to sustain life and promote health. Nutrition education is therefore essential to encourage healthy and balanced diets and to ensure that available food contributes effectively to human well-being.

The Coefficient of Food Security

Beyond the four ASAN dimensions, households must continuously balance food security and income generation. Smallholder farmers commonly cultivate a mixture of crops in order to spread risk while meeting both consumption and cash-income needs.

At harvest, households must decide how much of each crop to retain for consumption and how much to sell. The relationship between dependence on a principal staple crop, such as maize, and dependence on climate-adaptable alternatives, such as sorghum or millet, can be expressed as a **coefficient of food security**.⁷

For example, if a household retains most of its sorghum harvest for consumption while selling a larger share of its maize harvest, sorghum may be functioning as an important food-security crop within the household economy.

Coefficients greater than unity suggest that a household is prioritising a crop for domestic consumption and therefore giving greater weight to food security than to immediate cash income. Coefficients below unity suggest the opposite pattern. The coefficient thus provides a practical household-level indicator that can help farmers, researchers, and policymakers understand food-security behaviour more precisely than aggregate production statistics alone.

5. Conclusion and Recommendations

The arguments advanced in this chapter reflect the author's perspective and are intended to contribute to the wider discussion pursued throughout this volume. Three recommendations emerge from the analysis. First, agricultural actors, including government leaders, require greater awareness of the consequences of mismanaging natural resources and the importance of agroecological approaches. Second, policymakers, researchers, extension officers, and other food-system actors should collaborate to identify and implement strategies that encourage the adoption of agroecological practices, thereby improving rural livelihoods and supporting sustainable development. Third, governments should strengthen the adaptive capacity of agricultural and livestock producers by mobilising financial and institutional resources that enable effective responses to climate change.

Taken together, these recommendations point towards a single conclusion: agroecology and food security should not be treated as

separate agendas. Both depend upon coordinated action across the food system—from farmers adopting good agricultural practices, to processors ensuring food safety, to policymakers improving accessibility, and communities embracing balanced nutrition. Achieving this agenda will not be easy, but it remains possible when each actor plays a meaningful role in strengthening sustainable agriculture, improving food security, and supporting resilient rural livelihoods.

Endnotes

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Interlude I: What Have We Learned from the Ecological Crisis?

Part I has traced a journey from ecological memory to planetary measurement, from soil science to structural policy, from the practical experience of a farmer-support organisation to theological reflection on food security. Before turning to the explicitly theological questions explored in Part II, it is helpful to pause and consider the insights that emerge collectively from the preceding chapters.

Soil matters. Chapters One and Four, despite their very different disciplinary perspectives, arrive at a common conclusion: soil is not merely an agricultural input but a living system upon which food production, biodiversity, and human well-being depend. Any meaningful response to the ecological crisis must therefore begin with the protection, restoration, and responsible stewardship of the land itself.

Climate matters. Chapters Two and Five demonstrate that ecological disruption is neither isolated nor localised. Climate change is a measurable, accelerating, and unequally experienced global reality, whose consequences are borne most heavily by communities least responsible for its causes. Consequently, all contemporary discussions of agriculture, livelihoods, and food security must be situated within this wider environmental context.

Agriculture matters. Chapters Three, Seven, and Eight show that agriculture cannot be understood simply as a technical activity concerned with production alone. Decisions about farming are simultaneously ecological, economic, social, and ethical. Questions of land use, production systems, markets, and livelihoods are inseparable from questions of justice, responsibility, and human flourishing.

Food security matters. Chapters Six and Eight make clear that food security is more than a national indicator or policy objective. It is experienced most directly at the household level, where families continually negotiate between consumption and income, immediate needs and long-term resilience. Effective responses must

therefore be evident not only in policy frameworks but also in the everyday realities of farming households and communities.

Relationships matter. A common theme runs through all the chapters: the ecological crisis is fundamentally a crisis of relationships. It is expressed in the growing separation between people and land, between extractive forms of production and ecological limits, between present choices and future generations, and between those who generate environmental harm and those who bear its greatest burdens.

Taken together, these insights point towards a single conclusion. The ecological crisis examined in Part I is more than a technical problem requiring technical solutions. Scientific knowledge, agricultural innovation, and policy reform are indispensable; yet, on their own, they are insufficient. The crisis is also moral, social, and spiritual because it reflects damaged relationships that cannot be restored through technology alone.

It is this deeper dimension of the ecological crisis that Part II now explores. Drawing on biblical and theological resources, the chapters that follow consider how faith traditions may contribute to the renewal of relationships between humanity, the earth, and the Creator, and what role theology can play in the pursuit of ecological justice, human flourishing, and sustainable futures.

PART II

BIBLICAL AND THEOLOGICAL FOUNDATIONS

Part I asked what is happening; Part II asks the volume's second question: **how should these realities be interpreted?** Drawing on Scripture and theology, the section is united by a shared conviction. Each chapter, in its own way, rejects interpretations of Genesis that legitimise domination of the earth and instead advances an alternative vision rooted in responsibility, interdependence, and care.

The four chapters also trace a progression worth making explicit. Ngoy grounds this vision in the philosophy of Ubuntu; Brown develops its implications through an economy of sufficiency; Kimilike anchors it exegetically in a theology of stewardship; and Mwaikulu extends it into a comprehensive ethic of production and consumption. Read in sequence—Ubuntu, sufficiency, stewardship, and ethics of production—the chapters converge on a single claim, expressed with increasing clarity across the section: that cultivation, rather than domination, is Scripture's account of humanity's vocation within creation.

Together these four chapters establish the theological framework of the volume. Beginning with the relational vision of Ubuntu, moving through an ethic of sufficiency, grounding human responsibility in the biblical vocation of stewardship, and culminating in a theology of production and consumption, they demonstrate that the ecological crisis is fundamentally a theological question. Read as a whole, Part II argues that Scripture calls humanity not to dominate creation but to cultivate, preserve, and participate responsibly in the flourishing of the community of life.

9. The Groaning Creation and Ubuntu Vitamin

LEITA NGOY

Abstract

Engaging biblical theology, African ecological wisdom, ecofeminist perspectives, and the philosophy of Ubuntu, this chapter explores the interconnectedness of environmental degradation, human suffering, and social injustice. Writing from the context of the Democratic Republic of Congo, it argues that the cry of the earth and the cry of the poor are inseparable. Through reflection on creation theology, Romans 8, and Ubuntu, the chapter proposes ecological healing grounded in responsibility, solidarity, and justice, arguing that ecological sustainability depends upon renewed commitment to community and care.

Keywords: creation care; ecological justice; Ubuntu; climate justice; Democratic Republic of Congo; ecofeminism; environmental theology; sustainability; creation; stewardship

1. Introduction: The Cry of the Earth from the Heart of Congo

I was born and raised in the Democratic Republic of Congo (DRC). My country, vast as an elephant and rich in natural resources, has always symbolised for me both the beauty and the tragedy of Africa. It is a land blessed with immense ecological wealth: dense tropical forests, abundant rivers, fertile lands, and extraordinary mineral resources. Yet it is also a land deeply wounded by conflict, exploitation, corruption, and external economic interests. As I often say, “The DRC is like the elephant of Africa”—strong, magnificent, and rich, yet burdened by suffering and vulnerability.¹

This paradox continually raises questions in my mind. Why does a country endowed with such extraordinary wealth remain poor? Why do communities living amid abundance continue to struggle? And beyond the Congolese context, I ask an even broader question: What has happened to the earth itself? What has become of this beautiful creation that God once declared “very good”?

These questions have become increasingly urgent in an age marked by climate change, biodiversity loss, environmental degradation, and growing social inequalities. Across the world, ecosystems are deteriorating, species are disappearing, forests are shrinking, and communities are becoming increasingly vulnerable to environmental disruption. Many people now speak of the “cry of the earth.” Dr. Brighton Katabaro similarly speaks of “Mother Earth weeping,” a powerful image that captures the suffering of creation under human exploitation.²

The answer to why the earth is crying is not difficult to identify. Human beings have wounded creation. What God originally created in harmony has been subjected to greed, exploitation, and irresponsibility. The ecological crisis is therefore not simply a scientific or environmental issue. It is a spiritual and ethical crisis that challenges humanity’s relationship with God, with one another, and with the wider community of life.

The Brazilian liberation theologian Leonardo Boff famously speaks of both the “cry of the earth” and the “cry of the poor.”³ These two cries are inseparable. Wherever ecosystems suffer, human communities suffer as well—particularly the poor, women, and children. Ecological destruction and social injustice are interconnected realities that require integrated responses.

This chapter explores the ecological crisis through biblical theology, African philosophical traditions, and contemporary ecological thought. It argues that the healing of creation requires the restoration of relationships: relationships between humanity and the earth, between affluent and vulnerable communities, and between human beings and God. Ubuntu offers a particularly important resource for such healing because it reminds us that life flourishes only through interconnectedness and mutual responsibility.

2. Creation: “Very Good,” Yet Wounded

The biblical story begins with creation. The opening chapters of Genesis present a vision of a world brought into being through God’s creative love and declared fundamentally good. In Genesis 1:31 we read: “God saw everything that he had made, and indeed, it was very good.” The goodness of creation is a foundational affirmation of biblical theology. The earth is not an accidental by-product of cosmic processes, nor is it merely a resource for human consumption. It is God’s creation, endowed with dignity, purpose, and value.⁴

Genesis 1:26–30 and Genesis 2:15 further clarify humanity’s role within creation. Human beings are entrusted with responsibility for the earth. They are called to “till and keep” the garden. The Hebrew verbs *abad* (to cultivate, serve) and *shamar* (to protect, preserve) suggest stewardship rather than domination. Humanity is not appointed as a destructive ruler but as a caretaker of God’s creation.⁵

The Old Testament scholar Claus Westermann emphasises that the creation narratives celebrate the goodness of the entire created order. Every aspect of creation possesses intrinsic value because it originates from God.⁶ Yet contemporary realities reveal a disturbing contrast between this biblical vision and the condition of the world today. Forests are disappearing. Rivers are polluted. Species are becoming extinct. Climate systems are destabilised. The earth bears visible scars of human activity.

Jürgen Moltmann describes this reality as a “wounded creation.”⁷ Creation suffers because humanity has failed to exercise responsible stewardship. Instead of serving the earth, people have frequently sought to dominate it. Instead of protecting creation, they have often exploited it. Ernst Conradie similarly argues that biblical dominion should never be interpreted as a licence for exploitation. Rather, dominion implies responsible care exercised in accordance with God’s purposes for creation.⁸

Pope Francis echoes this concern in *Laudato Si’*. He criticises what he calls the technocratic paradigm—a worldview that treats nature

merely as an object to be manipulated for economic gain.⁹ When creation is reduced to a commodity, its sacred character is forgotten. The theologian Sallie McFague offers a compelling alternative. She proposes understanding the earth as the “body of God.”¹⁰ While metaphorical, this image reminds believers that creation is intimately related to God and therefore deserves reverence and protection.

The Apostle Paul provides perhaps the most profound biblical description of ecological suffering when he writes: “We know that the whole creation has been groaning in labour pains until now” (Romans 8:22). This groaning is visible today in climate disruption, environmental degradation, resource conflicts, water scarcity, and ecological instability. Creation is not silent. It is crying out under the weight of human irresponsibility. The biblical narrative therefore moves from creation declared “very good” in Genesis to creation “groaning” in Romans, linking environmental degradation directly to humanity’s failure to fulfil its vocation as steward.

3. Women and the Earth: Shared Vulnerability and Shared Hope

Whenever I reflect on the suffering of the earth, I also think about the women of Africa. There is a profound connection between the experiences of women and the experiences of the earth. Both nurture life. Both provide sustenance. Both are often taken for granted. And both frequently bear the burdens of exploitation.

The African theologian Mercy Amba Oduyoye emphasises the close relationship between women, fertility, community, and life within many African societies.¹¹ Women play central roles in sustaining families and communities through food production, caregiving, water collection, and social support.

The ecological crisis therefore affects women in particularly significant ways. Musa Dube reminds us that environmental crises are never abstract events. They affect real communities and real people, especially women and children.¹² When forests disappear,

women often travel longer distances to collect firewood. When water sources dry up, women frequently bear the responsibility of securing water for households. When agricultural productivity declines, women experience increased workloads and food insecurity. Wangari Maathai vividly documented these realities in her work with rural communities throughout Kenya. She observed how environmental degradation directly affected women's daily lives and contributed to poverty, hunger, and social instability.¹³

Ecofeminist theologians have further highlighted the connections between environmental exploitation and gender oppression. Lisa Isherwood and Marko Zlomislíć argue that both women and nature have frequently been subjected to similar structures of domination and control.¹⁴ Patriarchal systems that seek to dominate women often reflect broader patterns of domination over the natural world.

The consequences are evident globally. Women and children frequently become the first victims of climate change despite contributing least to its causes. Environmental disasters, food insecurity, displacement, and resource scarcity disproportionately affect vulnerable populations.¹⁵ The ecological crisis is therefore also a justice crisis. It raises fundamental questions concerning power, responsibility, and inequality. The suffering of women and the suffering of the earth are often intertwined realities within the same story of injustice.

4. Ubuntu as the Healing Medicine for a Groaning Creation

If the earth is wounded, where might healing be found?

Within African philosophical traditions, Ubuntu offers a profound answer. Ubuntu is often summarised through the expression: "I am because we are." Desmond Tutu describes Ubuntu as the recognition that human beings exist only through relationships with others.¹⁶ Personhood is not an isolated achievement but a communal reality. Human flourishing depends upon interconnectedness, reciprocity, and mutual care.

For this reason, I describe Ubuntu as the **Vitamin of Life**. Just as vitamins strengthen the body, Ubuntu strengthens relationships. It reminds us that wellbeing emerges not through selfishness but through solidarity. Michael Battle argues that Ubuntu challenges individualistic understandings of identity and invites people to discover themselves through interconnectedness.¹⁷ Similarly, Mogobe Ramose presents Ubuntu as a philosophical vision grounded in community, compassion, and shared responsibility.¹⁸

Ubuntu also extends beyond human relationships. Laurenti Magesa notes that African spirituality understands human life as inseparable from nature, community, ancestors, and the divine.¹⁹ Human beings do not exist apart from creation but within it. This insight has profound ecological implications. The ecological crisis is partly the result of what might be called the “I syndrome”—the belief that individuals, corporations, or nations can pursue their own interests without regard for the wellbeing of others. Such attitudes generate exploitation, environmental degradation, and social injustice. Ubuntu offers an alternative vision. Instead of “I first,” it teaches “we together.” Instead of competition, it promotes cooperation; instead of domination, care; instead of extraction, stewardship. The healing of the earth requires precisely this transformation of consciousness. Ecological renewal begins when people rediscover that they belong not only to one another but also to the wider community of creation.

5. The Exploitation of Africa and the Ecological Cost of Global Prosperity

The suffering of creation is particularly visible in the exploitation of Africa’s natural resources. The Democratic Republic of Congo provides a striking example. The country possesses vast reserves of cobalt, coltan, copper, and other minerals essential for modern technologies, including smartphones, computers, electric vehicles, and renewable energy systems.

Yet the wealth generated by these resources rarely benefits local communities. Siddharth Kara’s study *Cobalt Red* documents how

global demand for cobalt has contributed to environmental destruction, dangerous labour conditions, and human suffering within the Congo.²⁰ Communities often bear the costs of extraction while receiving few of its benefits. Jason Stearns similarly demonstrates how competition for resources has contributed to violence and instability within the region.²¹ Economic interests, political conflict, and environmental exploitation frequently reinforce one another.

Denis Mukwege has repeatedly drawn attention to the suffering experienced by women and children within these contexts.²² These realities raise difficult ethical questions. Who pays the price for global prosperity? Who bears the environmental costs of technological progress? The transition to greener technologies is important, yet it must not be achieved through the exploitation of vulnerable communities. Genuine sustainability requires justice. Pope Francis warns that environmental degradation and social injustice are inseparable.²³ Likewise, Leonardo Boff insists that the cry of the earth and the cry of the poor must always be heard together.²⁴ Climate justice therefore requires more than reducing carbon emissions. It requires transforming economic systems that externalise environmental costs onto vulnerable communities.

6. Climate Justice as Shared Responsibility

Climate change presents one of the greatest moral challenges of our time. The countries most vulnerable to climate impacts are often those that contributed least to historical greenhouse-gas emissions. African communities increasingly experience droughts, floods, food insecurity, and environmental instability despite their relatively small contribution to global emissions.

This reality highlights the importance of climate justice. Climate justice recognises that environmental responsibilities are shared but not equal. Those who have benefited most from fossil-fuel-driven development bear particular obligations to support mitigation, adaptation, and ecological restoration.

Ubuntu provides an important ethical framework for understanding these responsibilities. If humanity is interconnected, then suffering in one part of the world concerns everyone. Leonardo Boff argues that ecological crisis is also a spiritual crisis because it reflects distorted relationships between humanity and creation.²⁵ Heinrich Bedford-Strohm similarly emphasises that Christian responsibility must be understood globally.²⁶ No nation can solve ecological problems alone, and no community can heal the earth in isolation. The challenges are collective and therefore the responses must also be collective.

Climate justice requires solidarity, cooperation, and shared responsibility. It requires listening to vulnerable communities and ensuring that ecological transitions are equitable and inclusive. The future of the earth depends upon humanity's willingness to act together.

7. Conclusion: Healing the Earth through Ubuntu

The ecological crisis is not only an environmental problem. It is a crisis of relationships. The earth groans because human beings have forgotten their interconnectedness with creation. Communities suffer because economic systems frequently prioritise profit over life. Women and children bear disproportionate burdens because injustice remains deeply embedded within global structures. Yet hope remains possible. The biblical vision of creation reminds us that the earth is fundamentally good. Romans 8 reminds us that creation's groaning is not the final word. Groaning anticipates new life.

Ubuntu offers a pathway towards that future. By affirming solidarity, reciprocity, responsibility, and care, Ubuntu challenges the individualism and exploitation that have contributed to ecological crisis. It reminds humanity that life flourishes through relationships. The healing of the earth will not come through technology alone. It will require moral transformation, ecological responsibility, and renewed commitment to justice. The earth is our common home. Its future is our shared responsibility. And perhaps the most important lesson Ubuntu teaches us is this: we can heal the earth

only when we learn once again to live as a community of life, bound together in responsibility to one another, to creation, and to God.

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10. Pathways to Sustainable Living: What Does Responsible Theology Teach Us?

MIMII BROWN

Abstract

Educators, faith leaders, and students each face the challenge of developing approaches to economic activity that remain environmentally, ethically, and theologically responsible. Drawing on the narrative of manna and quail in Exodus 16 as its central biblical lens, it develops a framework of responsible theology grounded in stewardship, justice, moderation, and care for creation. This framework offers guidance for shaping sustainable patterns of living, consumption, and production. The chapter concludes with a prophetic question directed to all readers: are we managing God's gifts as faithful stewards, or quietly accumulating as owners while others remain in need?

Keywords: sufficiency; Exodus 16; manna; sustainability; consumption; stewardship; creation care; ecological ethics; food systems; theology

1. Introduction

I begin with a challenge directed to educators, faith leaders, and students alike: **how can we pursue economic growth in ways that remain environmentally, ethically, and theologically responsible?**

This question resists easy answers. It points to a central tension of contemporary life: the gap between ambition—what institutions, communities, and individuals seek to achieve—and the realities of

ecological limits, ethical responsibilities, and theological commitments. It is the same tension that underlies the broader theme of this conference, approached here from the perspective of practical and pastoral theology. The challenge is therefore not simply how to achieve growth, but how to pursue it responsibly. It is not enough to ask what can be produced, consumed, or accumulated. We must also ask whether these activities contribute to the flourishing of people, communities, and the wider creation. Responsible theology provides a framework for addressing these questions by connecting faith with everyday practice and guiding human action towards sustainable and just ways of living.

This chapter draws on the narrative of manna and quail in Exodus 16 to explore what responsible theology can teach about sustainability, consumption, and stewardship. It argues that sustainable living is rooted not in endless accumulation but in the practice of sufficiency, trust, justice, and care for creation. In doing so, it seeks to show how theological reflection can inform practical responses to the ecological and economic challenges of our time.

2. Key Concepts: Definitions

Four concepts provide the foundation for this discussion.

Pathways to sustainable living refer to practical ways of life that protect the environment, use resources wisely, and promote long-term wellbeing for both people and the planet.

Production involves creating goods and services responsibly as stewards of God's creation.

Consumption refers to the use of those goods and services in ways that are wise, ethical, and free from excess.

Responsible theology refers to an approach to faith that guides human action through moral responsibility, promoting justice, stewardship, and care for both people and the Earth.

These concepts are not merely theoretical. They are practical and operational, translating abstract commitments into everyday decisions about how we produce, consume, and live. Together, they form a coherent framework of responsible theology—a theology that shapes behaviour and informs action.

3. Biblical Foundation: The Manna and Quail Narrative

The Narrative

The central biblical text for this reflection is Exodus 16, the account of manna and quail in the wilderness. As the Israelites journey through the desert after leaving Egypt, they complain to Moses and Aaron about hunger. Their longing for the food of Egypt reveals how easily oppression can be remembered as security when people are confronted by uncertainty. God responds not with condemnation but with provision. Manna appears in the morning and quail in the evening. Yet this provision is accompanied by specific instructions:

- Gather only what is needed for each day—no more and no less.
- On the sixth day, gather double in preparation for the Sabbath.
- Do not keep manna overnight on ordinary days.

The narrative introduces a theology of sufficiency. God provides daily, and the appropriate human response is trust rather than accumulation.

Human Behaviour in the Wilderness

The Israelites' response to these instructions is both complex and instructive. Their behaviour reflects patterns that remain recognisable in contemporary systems of production and consumption. Where the Israelites responded to uncertainty through complaint and distrust, the text calls instead for faith and daily dependence

upon God's provision. Where some attempted to hoard manna—only to discover that it spoiled—the lesson is to take only what is needed and to resist the impulse to accumulate beyond necessity. Where some disregarded the Sabbath by gathering manna when forbidden, the narrative insists on the importance of rest, reminding us that not every moment is intended for production and acquisition. The Israelites also required time to learn dependence upon God. Sustainable living is therefore portrayed not as a single choice but as a discipline cultivated through repeated practice. The narrative highlights God's faithfulness in providing for his people and teaches reliance upon daily provision rather than fear-driven accumulation. This is not a call to passivity. It is a call to trust—and in this text, trust takes on a distinctly ecological character.

4. What Does Responsible Theology Teach Us?

Responsible theology offers a framework for understanding how human life—through production, consumption, and everyday decision-making—should be shaped by stewardship, justice, moderation, and care for creation. Its central claim is simple: faith has practical implications. It guides how individuals and communities live in relation to God, to one another, and to the Earth.

This framework operates not only at the level of belief but also at the level of lived practice. Responsible theology insists that the ways in which we produce goods, use resources, and organise economic life reflect our theological commitments. In this sense, theology is not removed from everyday life; it is embodied within it.

Stewardship, Not Ownership

Responsible theology begins with the conviction that creation belongs to God. As Psalm 24:1 declares, "The earth is the Lord's, and everything in it." Human beings are therefore not owners but stewards, entrusted with the care and preservation of what ultimately belongs to God. This shift from ownership to stewardship carries significant implications. It challenges exploitative patterns of production and consumption by reminding us that resources are not

unlimited commodities but gifts entrusted to human responsibility. Stewardship requires that resources be used in ways that respect ecological limits, promote justice, and contribute to the wellbeing of others.

Challenging Ambition with Humility

Responsible theology also calls for a critical examination of ambition. Ambition itself is not inherently problematic. The desire to achieve worthwhile goals can motivate innovation, service, and development. Problems arise, however, when ambition becomes detached from ethical responsibility and ecological limits. The manna narrative illustrates this clearly. Those who gathered more than they needed discovered that their excess spoiled. The story therefore challenges the assumption that more is always better. Unlimited accumulation is neither sustainable nor faithful. Responsible theology calls for humility—a willingness to recognise limits and align human aspirations with the wellbeing of communities and creation.

Shaping Lifestyles for the Earth's Habitability

Responsible theology contributes to the habitability of the Earth by promoting sustainable living, environmental care, and responsibility towards future generations. This is not a peripheral concern of faith but a central one. The habitability of the Earth is, from a theological perspective, a matter of covenant responsibility. Five dimensions of responsible theology are particularly relevant.

Stewardship begins with the conviction that creation belongs to God and that human beings are entrusted with its care. In practice, this means developing systems of production that respect ecological limits and patterns of consumption that honour this trust.

Justice recognises that access to resources is a moral concern. The poor often bear the costs of excessive consumption by others. Justice therefore calls for fairness in supply chains, equitable distribution of resources, and a commitment to prioritising the needs of vulnerable communities.

Moderation flows directly from the manna narrative's insistence that enough is enough. It requires reducing waste, resisting consumerism, and aligning desire with genuine need.

Care for creation recognises the Earth's habitability as a theological concern in its own right. Damage to creation is therefore not merely an environmental issue but also a matter of faithfulness. Practices such as sustainable agriculture, renewable energy, and circular economic models can be understood as expressions of covenant responsibility.

Trust over greed offers a theological alternative to the fear and greed that drive overconsumption and unjust accumulation. It calls for economic and agricultural systems that value sufficiency rather than endless growth at ecological cost.

5. Actions: What We Should Do

Responsible theology cannot remain at the level of reflection alone; it calls for concrete action. If theology is to be meaningful, it must shape how we live, work, produce, and consume.

First, we are called to practise moderation. This means using only what is necessary and avoiding waste and excess in both consumption and production. Moderation is not deprivation. Rather, it is the recognition that enough is sufficient and that unchecked accumulation undermines ecological balance and social wellbeing.

Second, we are called to embrace sustainable living. This involves protecting the environment and supporting the responsible use of natural resources. Everyday choices should be guided by long-term responsibility rather than short-term gain.

Third, responsible theology calls us to promote justice. Patterns of production and consumption must be examined in light of their impact on others, particularly those who are vulnerable or marginalised. Fair access to resources and equitable participation in economic life are essential dimensions of faithful living.

Fourth, we are challenged to use technology wisely. Technological innovation can help address poverty, improve wellbeing, and support environmental sustainability. However, technology must be guided by ethical responsibility and directed towards the flourishing of life rather than exploitation.

Fifth, we are called to work responsibly. Production should respect human dignity, uphold fair labour practices, and preserve the integrity of creation. Work is not merely economic activity; it is participation in God's ongoing care for the world.

Finally, the manna narrative calls us to trust and obey. Rather than acting from fear of scarcity, we are invited to depend upon God's provision. This does not exclude prudent planning, but it challenges the tendency to accumulate excessively. Faithfulness is expressed not through hoarding but through trust. These actions are not a checklist to be completed once. They describe a way of life—a sustained commitment to stewardship, justice, moderation, and care for creation. They are especially important for educators and faith leaders, who help shape the values and practices of future generations.

6. A Prophetic Question

Are we managing God's gifts as faithful stewards, or are we quietly becoming owners who accumulate while others remain in need? This question is intentionally probing. Rather than resolving the tension between ambition and responsibility, it brings that tension into sharp focus and places it before the moral and theological conscience of the reader. It presents two contrasting orientations: faithful stewardship on the one hand, and the subtle tendency towards accumulation on the other.

The term *quietly* is especially significant. The forms of accumulation in question are not always dramatic or visible. More often, they are gradual, normalised, and embedded within everyday practices. They appear in routine patterns of consumption, investment, and participation in economic systems that prioritise profit over justice and ecological sustainability.

Importantly, this question extends beyond individual behaviour. It also draws attention to the structures within which such behaviour is formed and sustained—economic systems, supply chains, consumption patterns, and land-use practices. These structures play a crucial role in determining whether the gifts of creation are shared equitably or concentrated in ways that exclude others.

The prophetic force of the question therefore lies in its dual focus. It calls for personal examination while simultaneously demanding critical reflection on the systems and institutions that shape collective life. It challenges individuals, communities, and organisations not only to reconsider their practices but also to evaluate the structures they maintain and perpetuate.

7. Conclusion

This chapter has explored how responsible theology provides a framework for shaping sustainable patterns of living, consumption, and production. Against approaches that separate faith from everyday practice, it has argued that theology must inform how individuals and communities engage with economic life and ecological realities. The narrative of Exodus 16 offers a powerful theological vision of sufficiency grounded in trust, discipline, and daily dependence upon God's provision. By teaching the Israelites to gather only what they needed, the manna narrative challenges patterns of accumulation, excess, and fear that continue to shape contemporary systems of production and consumption.

At the heart of this chapter lies a framework of responsible theology that integrates stewardship, justice, moderation, and care for creation. These are not abstract ideals but practical principles that shape how resources are used, how communities are organised, and how the Earth's life-sustaining systems are protected. The chapter has also emphasised that sustainability presents both a personal and a structural challenge. It requires individuals to examine their habits of consumption while encouraging communities, institutions, and policymakers to address the systems that perpetuate environmental degradation and social inequality.

Ultimately, responsible theology teaches that sustainability is not merely a technical or policy issue but a matter of faithfulness. To live sustainably is to live within limits, to practise justice, to care for creation, and to trust in God's provision. In a world marked by ecological crisis and growing inequality, the lesson of the wilderness remains profoundly relevant: there is enough when God's gifts are received with gratitude, shared with justice, and used with restraint.

11. Tilling and Keeping: Sustainable Agriculture from a Biblical and Theological Perspective

LECHION PETER KIMILIKE

Abstract

The God-given mandate to humanity to “till and keep” the earth, as expressed in the Old Testament creation narratives, provides a profound biblical and theological foundation for sustainable agriculture. This chapter examines how agriculture has often been neglected in theological studies, leading to ecological and social consequences, including exploitative interpretations of dominion. Drawing on Genesis 2:15, African traditional wisdom, Old Testament land theology, and contemporary ecological concerns, it argues that sustainable agriculture is a divine vocation. Tilling and keeping represent a relational responsibility toward creation and form part of God’s enduring mission entrusted to humanity for the preservation and flourishing of life.

Keywords: Genesis 2:15; tilling and keeping; sustainable agriculture; biblical theology; African wisdom; land; stewardship; creation care; ecological responsibility

1. Introduction

What is sustainable agriculture from a theological perspective? This question forms the central concern of this chapter. The answer, however, is not straightforward because agriculture and theology have received insufficient attention in biblical and theological studies until relatively recently. One reason for this neglect is that

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many mainstream missionary approaches within the churches focused primarily on the spiritual salvation of souls, often in ways that alienated human beings from nature and the land.

Frank Moore Cross observes that much Christian and Western thought contributed to a radical alienation of humanity from nature. Greek idealism, Gnostic dualism, medieval theological tendencies, and German idealism each sought, in different ways, to separate humanity from nature and to exclude nature from the history of salvation.¹ Such theological alienation has had serious consequences. It has encouraged Christians to think about salvation as though it concerns only the soul while neglecting the land, agriculture, food, animals, forests, water, and the wider created order.

This perspective stands in sharp contrast to traditional African agricultural wisdom. Among the Sukuma people of Tanzania, a proverb says: *Idimagi chiza isi, kulwa nguno batang'winhile babyaji bing'we bamubikija bana bing'we*. Literally translated, it means: "Treat the earth well. It was not given to you by your parents; it was loaned to you by your children."² This proverb gives future generations a voice in the use of agricultural land. It expresses a holistic understanding of land as a common wealth entrusted to the living by both ancestors and descendants.

In African traditional thought, land is not merely private property. Together with water, animals, minerals, labour, and other natural resources, it is understood as a divine and dynamic gift to past, present, and future generations.³ Agriculture was therefore not only an economic activity but also a religious act. The agricultural cycle was marked by rituals, sacrifices, prayers, and communal intercession. Traditional religious specialists often played important roles in promoting agriculture through observances connected with the seasons and the fertility of the land.⁴

This African closeness to the land is helpful for developing a biblically grounded understanding of sustainable agriculture. It supports what Gabriel Ezekia Nduye calls "an African Christian ethic of care" that promotes life-affirming agricultural methods rather than irresponsible farming practices that damage God's creation and deplete the ecosystems that sustain life.⁵ In this respect, African tra-

ditional agricultural wisdom stands close to the Old Testament understanding of land. Both are regenerative. Both emphasise the health of the land, the welfare of future generations, social and interspecies justice, meaningful work, responsible relationships, reverence for life, and care for the land as God's gift.

2. Agriculture as Divine Vocation and the Earth as God's Farm

Is sustainable agriculture deeply and inherently biblical? Put more simply: what constitutes biblically good agriculture? This question reveals two important dimensions of the relationship between agriculture and humanity.

First, agricultural sustainability forms part of God's basic mission to humanity as revealed in the creation narratives of Genesis 1 and 2. In the second creation account, God's purpose in creating the human being is directly connected with the need for someone to till the ground (Gen. 2:5). After forming the human being from the dust of the ground (Gen. 2:7), God established a garden in Eden and placed the human being there (Gen. 2:8). The garden was not simply a place of leisure. It was a place of vocation, learning, cultivation, and responsibility.

Genesis 2:15 states: "The Lord God took the man and put him in the Garden of Eden to till it and keep it."

The human being, *adam*, made from the soil, *adamah*, is placed in a direct relationship with the land. The two Hebrew verbs commonly translated as "till" and "keep" define the human vocation. The first, *abad*, can mean to serve, cultivate, or work. The second, *shamar*, means to keep, guard, observe, preserve, or protect. Together, they present the human being as both servant of the soil and protector of creation.

Second, the Garden of Eden may be understood as an agricultural field school. Adam, still inexperienced in farming, is placed there to learn the art of living on the created earth. Agriculture is therefore essential to human survival and flourishing as intended by God.

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Tilling and keeping are not automatic instincts; they are skills that must be learned. They include learning weather patterns, as Jesus notes in Matthew 16:3 when people interpret the appearance of the sky. They also involve learning agricultural care, as suggested in Luke 13:6–9, where the fig tree is given additional attention and manure so that it may bear fruit.

Without skilled tillers there is no food. Without food there is no future. Humanity therefore rises and falls with agriculture. God causes plants to grow, but human beings are called to cultivate the land responsibly. The Garden of Eden may thus be viewed as a universal model of agricultural education. It may even suggest a form of mixed farming, where crops and livestock contribute to soil fertility through the use of manure and organic matter.⁶

Isaiah 28:24–26 presents God as the source of agricultural wisdom:

*Do those who plow for sowing plow continually?
Do they continually open and harrow their ground?
When they have levelled its surface,
do they not scatter dill, sow cumin,
and plant wheat in rows
and barley in its proper place,
and spelt as the border?
For they are well instructed;
their God teaches them.*

The passage continues:

*Dill is not threshed with a threshing sledge,
nor is a cart wheel rolled over cumin;
but dill is beaten out with a stick,
and cumin with a rod.
Grain is crushed for bread,
but one does not thresh it forever;
one drives the cart wheel and horses over it,
but does not pulverise it.
This also comes from the Lord of hosts;
he is wonderful in counsel,
and excellent in wisdom.*

Agricultural wisdom is therefore not separate from divine instruction. God teaches the farmer how to settle in the land, cultivate, plant, harvest, and use resources without destroying them. Agriculture becomes the basic biblical human profession, requiring God's wisdom so that land and resources may be used in ways that promote life rather than destruction.⁷

This limitation upon exploitation is also reflected in the command to "keep" the garden and in the prohibition concerning the tree of the knowledge of good and evil. The command introduces spiritual values into agriculture: worship of God the Creator and reverence for creation.

The Bible also presents a creative relationship between settlement and rootedness. Jeremiah 29:5 instructs the exiles: *"Build houses and live in them; plant gardens and eat what they produce."*

Similarly, Micah 4:4 describes peace as a condition in which: *"They shall all sit under their own vines and under their own fig trees, and no one shall make them afraid."*

To be human is to be rooted in land, to practise local ecological responsibility, and to recognise the sanctity of creation. Farming connects human beings to the land and gives concrete expression to God's mission.

The word *shamar* ("keep"), when used in relation to the garden, carries rich associations throughout Scripture. It resembles the keeping of a brother (Gen. 4:9), the keeping of a flock (1 Sam. 17:20), and the keeping of a family (2 Sam. 15:16). It may also refer to observing the workings of the world (Ps. 107:43; Isa. 42:20), obeying the demands of justice (Hos. 12:6; Isa. 56:1), and observing the seasons and patterns of nature (Jer. 8:7). It further includes observing God's commands concerning Sabbath practices (Exod. 31:13).

Ellen F. Davis rightly observes that the human being is charged not only to "keep" the garden but also to "observe" it: to learn from it and to respect its limits. Indeed, keeping God's ordinances is the condition upon which Israel may retain its hold on the God-given—or more accurately, God-entrusted—land of Canaan.⁸ This under-

standing rejects the privatisation of land in ways that grant unlimited human licence. The mandate to till and keep offers a regenerative agricultural vision. It restores, sustains, and preserves the garden according to the intention of God, who remains its owner.

The human being is therefore the responsible manager of God's farm. The manager's livelihood comes from the produce of the farm (Gen. 2:16), and that livelihood corresponds to the labour invested in tilling and keeping the land (Gen. 3:19; Prov. 12:11).

3. Biblical and Theological Principles for Sustainable Agriculture

If agriculture is a divine vocation, it must be understood within a holistic theology. Such theology is God-centred and treats humanity and creation as an integrated whole, as Scripture teaches.⁹ This perspective is especially important for contemporary Christianity in Africa, where agriculture continues to employ the majority of the population. It has the potential to strengthen responsible Christian faith, encourage responsible Christian living, and support a holistic Christian mission.¹⁰

First, Christian confession must affirm clearly that God is Creator and Sustainer of the universe. This confession appears in the Apostles' Creed and in the Nicene Creed.¹¹ Human beings must therefore understand themselves as creatures located within creation and entrusted with responsibility for it.

The land was a vital component of the ancient community of faith. It was not incidental to the covenant but part of its substance. Walter Brueggemann's observation that land is "a central, if not the central theme of biblical faith" remains highly relevant.¹² Through agriculture, human beings are connected to the land, and this connection occupies an important place in God's mission to the world.

Second, sustainable agriculture involves environmental stewardship. The commands to "subdue" and "have dominion" in Genesis 1:28 should not be interpreted as permission for exploitation. Ra-

ther, they should be understood as transformative authority exercised under God's sovereignty. Humanity is called to manage creation in ways that allow all creatures to participate in creation's praise of the Creator.¹³

Third, holistic agriculture understands farmers as stewards who are sensitive to nature, rooted in the land, realistic in practice, decisive in action, and co-workers with God. The command to exercise dominion must never be interpreted as destructive control. Revelation 11:18 condemns those who destroy the earth, while Romans 8:18–25 portrays creation as longing for renewal.

Agriculture also carries a priestly dimension. It seeks to enable creation to express praise to God and to offer that praise back to the Creator. Psalm 150:6 declares:

"Let everything that breathes praise the Lord."

Agricultural stewardship therefore includes care for farms (Exod. 22:5–6), fruit trees (Lev. 19:23), animals (Prov. 12:10), vulnerable people (Lev. 19:9; 23:22), and God's covenantal order (Gen. 8:22).

Among the Hehe people of Tanzania, a proverb says: *Yahelee ingava fidunda, ingava malema pele yapifwiike*, meaning: "He who created the hills went away, but the Creator of deformities is still at work."¹⁴ This proverb expresses confidence that the Creator continues to work in partnership with vulnerable humanity for survival and flourishing. The same idea is reflected in God's covenant with Noah: "As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night shall not cease" (Gen. 8:22).

Such agricultural companionship creates balance among creatures. Human beings and trees are distinct, yet they share creaturehood and vulnerability.¹⁵ Within this companionship, only the human being is entrusted with accountable stewardship. Luke 16:2 reminds stewards that they must give an account of their management. Tilling and keeping are therefore accountability practices intended to preserve the capacity of the land to sustain all forms of life.¹⁶

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Finally, holistic agricultural practice involves teamwork and co-workership with others and with God (1 Cor. 3:9). Chris Gousmett expresses this well:

The biblical perspective on the earth is rooted in the belief that the world and all that it contains was created by God and continually sustained and cared for by God. Human beings were created for two main purposes: firstly, to have fellowship with God and offer a loving response to His goodness to the world; secondly, to care for the world He has made and to explore and uncover its richness, developing it in a responsible manner for the benefit of all. The two purposes behind God's creative act are not separate. They are intrinsically bound up together.¹⁷

Christian communities must therefore develop sustainable relationships between people and nature. Such relationships include belief in the goodness of creation, the image of God as a mandate to govern and serve the earth, the Jubilee tradition, God's covenant with all creation, and human responsibility to live according to God's intentions for the world.¹⁸ In relation to agricultural land, *nahalah* (inheritance) possesses profound theological significance. Psalm 37:18 states that the Lord knows the days of the upright and that their inheritance will endure. Land inheritance is God's blessing to the people (Lev. 26:4–13). Deuteronomy 4:21 speaks of “the good land” given by God as an inheritance. In agricultural societies, landlessness is painful because land is tied to economic independence, identity, citizenship, dignity, and communal wellbeing.

4. Implications of Sustainable Agricultural Biblical Teaching

The preceding discussion demonstrates a clear biblical connection between agriculture and human vocation. This connection has social, economic, ecological, and spiritual implications. Yet the contemporary Church has often neglected the agricultural inheritance found within Scripture.

Lynn White famously argued that aspects of Christianity contributed to the ecological crisis by encouraging unsustainable relationships with nature.¹⁹ Whether or not one fully agrees with his analysis, it highlights the importance of recovering biblical agricultural wisdom.

Ellen F. Davis similarly argues that agricultural decisions are often shaped by cultural assumptions that encourage exploitation rather than stewardship.²⁰ Land should never be reduced to a mere commodity. Julius K. Nyerere expressed a similar conviction: All human beings, be they children brought up in poor or rich families, or belonging to sinners or saints, or even those whose parents are either slaves or free men, were born to find land in existence. They can neither add to it nor reduce its extent. It is God's gift, given to all His creation without any discrimination.²¹

Ancient Israel and traditional African societies alike depended on subsistence agriculture. Land formed the foundation of economic life and communal wellbeing.²² If Christian faith is to remain meaningful in Africa, where the majority of people depend directly or indirectly on farming, sustainable agricultural teaching must be recognised, developed, and respected.

The implementation of faith-based agricultural teaching can benefit greatly from indigenous ecological knowledge. Among the Wabena of Tanzania, remembrance of ancestors is linked with a commitment by the living to care for nature as part of their stewardship of land borrowed from future generations. Land management includes limits on resource use and the practice of resting portions of farmland to preserve fertility.²³ Such practices show a clear awareness of the relationship between nature, economic life, and human survival.

Another important implication is the need to connect sustainable agriculture with Christian spirituality. Farming must be recognised as a vocation. Food serves as a medium through which human beings live, form relationships, and express gratitude to God. It possesses physical, social, moral, and spiritual significance.²⁴

The World Council of Churches has stated:

Protection of the atmosphere is both a moral responsibility and a spiritual answer to the divine invitation to humanity. Spirituality is defined as a practice of living out of gratitude and wonder for the life-sustaining richness of creation, a feeling of deep commitment to all life and to nature as God's creation, and a sincere indignation about all threats to this richness. The churches' commitment to the issue of climate change grows out of attentive listening to the most vulnerable and marginalized and responds to the prophetic call for justice and transformation.²⁵

Christians therefore have a responsibility to recognise the environmental damage that religion has sometimes contributed to through neglect of creation care. The Bible is not merely a book about heaven or personal salvation. It is also a practical guide to the proper use of land, especially agricultural land, and a warning against its abuse.²⁶ The Church should therefore promote agricultural stewardship through teaching, evangelism, and theological education. Biblical principles of land management can improve livelihoods, strengthen climate resilience, restore soil fertility, and contribute to environmental sustainability. Theological curricula should include agricultural understanding from a faith perspective.

5. Concluding Remarks

This chapter has argued that sustainable agriculture from a biblical and theological perspective must be recovered as a central dimension of Christian faith and mission. The biblical mandate to till and keep the land has too often been neglected, yet it remains a fundamental expression of humanity's vocation within creation.

The principles of tilling and keeping establish human accountability before God for the care of the earth. They affirm that the land belongs ultimately to God and that human beings are stewards rather than owners. Sustainable agriculture therefore requires care for future generations, attentiveness to ecological limits, and faithful participation in God's sustaining work.

The chapter has also demonstrated that biblical teaching on land and agriculture resonates strongly with African ecological wisdom. Both traditions affirm the interconnectedness of people, land, community, creation, and future generations. Together they offer important resources for addressing contemporary ecological challenges. In Tanzania, and throughout Africa, the Church has an important role to play in promoting agricultural stewardship. Through teaching, theological education, community engagement, and practical agricultural initiatives, Christian communities can help restore an understanding of farming as both a livelihood and a sacred vocation.

To till and keep the earth is therefore more than an agricultural task. It is a covenant responsibility, an act of worship, and a continuing participation in God's mission of sustaining creation. In a time of ecological crisis, recovering this vocation is not optional. It is essential for the flourishing of humanity, the wellbeing of future generations, and the integrity of God's creation.

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12. Biblical Insights on Production and Consumption that Preserve the Earth's Capacity to Sustain Life

EMMANUEL GLADSON MWAIKULU

Abstract

This chapter develops a biblical-theological account of principles governing responsible production and consumption. Through eight interrelated themes—God as Creator and Owner, stewardship, justice and care for creation, contentment, sin and environmental destruction, land Sabbath, intergenerational accountability, and harmony between humanity and creation—it demonstrates that Scripture provides a comprehensive framework for sustainable living. Preserving the Earth's capacity to sustain life is therefore not an optional environmental concern but a theological and moral obligation grounded in God's character and humanity's vocation. The chapter concludes with a bilingual summons from Isaiah 1:19, linking obedience with the flourishing of the land.

Keywords: responsible production; responsible consumption; stewardship; creation care; sustainability; Sabbath; justice; biblical theology; ecological ethics; Christian responsibility

1. Introduction

The question of how human beings produce and consume is not peripheral to Christian faith—it lies at its centre. From the opening chapters of Genesis, where humanity is placed in the garden to cultivate and care for it, to the prophetic literature, where moral failure and ecological degradation are linked together, Scripture con-

sistently connects the way human communities relate to the natural world with the quality of their relationship to God.¹ This chapter proceeds in ten steps, each developing one dimension of the biblical framework. Together, they constitute a coherent theology of production and consumption that is both spiritually grounded and practically urgent.

2. God: Creator and Owner of the Earth

The entire biblical framework for sustainable production and consumption rests on a prior theological affirmation: God is the Creator and Owner of all things. The Bible opens with this claim (Genesis 1–2), and Psalm 24:1 articulates it with striking clarity: “The earth is the Lord’s, and everything in it.” Several implications follow directly from this foundation. Creation is declared “very good” (Genesis 1:31), establishing that the natural world possesses inherent value and is not merely valuable because it serves human needs. Recognising God as the ultimate Owner fosters both humility and responsibility. If the Earth belongs to God, then human beings cannot relate to natural resources as absolute proprietors. This theological foundation challenges the extractive logic that underlies much contemporary production and consumption. It replaces the language of ownership with the language of trust: human beings hold the Earth and its resources as trustees, not as owners.

3. Humanity: Mandated to Stewardship

If God is the Owner, humanity is the steward—entrusted with both the productive use and protective care of creation. Genesis 2:15 places the human being in the garden “to work it and take care of it,” defining the human vocation in relation to the Earth. The New Testament deepens this understanding through the Parable of the Talents (Matt. 25:14–30), in which servants are held accountable for how they manage what has been entrusted to them. Three responsibilities follow from this mandate:

- **Responsibility**—avoiding exploitation and misuse;
- **Efficiency**—avoiding waste and unnecessary loss;
- **Alignment with God’s purposes**—rejecting forms of production driven solely by profit.

Stewardship therefore requires both productivity and accountability.

4. Justice and Care for Creation

Biblical ethics extend explicitly to the natural world. Proverbs 12:10 affirms care for animals, Deuteronomy 20:19 limits environmental destruction even during war, and Romans 1:20 affirms the significance and value of creation as a witness to God. These texts encourage a posture of respect and reverence towards the environment. Environmental justice is therefore not a modern addition to biblical ethics; it is embedded within Scripture itself. The care of creation reflects both love for God and concern for the wellbeing of present and future generations.

5. The Principle of Contentment: Enoughness

Scripture consistently teaches moderation and contentment, as reflected in Proverbs 30:8–9, 1 Timothy 6:6–8, and Luke 12:15. Greed-driven overconsumption often leads to environmental degradation, resource depletion, and social inequality. Contentment, by contrast, promotes simplicity, gratitude, and the responsible use of resources. The concept of *enoughness* captures the biblical recognition that there is a point at which accumulation ceases to be a blessing and becomes a form of disorder. Sustainable living therefore requires discernment regarding what is sufficient rather than an endless pursuit of more.

6. Sin and Environmental Destruction

The Bible identifies ecological degradation as one consequence of human sin. Hosea 4:1–3 links moral failure with environmental collapse, declaring that the land mourns and the creatures that inhabit it suffer. Unsustainable patterns of production and consumption therefore carry both spiritual and environmental consequences. Ecological crises are not only technical or economic problems; they also reveal deeper moral and spiritual failures. Sustainable living can thus be understood as an expression of repentance, restoration, and covenant renewal.

7. Land and Sabbath: Rest as an Ecological Principle

Leviticus 25:1–7 introduces the principle of Sabbath rest for the land. Every seventh year the land was to lie fallow rather than being cultivated continuously. This command reflects profound ecological wisdom. It recognises that the land has limits, that continuous exploitation leads to degradation, and that rest is necessary for renewal. The Sabbath principle acknowledges that productivity must be balanced by recovery and restoration. In many respects, this biblical teaching anticipates contemporary discussions of regenerative agriculture and sustainable land management.

8. Accountability to Future Generations

Biblical stewardship extends beyond the present generation. Proverbs 13:22 teaches that “a good person leaves an inheritance for their children’s children.” Similarly, Psalm 112:1–2 declares: “Blessed are those who fear the Lord... their children will be mighty in the land.” Deuteronomy 6:6–7 instructs parents to teach God’s commandments to their children, while Genesis 17:7 establishes God’s covenant with future generations. Exodus 20:5–6 further reminds readers that present actions have consequences that extend beyond the immediate moment. This intergenerational perspective

demands sustainability in both values and resource use. Responsible production and consumption require consideration not only of present needs but also of the wellbeing of future generations.

9. Practical Applications for Contemporary Society

Biblical teaching leads naturally to practical action. Agriculture should follow principles of conservation, renewal, and responsible land management. Consumption should reflect moderation and avoid waste, in keeping with the teaching that “godliness with contentment is great gain” (1 Tim. 6:6). Faith communities have a particular responsibility to model and teach sustainable living. Sharing resources reflects biblical commitments to justice, while participation in environmental conservation expresses collective stewardship. These principles have personal, communal, and structural implications.

Area	Application
Agriculture	Crop rotation, fallow systems, and waste reduction
Consumption	Moderation and the reduction of waste
Faith Communities	Teaching and modelling sustainable living
Community Sharing	Justice, generosity, and redistribution
Conservation Participation	Collective stewardship of creation

These principles operate not only at the level of individual behaviour but also within wider social, economic, and institutional structures.

10. Harmony Between Humanity and Creation

The biblical vision culminates in harmony between humanity and creation. Genesis 1:31 declares: “God saw all that he had made, and it was very good.” This harmony involves responsible use of resources, gratitude for God’s gifts, preservation of creation for future generations, and alignment with God’s purposes. Sustainability is therefore not external to faith; it is intrinsic to faithful living. Human flourishing and environmental wellbeing are not competing goals but mutually reinforcing dimensions of God’s intention for creation.

11. Summary: The Eight Biblical Principles

The eight principles discussed in this chapter form a coherent framework for responsible production and consumption:

- God as Creator and Owner
- Stewardship
- Justice and care for creation
- Contentment
- Recognition of sin and its consequences
- Sabbath rest
- Intergenerational responsibility
- Harmony between humanity and creation

Together, these principles provide a theological framework for sustainable living.

12. Conclusion

The biblical perspective on production and consumption provides a comprehensive framework for sustainability. Humanity is not the owner of creation but its steward, entrusted with the responsibility of managing God's gifts wisely and faithfully.

Preserving the Earth's capacity to sustain life is therefore both an environmental and a theological responsibility. Sustainable living reflects obedience to God, care for creation, concern for future generations, and commitment to justice.

As Isaiah declares:

"If you are willing and obedient, you shall eat the good things of the land" (Isa. 1:19).

"Kama mkikubali na kutii, mtakula mema ya nchi."

This biblical promise reminds us that obedience to God and the flourishing of the land belong together.

Endnotes

1. Unless otherwise noted, biblical quotations in this chapter follow the New Revised Standard Version (NRSV) of the Bible (Washington, DC: National Council of Churches, 1989).

Interlude II: What Theology Contributes

Part II has interpreted the ecological crisis diagnosed in Part I through the lenses of Ubuntu, the manna narrative's economy of sufficiency, a direct exegetical challenge to dominationist readings of Genesis, and a comprehensive biblical ethic of production and consumption. Before Part III turns to practical and institutional responses, it is worth identifying what theology contributes to the conversation that agroecological science and development policy, valuable though they are, cannot provide on their own.

- **Creation.** Chapters Nine to Twelve share a doctrine of creation in which the earth is not merely raw material awaiting human use but a community of life to which humanity itself belongs. This conviction forms the theological foundation beneath every claim made in this volume about relationship, responsibility, and care rather than domination and exploitation.
- **Stewardship.** Kimilike's exegesis of Genesis 2:15 gives this doctrine of creation its clearest practical expression. Humanity's vocation is to cultivate and protect rather than to extract and destroy. This vocation is not imposed upon the biblical text from outside; it arises directly from the commands to "till" and "keep" the garden entrusted to human care.
- **Relationality.** Ngoy's Ubuntu framework and Brown's economy of sufficiency both insist that ecological ethics cannot be reduced to individual virtue alone. Human flourishing emerges through right relationships with God, neighbour, community, future generations, and the land itself. Ecological crisis follows wherever these relationships are damaged, distorted, or forgotten.
- **Justice.** Mwaikuru's biblical ethic of production and consumption refuses to separate ecological responsibility from economic justice. Questions concerning how food is grown, distributed, consumed, and shared are not merely technical or policy matters; they are theological questions that reveal how

communities understand stewardship, neighbourliness, and the common good.

- **Hope.** Taken together, these four chapters resist despair without minimising the severity of the crisis documented in Part I. Theology's distinctive contribution is not the provision of a technical solution overlooked by science but an account of why the work of restoration remains worth pursuing. It grounds hope in the conviction that creation, despite its wounds, remains the object of God's continuing care and redemptive purpose.

These five themes, namely creation, stewardship, relationality, justice, and hope, do not represent separate theological insights but mutually reinforcing dimensions of a single vision. Together, they provide the moral and spiritual framework within which practical responses become possible.

Part III now asks what follows from this theological foundation in practice: what faith communities, churches, and institutions are called to do once creation, stewardship, relationality, justice, and hope are adopted as starting points rather than merely as conclusions.

PART III

FAITH AS A TRANSFORMATIVE POWER

Having asked what is happening and how it should be interpreted, Part III turns to the question that gives it its title: how should we respond? The final section moves from interpretation to practice and, in its concluding chapters, to constructive theological reflection. Lyimo-Mbowe opens by asking what makes faith transformative rather than merely doctrinal. Lugazia follows with a diagnosis, reworking Luther's *incurvatus in se* as a theological account of the self-enclosure that drives ecological degradation and the commodification of creation. Shoo then offers an institutional response through the Church Climate Action Partnership, demonstrating what faith-driven ecological transformation looks like when it is organised, resourced, and embedded in community life. Katabaro's study of KARUCO College extends this discussion by showing how a church-based institution can promote sustainable agriculture, environmental stewardship, and rural transformation through education, research, and community engagement. The next chapter turns to indigenous ecological wisdom, exploring how the cosmology and lived practices of the Bahaya and Banyambo historically functioned as mechanisms of ecological stewardship and intergenerational responsibility. Chapter Eighteen closes the volume by drawing together the empirical findings, practical initiatives, theological diagnoses, and indigenous ecological insights developed throughout the preceding chapters, and proposes Agrartheology as the constructive theological horizon toward which their diverse perspectives converge.

13. Faith in a Warming World: How Faith Unleashes Transformative Power for Ecological and Social Change

HOYCE JACOB LYIMO-MBOWE

Abstract

How faith serves as a transformative force for ecological and social change in a warming world is this chapter's central question. While climate change is often addressed through scientific and political approaches, these remain insufficient when they fail to engage its moral and spiritual roots. Drawing on biblical theology, African theological perspectives, and the concept of *incurvatus in se*, the chapter argues that faith reshapes human identity, reorders desire, mobilises communities, advances justice, and sustains hope. Through theological reflection and examples from African contexts, particularly the Mindolo Ecumenical Foundation in Zambia, it demonstrates that faith provides an essential framework for holistic ecological responsibility and socially just transformation.

Keywords: faith; climate change; ecological transformation; social change; *incurvatus in se*; African theology; stewardship; Mindolo Ecumenical Foundation; eco-justice; hope

1. Introduction

Climate change is widely framed as a scientific and political problem requiring technological innovation, policy reform, and international cooperation. While such responses are necessary, they remain insufficient when they fail to address the moral, spiritual, and anthropological roots of ecological degradation. A warming world—characterised by rising global temperatures driven by fos-

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sil-fuel combustion, deforestation, industrial expansion, and unsustainable consumption—reflects not only environmental disruption but also a breakdown in humanity's relationship with creation.¹

The effects of climate change are increasingly evident in extreme weather events, ecological degradation, food insecurity, displacement, and widening inequality. These impacts are particularly severe in regions such as sub-Saharan Africa, where communities depend directly on land, rainfall, forests, and local ecosystems for survival. Climate change must therefore be understood not only as an environmental problem but also as a social, moral, and spiritual crisis.²

From a theological perspective, this crisis represents a failure of vocation. Genesis 2:15 presents humanity as both servant and guardian of the earth. The Hebrew terms *'abad* and *shamar* emphasise care, service, and preservation rather than domination. Humanity is thus called to cultivate and protect creation as a sacred trust. Creation does not belong to human beings as private property; it belongs to God, and human beings are entrusted with its care.³

African theological thought deepens this vision by emphasising relationality and interconnectedness. John S. Mbiti famously asserts that existence is fundamentally communal: "I am because we are."⁴ Human identity is therefore not autonomous but formed through relationships—with other people, with the land, with ancestors, and with the wider creation. This relational worldview extends ecological responsibility beyond human society to the entire web of life.

Yet this relational order has been distorted. Martin Luther describes sin as *incurvatus in se*—the human condition of being curved inward upon oneself.⁵ This inward orientation manifests itself in greed, consumerism, and the commodification of creation. Instead of receiving land, forests, animals, and ecosystems as gifts to be stewarded, humanity increasingly treats them as objects of control, extraction, and profit.

In this context, technological and policy solutions, though indispensable, cannot by themselves address these deeper distortions of human desire and identity. What is required is transformation at the level of moral imagination and spiritual orientation. This chapter

therefore argues that faith is not merely a supportive ethical framework for ecological action but a distinctive transformative force. Faith reshapes human identity, reorders desire, mobilises communities, advances justice, and sustains hope.⁶ By reframing ecological care as a sacred mandate and integrating environmental sustainability with social equity, faith traditions—particularly within African contexts—offer an essential paradigm for holistic ecological and social transformation. This chapter explores that claim through engagement with biblical theology, African thought, and practical examples of faith-based ecological action.

2. Literature Gap and Contribution

Scholarly engagement with climate change has, for many decades, been dominated by environmental science, economics, and political theory. These approaches have significantly advanced understanding of climate systems, mitigation strategies, and governance frameworks. More recently, however, theological scholarship has entered the discourse, recognising that ecological degradation is not only a technical challenge but also a moral and spiritual one.

A seminal turning point in this conversation was Lynn White Jr.'s influential essay, which highlighted how theological ideas—particularly those emphasising human dominion—have shaped attitudes towards nature. Since then, theologians such as Cynthia Moe-Lobeda and Larry Rasmussen have expanded the discussion by addressing ecological justice, structural sin, and the ethical dimensions of environmental degradation. Their work demonstrates that ecological crises are deeply embedded in economic systems, moral frameworks, and patterns of human desire.

At the global level, institutions have also begun to acknowledge the significance of faith communities in climate action. The United Nations Environment Programme, through its Faith for Earth Initiative, emphasises the capacity of religious organisations to influence behaviour, mobilise communities, and shape moral commitments across diverse contexts. Despite these important developments, three significant gaps remain.

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First, faith is frequently treated in an instrumental manner—as a tool for mobilising communities—rather than as a primary source of transformation. In such approaches, religion supports pre-existing environmental agendas but is rarely understood as offering a distinct paradigm that reshapes human identity, desire, and responsibility. This chapter argues instead that faith is not secondary but foundational to ecological transformation.

Second, the theological concept of *incurvatus in se* remains underutilised in ecological discourse. This concept provides a profound diagnosis of why ecological destruction persists despite widespread awareness. Ecological degradation cannot be explained solely by a lack of knowledge; it is sustained by inward-curved desire that prioritises self-interest over communal and ecological wellbeing.

Third, African theological perspectives remain underrepresented in global ecological conversations. Yet these perspectives offer rich resources, particularly in their emphasis on relationality, community, land, and interdependence. They challenge dominant individualistic frameworks and provide alternative ways of understanding humanity's place within creation.

This chapter addresses these gaps by presenting faith as a primary agent of transformation. It integrates the concept of *incurvatus in se* as a theological diagnosis of ecological crisis and grounds the discussion in African eco-theological praxis. In doing so, it contributes to a more holistic understanding of ecological transformation—one that encompasses moral, spiritual, communal, and structural dimensions.

3. Methodology

This chapter employs a qualitative, interdisciplinary theological methodology that integrates biblical exegesis, constructive theology, and contextual analysis within African eco-theological frameworks.

First, a biblical-theological approach is used to interpret key scriptural texts, including Genesis 1–2, Psalm 24, Romans 12, Isaiah 65,

and Revelation 21. These texts articulate themes of stewardship, relationality, transformation, and hope, forming the theological foundation for ecological responsibility. Rather than treating these passages as isolated moral directives, the chapter reads them as part of a coherent theological vision in which creation is understood as God's gift and humanity as entrusted with its care.⁷

Second, the chapter adopts a constructive theological approach, drawing on the concept of *incurvatus in se*, particularly as developed in Martin Luther's theology. This concept serves as a diagnostic framework for understanding the spiritual roots of ecological crisis, especially in relation to disordered desire, self-centredness, and patterns of consumption. This analysis is brought into dialogue with contemporary ecological theologians such as Cynthia Moe-Lobeda and Larry Rasmussen, whose work highlights the structural and ethical dimensions of environmental degradation.⁸

Third, the chapter employs the See–Judge–Act framework as an interpretive and practical tool. The “see” dimension examines ecological realities, particularly within African contexts marked by environmental vulnerability and socio-economic challenges. The “judge” dimension interprets these realities through biblical and theological reflection. The “act” dimension identifies faith-based responses capable of fostering ecological and social transformation.

Fourth, the chapter incorporates contextual and case-based analysis, paying particular attention to the work of the Mindolo Ecumenical Foundation in Zambia. This case study illustrates how faith is embodied in practice through reforestation initiatives, community mobilisation, sustainable agriculture, and theological education. It provides concrete evidence of how theological commitments can translate into measurable ecological restoration and social empowerment.⁹

Finally, insights from global frameworks—particularly those developed through the United Nations Environment Programme's Faith for Earth Initiative—are engaged to situate the analysis within a broader international context. These perspectives underscore the capacity of faith communities to mobilise large constituencies, shape moral values, and contribute meaningfully to climate action.¹⁰

Together, these methodological components enable a holistic analysis that addresses the moral, spiritual, communal, and structural dimensions of ecological transformation. By integrating theological reflection with lived practice, the chapter demonstrates that faith operates not merely as a system of beliefs but as a dynamic and transformative force within ecological and social realities.

4. The Nature of Transformative Power in Faith

Transformative power refers to the capacity to generate deep and sustained change across personal, relational, communal, and structural dimensions. Faith possesses such power because it does more than provide moral encouragement; it reshapes identity, reorders desire, and redirects action. Faith reframes ecological care as a sacred moral obligation. When creation is understood as God's gift, ecological responsibility becomes more than environmental management—it becomes an act of obedience, gratitude, stewardship, and worship. In this way, faith cultivates values such as justice, compassion, solidarity, humility, and hope, which are essential for sustained ecological transformation. Faith therefore does not merely support ecological action; it redefines its meaning and motivation. It calls attention not only to what must be done, but also to why it must be done and who humanity is called to become.

5. Inner Conversion: Reordering Desire and Overcoming *Incurvatus in Se*

Faith's transformative power begins with the reordering of human desire. Ecological degradation is not simply the result of insufficient knowledge; it is also the consequence of disordered loves. Theology identifies this condition as *incurvatus in se*—the self turned inward upon itself. As Luther suggests, this inwardness distorts human freedom. Instead of directing freedom toward service of God, neighbour, and creation, it is oriented toward consumption, accumulation, control, and domination. Individuals, institutions, and societies become curved inward toward their own desires. In

ecological terms, this inward turn is evident in overconsumption, land commodification, deforestation, pollution, and the exploitation of vulnerable communities.

Romans 12:2 calls believers not to be conformed to the pattern of this world, but to be transformed by the renewal of the mind. Ecological transformation therefore requires a conversion of consciousness—a reorientation of imagination, desire, and understanding of humanity’s place within creation. Cynthia Moe-Lobeda argues that ecological harm is sustained by economic systems that shape desire toward excess rather than sufficiency.¹¹ Faith disrupts this cycle by cultivating an alternative moral imagination grounded in sufficiency, responsibility, and care. This inner transformation is foundational. Without it, structural and communal efforts risk reproducing the same patterns of domination. Policies may change, but if desire remains curved inward, ecological destruction will continue in new forms.

6. Relational Reorientation: From Ownership to Sacred Stewardship

Faith also transforms humanity’s relationship with creation. Scripture affirms that “the earth is the Lord’s” (Psalm 24:1), and that land ultimately belongs to God rather than to human beings. This challenges notions of absolute ownership and reframes land and natural resources as a sacred trust.

Within this perspective, creation is not an object to be possessed, but a gift to be received and sustained. Faith reorients human attitudes from domination to care, from control to responsibility, and from exploitation to stewardship. Ecological responsibility thus becomes relational rather than transactional. This shift is particularly significant in contexts where land and ecosystems are increasingly commodified. When creation is treated primarily as an economic asset, forests become timber, rivers become commodities, and land becomes a resource for profit. Faith resists this reduction by affirming the intrinsic value of creation as belonging to God.

In African contexts, this relational approach resonates deeply with communal understandings of land as shared, life-giving, and inter-generational. It reinforces the idea that human beings exist within, rather than over against, the natural world.¹² In this way, faith restores a vision of stewardship grounded in care, accountability, and continuity, enabling a renewed relationship between humanity and the earth.

7. Communal Mobilization: Faith as a Catalyst for Grassroots Transformation

Faith becomes socially transformative when it is embodied in community. While inner conversion reshapes personal desire, communal life translates these changes into shared practices and collective action. In many contexts—particularly in Africa—faith communities remain trusted institutions capable of mobilising people around shared moral commitments.

The communal nature of faith challenges individualism and fosters a sense of mutual responsibility. Biblical communities, as reflected in Acts 2:44–45, model a shared life in which resources are distributed according to need. This vision encourages forms of ecological responsibility that are relational, cooperative, and justice-oriented rather than individual and market-driven. Faith communities also play a critical role in linking ecological sustainability with social equity. Environmental degradation disproportionately affects vulnerable populations who depend directly on land and local ecosystems. In this context, churches and faith-based organisations can mobilise collective responses that address both environmental and social needs.

At the grassroots level, institutions such as the Mindolo Ecumenical Foundation demonstrate how faith can catalyse practical transformation. Through tree-planting initiatives, sustainable agriculture training, and community engagement, such efforts integrate ecological restoration with local empowerment.¹³ These practices are not isolated interventions but part of a broader communal commitment to care for creation. Because faith communities are rooted in trust, shared values, and long-term relationships, they possess a

unique capacity to sustain ecological action over time. In this way, faith becomes a catalyst for grassroots transformation, translating belief into practice and conviction into collective responsibility.

8. Prophetic Justice: Confronting Structural and Ecological Injustice

Faith's transformative power extends beyond personal and communal life to the structural level through prophetic engagement. The ecological crisis is not experienced equally; it disproportionately affects those who contribute least to its causes. Environmental degradation therefore raises urgent questions of justice. Biblical tradition calls for active engagement in justice. Proverbs 31:8–9 urges the faithful to speak for those who cannot speak and to defend the rights of the vulnerable. Within an ecological context, this implies responsibility to address systems that exploit both people and the environment. Contemporary economic and political structures often drive ecological harm through practices such as land dispossession, deforestation, extractive industries, and the commodification of natural resources. These processes deepen inequality, displace communities, and degrade ecosystems. Faith challenges these systems by exposing their moral implications and advocating for more just and sustainable alternatives.

As Rasmussen argues, the ecological crisis can be understood as a form of “species sin,” in which humanity elevates itself above the rest of creation and legitimises exploitation.¹⁴ Faith responds by calling for accountability, equity, and the protection of vulnerable communities. In this way, prophetic faith does more than critique injustice; it motivates action. It calls communities to resist harmful systems, advocate for equitable resource distribution, and embody forms of life that honour both human dignity and ecological integrity.

9. Sustained Hope: Enabling Long-Term Ecological Commitment

Ecological transformation requires endurance, and faith sustains such endurance through hope. Environmental restoration is often slow and uncertain: trees take years to grow, soils require time to recover, and communities must adapt to changing and often worsening climate conditions. Without hope, such long-term commitments risk fatigue and abandonment.

Christian faith offers a vision of renewed creation that sustains perseverance. Prophetic texts such as Isaiah 65:17–25 portray a future marked by peace, restoration, and harmony, while Revelation 21:1–5 speaks of God making all things new. This eschatological horizon does not encourage withdrawal from the world but inspires ongoing participation in the work of renewal.¹⁵

Hope, therefore, is not passive optimism but an active orientation that enables sustained engagement. It empowers communities to continue practices such as reforestation, sustainable agriculture, and ecological restoration even when results are not immediate. In this sense, faith-rooted hope sustains long-term ecological commitment. It provides the resilience needed to act within crisis, ensuring that efforts toward environmental care and social justice endure beyond moments of urgency. Hope does not deny the reality of ecological degradation; rather, it enables faithful action within it.

10. Challenges and Theological Responsibility

While faith holds significant transformative potential, it does not automatically produce ecological responsibility. Religious traditions themselves are not immune to distortion. Misinterpretations of theological concepts—particularly dominion—have at times contributed to the exploitation of nature and the legitimisation of ecological harm.¹⁶ Moreover, *incurvatus in se* can persist within religious communities and institutions. Faith may become inward-looking, detached from ecological realities, or narrowly focused on personal salvation at the expense of communal and environmental

responsibility. In some contexts, prosperity-oriented theologies may even reinforce patterns of consumption and environmental exploitation.

These challenges highlight the need for continual theological renewal. Faith must undergo processes of repentance and reorientation (*metanoia*), ensuring that its teachings cultivate life-giving relationships with creation. This includes reinterpreting Scripture in ecologically responsible ways, integrating creation care into theological education, and embedding sustainable practices within churches and faith-based organisations.

The example of the Mindolo Ecumenical Foundation demonstrates that such renewal is possible in practice. By integrating ecological care into teaching, community engagement, and institutional life, faith communities can move beyond rhetoric toward embodied responsibility. In this way, theological responsibility becomes both reflective and practical, shaping belief and transforming action.

11. Conclusion

This chapter has examined how faith unleashes transformative power for ecological and social change in a warming world. It has demonstrated that climate change is not only an environmental or technical challenge but also a deeper crisis rooted in distorted human identity, disordered desire, and structural injustice.

The concept of *incurvatus in se* reveals that ecological degradation is sustained by inward-curved selfhood that prioritises consumption, control, and exploitation. In response, faith emerges not as a secondary support for environmental action, but as a distinctive transformative force. It reshapes identity, reorders desire, and re-orientes human relationships with creation.

Through biblical theology, African relational perspectives, and concrete eco-theological practices, this chapter has shown that faith moves humanity from ownership to stewardship, from self-centredness to responsibility, and from exploitation to care. This transformation becomes effective when it is embodied in lived practices that integrate ecological responsibility with social justice. The work

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of the Mindolo Ecumenical Foundation illustrates how faith can be translated into action. Through tree planting, sustainable agriculture, and community engagement, it demonstrates that faith-based institutions can contribute meaningfully to ecological restoration and social empowerment. These practices show that when ecological care is understood as a spiritual vocation, it becomes sustained and transformative.

The implications are clear. Ecological renewal requires not only technological innovation and policy reform, but also moral and spiritual transformation. Faith communities must therefore move from occasional environmental concern toward sustained ecological discipleship, integrating creation care into teaching, worship, and institutional practice.

Finally, faith sustains ecological action through hope. The biblical vision of renewed creation does not lead to withdrawal from the world but calls believers to active participation in its restoration. Hope enables perseverance, ensuring that ecological commitment endures even in the face of uncertainty and ongoing crisis.¹⁷ Faith is thus indispensable in a warming world because it addresses what technical and political responses alone cannot: the transformation of the human person, the renewal of moral imagination, and the sustaining of collective action over time. Without this transformation, ecological responses remain fragmented and temporary. With it, communities of faith become enduring agents of ecological restoration and social justice.

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14. Exploring the Concept of “*Incurvatus in Se*” and its Application to the Commodification of God’s Creation

FAITH K. LUGAZIA

Abstract

This eco-theological chapter explores how the inward turning of human beings (*incurvatus in se*) results in a betrayal of the biblical mandate of stewardship (Gen. 1:26–28; 2:15). It argues that human self-centredness undermines faithful care for creation and legitimises its commodification. Drawing on Scripture, Lutheran theology, and eco-theological scholarship, the chapter examines how greed, consumerism, and structural injustice contribute to environmental destruction, land dispossession, and ecological crises in Tanzania. It proposes repentance (*metanoia*), advocacy for land rights, sound biblical interpretation, and sustainable practices as pathways towards restoring stewardship, concluding with hope grounded in God’s promised renewal of creation.

Keywords: stewardship; eco-theology; *incurvatus in se*; eco-justice; commodification; Tanzania; creation care; advocacy

1. Introduction

The misunderstanding of the biblical concept of dominion in Genesis 1:26–28, derived from the Hebrew *radah* (רָדָה)—meaning authorised stewardship that grants humanity both the authority and responsibility to govern, manage, and care for the earth on God’s behalf¹—has significantly contributed to the exploitation of creation. When combined with a global culture of consumerism, often reinforced within contemporary development discourses, this mis-

understanding has legitimised the belief that human beings may exploit, commodify, and sell God's creation rather than serve as faithful stewards entrusted with its care.

Such attitudes have gradually produced far-reaching consequences affecting land, ecosystems, non-human creatures, and human communities, particularly those who are poor and marginalised. These consequences have rightly been described as the destruction of creation resulting from human failure.²

From a Christian theological perspective, God justifies human beings by divine grace and continues to sanctify them by entrusting them with responsibility for creation (Gen. 1:27; 2:16). Martin Luther, drawing on 1 Corinthians 9:19, articulates the paradox of Christian existence in these words: "A Christian is a perfectly free lord of all, subject to none. A Christian is a perfectly dutiful servant of all, subject to all."³

This paradox highlights the dynamic relationship between freedom and responsibility. Through the death and resurrection of Jesus Christ, believers are liberated from sin—not so that they may exploit creation, but so that they may serve it faithfully. Although humanity has been entrusted with land, plants, animals, and the resources of both land and water, such gifts do not legitimise their commodification. Rather, misuse gives rise to what may be described as eco-injustice, harming both human communities and the wider community of creation.⁴

This chapter is an eco-theological study that seeks to raise awareness among Christian communities that humanity has neglected its vocation as steward because of *incurvatus in se*. It argues that the present moment represents a *kairos*—a critical and decisive moment in history—in which Christians must be awakened to engage actively in eco-justice.

Methodologically, the chapter employs the See–Judge–Act (SJA) approach, a framework that encourages faith communities, particularly in Tanzania, to participate actively in eco-justice advocacy and campaigns against the misuse of power that enables the destruction, exploitation, and commodification of God's creation. The central argument of this study is that unless humanity acknowledges

its “anti-creation” actions—those driven by greed and self-centredness—the destruction of creation will continue unchecked, resulting in eco-anxiety, climate crises, environmental degradation, and persistent poverty.

The chapter proceeds by examining what Scripture teaches about stewardship and the work of the Triune God in caring for creation. It then explores New Testament perspectives on stewardship before analysing how this responsibility has been undermined through *incurvatus in se*. The discussion further presents empirical examples from Tanzania concerning the commodification of creation and its consequences before concluding with an urgent call to restore faithful stewardship for the flourishing of all creation.

2. God Is the Author and Owner of All Creation

The Holy Scriptures of the Christian faith clearly affirm that God created the heavens and the earth and all that is in them: “The earth is the Lord’s and all that is in it” (Ps. 24:1, NRSV). Scripture provides a structured and ordered account of creation from the first day through to the sixth day, culminating in the creation of human beings as the final and distinctive act of God’s creative work (Gen. 1:1–28, NRSV). Human beings were created not merely to exist but also to exercise responsibility. Humanity was entrusted with the task of stewardship over God’s creation. To be a steward is to act as a manager rather than an owner of resources, including land, time, talents, and all created realities. Stewardship therefore requires responsible oversight, protection, and wise use of these gifts in accordance with God’s purposes.⁵

This responsibility is expressed through the mandate of dominion (*radah*), which signifies the authority granted to humanity to govern, manage, and care for the earth and its creatures on God’s behalf.⁶ This dominion should never be understood as exploitative control. Rather, it is inherently relational and protective, requiring humanity to “till and keep” the earth (Gen. 2:15), thereby sustaining rather than degrading creation. The biblical vision of dominion is therefore pastoral rather than extractive, rooted in care rather than domination.

God repeatedly reminded the Israelites that the land and everything within it ultimately belong to God. Their role was never that of owners but of stewards entrusted with divine gifts. This principle is articulated clearly in Leviticus: *"The land shall not be sold in perpetuity, for the land is mine; with me you are but aliens and tenants"* (Lev. 25:23, NRSV).

This command underscores the reality that human beings are tenants within God's creation and therefore cannot claim absolute ownership over what belongs to God. Similarly, the psalmist affirms God's ownership over all living creatures: *"For every wild animal of the forest is mine, the cattle on a thousand hills. I know all the birds of the air, and all that moves in the field is mine"* (Ps. 50:10–11, NRSV). Such affirmations reinforce the conviction that all creation belongs to God and that human beings are entrusted with its care. Humanity's responsibility is therefore not to exploit creation for selfish gain but to care for it faithfully as part of God's economy of life.

The biblical narrative also demonstrates the consequences of failing in this stewardship. The Israelites experienced exile as a consequence of covenantal disobedience, including their failure to honour both God and the land (2 Kings 24:10–14; Jer. 25:11–12). In exile, they became acutely aware of the sacredness of the land they had defiled. This awareness is expressed poignantly in the lament: *"How could we sing the Lord's song in a foreign land?"* (Ps. 137:4).

This question reflects a profound theological recognition of the intimate relationship between faith, land, and identity. The Israelites likewise recognised the interconnectedness between human beings and the rest of creation. Scripture frequently employs poetic and anthropomorphic language portraying creation itself as praising God: *"Let the field exult, and everything in it. Then shall all the trees of the forest sing for joy"* (Ps. 96:12).

Likewise: *"The mountains and the hills before you shall burst into song, and all the trees of the field shall clap their hands"* (Isa. 55:12).

The New Testament echoes this vision when Jesus declares that if people were silent, "the stones would shout out" (Luke 19:40). Cre-

ation is portrayed as a living community that glorifies God, reinforcing humanity's responsibility to preserve and sustain this harmonious relationship.

Furthermore, biblical law provides explicit guidance on the care of animals and the environment. The Mosaic Law includes commands protecting animal welfare: *"You shall not muzzle an ox while it is treading out the grain"* (Deut. 25:4). Animals are granted rest on the Sabbath (Exod. 20:10), distressed animals are to be assisted (Exod. 23:5), and mother birds are protected so that future generations may thrive (Deut. 22:6–7).

These provisions demonstrate that biblical justice extends beyond human relationships to encompass the entire community of creation. The New Testament reaffirms stewardship with a particular emphasis on faithfulness and accountability. Paul writes: *"Moreover, it is required of stewards that they be found trustworthy"* (1 Cor. 4:2, NRSV). Faithfulness is therefore the defining characteristic of stewardship. It is not an optional ethical commitment but a theological obligation grounded in accountability before God.

In summary, both the Old and New Testaments consistently affirm that God is the owner of all creation while human beings are entrusted as stewards within it. This theological foundation challenges attempts to commodify or exploit creation and calls humanity back to faithful and responsible stewardship.

3. "Incurvatus in Se" as Legitimation for the Rescinding and Selling of God's Creation in Tanzania

Through his struggle with the question of self-justification by good works, Martin Luther came to recognise that the fundamental human condition is marked by a deep-seated inclination towards self-centredness. In this condition, selfishness permeates human existence after the Fall. Having turned away from God and neighbour, human beings become increasingly oriented towards themselves, seeking to possess, control, and exploit creation for their own benefit.

Building on Augustine's understanding of sin, Luther described this condition as *incurvatus in se*—the human being curved inward upon oneself.⁷ This theological insight emerged from his engagement with Pauline theology, particularly during his lectures on the Epistle to the Romans (1515–1516). Through this engagement, Luther realised that even his own efforts towards righteousness were ultimately directed towards his own benefit and therefore failed to acknowledge fully the decisive and transformative role of God's grace.⁸

Tore Johnsen further develops this concept by observing that, although *incurvatus in se* primarily describes the condition of individuals, it also manifests itself at collective and structural levels. Entire communities, societies, and even global systems may become inwardly curved upon themselves. In such circumstances, the communal "we" turns inward towards "ourselves", resulting in the marginalisation, exploitation, and subjugation of others and of the wider creation. This inward orientation can become embedded within institutional, political, and economic structures, thereby perpetuating the destruction of creation in systematic and enduring ways.⁹

Although Luther and Augustine applied this concept primarily to the question of human justification and distorted interpersonal relationships, it is both legitimate and necessary to extend it to humanity's relationship with the rest of creation. Within eco-theological discourse, *incurvatus in se* provides a powerful framework for understanding why human beings have historically justified the distortion, exploitation, and commodification of God's creation for their own benefit rather than living as faithful stewards in accordance with the biblical mandate (Gen. 1:26–28; 2:15; Ps. 24:1).

This inward turning represents a profound shift from relationality to instrumentalism. Creation ceases to be perceived as a community of subjects within God's household and is instead reduced to a collection of objects to be used, consumed, and traded. In this process, creation becomes commodified: its intrinsic value, grounded in its relationship to God, is replaced by utilitarian and economic value determined by human desires and market forces.

Luther's broader theological reflections offer further insight into questions of eco-justice. In his explanation of the First Article of the Creed in the *Small Catechism*, he writes: I believe that God has created me together with all that exists ... God has given me and still preserves my body and soul: eyes, ears, and all my members, my reason and all my senses.¹⁰

In this formulation, Luther articulates a deeply relational understanding of human existence within creation. Human beings are not autonomous individuals standing outside the created order; rather, they are creatures continuously sustained by God within the wider web of creation. This perspective undermines any notion of human autonomy that might justify domination or exploitation.

From this theological foundation, Luther further emphasises that although human beings are inclined to turn inward for personal gain, God's grace remains persistently active. His doctrine of justification by grace through faith affirms that God continually calls humanity—and indeed all creation—into right relationship.¹¹ This grace functions not only to restore human beings spiritually but also to remind them that creation belongs to God and must therefore be treated with reverence, responsibility, and care.

Gerhard O. Forde, reflecting on Luther's *Heidelberg Disputation*, deepens this critique by describing humanity as fundamentally "addicted" to itself and its own projects. He argues that the so-called "theology of glory" seeks to legitimise this self-centred condition by disguising it beneath religious or moral accomplishments. Within such a framework, concern for the rest of creation becomes secondary, provided that personal, social, or even religious satisfaction is achieved.¹² This insight reveals how theological distortions can reinforce ecological irresponsibility.

Cynthia Moe-Lobeda extends this line of thought by explicitly linking *incurvatus in se* to ecological destruction and economic injustice. She argues that human self-centredness contributes directly to environmental degradation because individuals and societies prioritise consumption and accumulation above care and sustainability. Humanity becomes characterised as "over-consumers" and even "un-creators", actively undermining the integrity of the natural world.¹³ Importantly, Moe-Lobeda expands the concept of

neighbour-love to include ecological and economic dimensions, thereby broadening Christian ethical responsibility beyond interpersonal relationships to encompass the whole created order.

Similarly, Philip Hefner provides an important theological contribution by describing human beings as “created co-creators.”¹⁴ In this formulation, human beings are both creatures within God’s creation and participants in God’s continuing creative activity. This dual identity carries profound responsibility. The original calling in Genesis 2:15—to till and keep the garden—reveals that humanity’s vocation is to sustain and nurture creation rather than exploit or commodify it.

While Moe-Lobeda emphasises the destructive consequences of overconsumption and ecological neglect, and Hefner highlights humanity’s vocation as co-creator, both converge in recognising that humanity has turned inward and neglected its calling. The ecological crisis therefore emerges not merely as a technical or economic problem but as a deeply theological and moral failure rooted in *incurvatus in se*.

Repentance, as Moe-Lobeda observes, does not arise simply through external instruction or moral exhortation. Rather, it emerges through a profound awareness of the harm caused by ignorance, selfishness, and systemic injustice to both human communities and the natural world.¹⁵ Sallie McFague similarly calls for a radical reduction in consumption as an expression of love for neighbour. Christian discipleship, she argues, requires a commitment to sharing resources rather than accumulating them in pursuit of self-centred desires.¹⁶

Larry Rasmussen introduces the concept of “species sin” to describe the anthropocentric worldview in which humanity places itself at the centre of all existence. Within this framework, all other creatures are reduced to resources for human use, and humanity forgets its role as steward and co-creator within God’s creation.¹⁷ This perspective illustrates how *incurvatus in se* has become embedded not only in individual behaviour but also in cultural and civilisational patterns.

The misinterpretation of dominion has further contributed to this distortion. Many assume that dominion implies ownership and unrestricted control, thereby justifying exploitation. Scripture consistently teaches the opposite. Dominion entails care, protection, responsibility, and accountability. When this responsibility is neglected, the consequences affect both humanity and the wider creation. Rather than pursuing sustainable and life-giving ways of preserving creation, human beings frequently legitimise its destruction.

This reality is particularly evident in contemporary Tanzania, where consumerism—understood as a socially constructed habit that prioritises material possessions, greed, and self-interest above spiritual and ethical concerns¹⁸—has contributed significantly to ecological injustice.

The empirical examples presented below illustrate how *incurvatus in se*, when combined with consumerist dynamics, leads directly to the destruction and commodification of God's creation and highlights the urgent need for a theological reorientation towards faithful stewardship. The agricultural sector in Tanzania is currently undergoing significant transformation, often accompanied by serious environmental degradation and structural challenges. It is estimated that agricultural activities contribute approximately 80 per cent of the country's deforestation.¹⁹

One of the most widespread practices associated with this process is the so-called "slash-and-burn" method, which involves clearing forested areas by cutting and burning vegetation in order to prepare land for cultivation. While this method may provide short-term benefits for agricultural expansion, it carries severe long-term consequences for soil health and ecological sustainability.

In particular, slash-and-burn practices contribute to rapid soil degradation, as essential nutrients are depleted and little effort is made to restore them. Once the soil becomes unproductive, farmers often abandon the exhausted land and move to new forested areas, thereby perpetuating a destructive cycle of deforestation and environmental decline. This pattern reflects not only economic necessity in some cases but also the influence of short-term production

strategies that prioritise immediate yields over long-term sustainability.

Beyond small-scale agricultural practices, large-scale land acquisitions have further intensified the commodification of land in Tanzania. Reports indicate that by 2010 the country had finalised land deals covering more than 1.8 million hectares.²⁰ These developments raise critical questions regarding land governance, particularly with respect to transparency, accountability, and participation. To what extent are local communities meaningfully involved in decisions concerning land allocation? How effectively are their rights protected in the face of increasing large-scale investments by both national and transnational actors?

The issue of land ownership among indigenous peoples and small-holder farmers remains deeply contested and largely unresolved. Although the Land Laws of 1999 were introduced to address land-tenure challenges, they have not adequately responded to realities at the local level. Consequently, conflicts over land use have intensified, often leading to violent confrontations between farmers and pastoralists competing for access to diminishing natural resources.

Research further indicates that in areas where village land has been allocated for wildlife management schemes or large-scale agricultural investments, the interests of powerful stakeholders are frequently prioritised over those of local communities.²¹ This imbalance reveals structural inequalities embedded within land-governance systems, where economic and political power often override the rights and livelihoods of vulnerable populations. In such contexts, land—understood theologically as a gift from God entrusted to human stewardship—is increasingly treated as a commodity subject to market forces and profit maximisation.

4. Natural Resources: Wildlife Exploitation and Poaching

The exploitation of wildlife resources represents another significant dimension of ecological degradation in Tanzania. The country has been identified as one of the largest sources of illegally traded

ivory in the world. Over a period of approximately ten years, Tanzania lost more than 60 per cent of its elephant population.²² In the Selous Game Reserve alone, nearly two-thirds of the elephant population was eradicated.

These alarming trends highlight the scale and severity of the poaching crisis. Reports attribute this widespread destruction primarily to corruption, weak enforcement of conservation laws, and sophisticated illegal trade networks operating at both national and international levels.²³ Elephants are killed primarily for their tusks, which are sold on lucrative black markets.

This reality illustrates the extent to which human beings, driven by self-interest and economic gain, are willing to destroy other forms of creation. Such practices constitute a profound distortion of humanity's God-given responsibility towards creation. Instead of acting as caretakers and stewards, human beings assume the role of exploiters, reducing living creatures to commodities within global trade systems. This not only undermines biodiversity but also reflects the deeper theological problem of *incurvatus in se*, whereby self-interest overrides responsibility to both Creator and creation.

Beyond wildlife exploitation, broader ecological imbalances are increasingly evident. Fish harvesting in many ecosystems exceeds natural reproduction rates, threatening the sustainability of aquatic life. Likewise, carbon emissions generated through human activity exceed the earth's capacity to absorb them, contributing to climate instability. At the same time, species extinction is occurring at a rate far greater than natural evolutionary processes would predict. These interconnected developments reveal that human exploitation of creation has reached levels that may, in some cases, be irreversible. Their cumulative impact extends beyond the loss of individual species to the destabilisation of entire ecosystems. Such realities highlight the urgent need for renewed theological reflection and ethical engagement concerning humanity's relationship with creation.

Consumerism and Structural Injustice

The examples discussed above clearly illustrate how *incurvatus in se*, when combined with consumerist culture, contributes directly to ecological injustice. Consumerism may be understood as an artificially cultivated habit in which material possessions, greed, and self-interest dominate human desires while displacing spiritual values and ethical responsibility toward God's creation.²⁴ Within this framework, consumption becomes an end in itself, disconnected from considerations of sustainability, justice, and communal wellbeing. Contentment is replaced by an insatiable desire for more, and ethical concerns regarding environmental care are increasingly marginalised. Such a mindset not only drives ecological degradation but also reinforces patterns of inequality and injustice.

In the Tanzanian context, these dynamics have contributed significantly to the exploitation and misuse of God's creation. Individualism, combined with the concentration and misuse of economic and political power, has facilitated the commodification of land and natural resources. As a result, creation is no longer perceived and protected as a divine trust entrusted to humanity but is increasingly treated as an economic asset exploited for short-term gain.

The consequences of this shift are profound. The commodification of creation leads not only to environmental degradation but also to social injustice, as vulnerable communities are displaced, dispossessed, and marginalised. Smallholder farmers, indigenous peoples, and pastoralists often bear the heaviest burden, losing access to the very resources upon which their livelihoods depend. These realities demonstrate how inward human orientation (*incurvatus in se*) becomes embedded within economic and social systems. What begins as individual self-centredness evolves into institutionalised practices that perpetuate environmental destruction and social inequality. Consumerism and structural injustice are therefore not merely parallel phenomena; they are interconnected expressions of the same underlying theological distortion.

5. Effects of Rescinding and Selling God's Creation

Environmental Degradation and Climate Change

Environmental degradation is one of the most visible and immediate consequences of the commodification of God's creation. Deforestation remains a primary driver of climate change, desertification, and soil erosion. The widespread clearing of forests—whether undertaken by local communities struggling for survival or by large-scale investors pursuing economic gain—has contributed significantly to ecological imbalance in Tanzania.²⁵

One of the most notable consequences of deforestation is the disruption of traditional agricultural cycles, particularly planting and harvesting seasons. Farmers who once relied upon relatively predictable rainfall patterns now face increasing uncertainty. In some instances, planting seasons arrive without sufficient rainfall, resulting in crop failure and food insecurity. In others, excessive and irregular rainfall causes flooding, erosion, and the destruction of crops. The cumulative effects of deforestation and climate instability have transformed previously fertile and ecologically balanced landscapes into environments increasingly characterised by drought, desertification, flooding, and hunger. Moreover, changing climatic conditions contribute to the spread of disease by creating favourable conditions for various pathogens and disease vectors.²⁶

Equally concerning is the impact on biodiversity. Many animal species are disappearing because of habitat destruction, ecological disruption, and direct exploitation. Others are increasingly threatened with extinction. Environmental degradation therefore represents not merely a physical transformation of the landscape but a profound disruption of the relationships that sustain ecosystems. The resilience of natural systems is being exceeded by the scale and intensity of human exploitation, creating long-term ecological instability.

Poverty, Land Dispossession, and Social Injustice

The commodification of land has also generated significant socioeconomic consequences, particularly in the form of intensified poverty and widening inequality. As land is increasingly transferred to large-scale investors and transnational corporations, local communities—especially smallholder farmers and indigenous peoples—are displaced from ancestral lands.

Stephen I. Manga captures the gravity of this situation:

“The exploitation of land and natural resources has had a profound impact on land tenure ... Ongoing land disputes have created and reinforced a neo-colonial system that enhances the power of a few wealthy individuals and transnational corporations at the expense of smallholder peasants and indigenous communities, who are displaced and dispossessed.”²⁷

Without access to land, families lose their primary means of livelihood, particularly in agrarian societies where subsistence farming remains essential. This often leads to chronic poverty, food insecurity, and reduced access to education and healthcare. Malnutrition, especially among children, becomes increasingly common, perpetuating cycles of vulnerability and intergenerational poverty.

Internal displacement also disrupts social and cultural structures, weakening community cohesion and identity. Thus, the commodification of land not only undermines environmental sustainability but also erodes human dignity and social justice.

Loss of Biodiversity

Another significant consequence of the destruction and commodification of creation is the rapid loss of biodiversity. Plant and animal species are disappearing because of habitat destruction, over-exploitation of resources, and climate change. Human activities have accelerated extinction rates far beyond what would occur through natural evolutionary processes.²⁸ From a theological perspective, this loss undermines the biblical vision of creation as an interconnected community in which all living beings participate in

praising and glorifying God. When species disappear, ecological diversity is diminished and the harmony of creation itself is impaired.

Eco-Anxiety among Human Beings

The destruction of creation has consequences that extend beyond environmental and economic concerns into the psychological and emotional wellbeing of human beings. One of the most significant emerging manifestations of this reality is eco-anxiety. Eco-anxiety may be defined as a chronic fear of ecological disaster arising from awareness of climate change and environmental degradation.²⁹ Although not classified as a clinical disorder, it is widely recognised as a legitimate emotional response to ecological crisis. Symptoms may include fear, grief, anger, helplessness, insomnia, and panic attacks. In severe cases, these responses can interfere with daily life and personal wellbeing.

In Tanzania, eco-anxiety is experienced across different age groups but is particularly pronounced among younger people aged approximately sixteen to twenty-five years.³⁰ Faced with the prospect of inheriting a degraded and uncertain environmental future, many experience heightened levels of concern, frustration, and fear. These psychological dimensions remind us that the ecological crisis is not merely scientific or technical. It is also deeply human, affecting how people understand their future, their identity, and their relationship with the world around them.

6. Urgency of *Excurvatus ex Se* (“Curved Outward from Oneself”) for Christian Stewardship

Tanzanian Christian communities are called to turn outward and recognise the presence, dignity, and value of all creation around them. This movement from inward self-centredness (*incurvatus in se*) towards outward orientation (*excurvatus ex se*) requires a fundamental transformation of perspective.

The first and most essential step towards such transformation is repentance. Christians must acknowledge their failure as stewards

of God's creation. This repentance (*metanoia*) is not merely verbal confession or superficial behavioural adjustment; rather, it is a profound ontological shift involving a turning away from destructive practices and a turning towards ways of life aligned with God's intentions for creation.

Furthermore, this experience of grace calls Christians to adopt responsible and sustainable patterns of living. Stewardship must be understood not as a peripheral activity but as a defining way of life. Faithfulness and trustworthiness must shape all relationships with the natural world.

Third, Christians are called to engage actively and constructively in environmental governance and policy processes. Rather than remaining passive observers, faith communities should participate in shaping policies that protect creation, promote justice, and safeguard vulnerable communities. Such engagement requires collaboration with a broad range of stakeholders, including government authorities, civil society organisations, academic institutions, and international partners. Through such cooperation, societies can create conditions that support life, learning, and economic development in ways that are just and ecologically responsible.

Finally, this theological vision must be grounded in hope. Scripture proclaims: "For I am about to create new heavens and a new earth" (Isa. 65:17–25), and See, I am making all things new" (Rev. 21:1–5). This eschatological vision does not diminish present responsibility; rather, it deepens and energises it by encouraging believers to participate actively in God's work of renewal. Practices such as equitable resource sharing, green economic development, and sustainable environmental management may therefore be understood as anticipatory signs of God's promised future.

In conclusion, the movement from *incurvatus in se* to *excurvatus ex se* is essential for reclaiming the Christian vocation of stewardship. It requires repentance, transformation, ethical commitment, active engagement, and hope. By embracing these dimensions, Christian communities in Tanzania—and indeed throughout the world—can participate faithfully in the care of God's creation and contribute to the flourishing of all life.

7. Conclusion

The foregoing discussion has demonstrated that the biblical and theological framework of stewardship is rooted fundamentally in the recognition of God as Creator and Owner of all creation, and in humanity's vocation as entrusted caretakers of that creation. The concept of *incurvatus in se* has provided a powerful theological lens through which to understand the distortion of this vocation.

In the Tanzanian context, this inward turning manifests itself concretely through the commodification of land, the exploitation of wildlife, and the misuse of natural systems. These practices reflect not merely economic or political dynamics but a profound theological disorder in which creation is treated as an object of ownership rather than a divine trust. The resulting consequences—environmental degradation, climate change, biodiversity loss, social injustice, poverty, and eco-anxiety—demonstrate that the ecological crisis is fundamentally a moral and spiritual crisis as well as an environmental one.

At the same time, the Christian tradition offers not only a diagnosis of the problem but also a path towards restoration. The movement from *incurvatus in se* to *excurvatus ex se* represents a necessary theological and ethical transformation. It calls for a reorientation from self-centredness to relational responsibility, from exploitation to care, and from commodification to stewardship. This transformation begins with repentance (*metanoia*) and is expressed through faithful stewardship, advocacy for justice, responsible interpretation of Scripture, and sustainable practices that honour God's creation.

Christian hope ultimately grounds and sustains this calling. Scripture affirms God's continuing commitment to creation and God's promise of renewal: "For I am about to create new heavens and a new earth" (Isa. 65:17–25), and "See, I am making all things new" (Rev. 21:1–5). This hope does not diminish present responsibility; rather, it strengthens it by calling believers to participate actively in God's ongoing work of healing and restoration. Faithful stewardship, therefore, is both a responsibility and a witness. By caring for

creation as God's gift rather than treating it as a commodity, Christian communities in Tanzania and beyond can contribute to ecological sustainability, social justice, and the flourishing of all life within God's household of creation.

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15. Church Partnership for Earth's Habitability: *The CCAP Project*

JOYGRACE SHOO

Abstract

At the centre of this chapter stands the *Church Climate Action Partnership (CCAP)*, a three-year North–South ecumenical initiative implemented by the Evangelical Lutheran Church in Tanzania, Victoria Diocese, in partnership with the Northern Church of Germany and supported by international agencies. Operating from 2023 to 2026 across multiple parishes and an educational institution, CCAP demonstrates how theological commitment to creation care can generate measurable ecological impact. Its achievements—including extensive tree planting, seedling distribution, and community engagement—illustrate a practical model of faith-driven climate action. The chapter argues that church partnership offers a distinctive and replicable contribution to sustaining the Earth's habitability.

Keywords: Church partnership; climate action; earth habitability; eco-theology; creation care; Tanzania; ecumenism; sustainable development

1. Introduction: Earth Habitability and the Church's Calling

Defining Earth Habitability

Earth habitability, understood as the capacity of the Earth to support life—both now and for future generations—is not merely a scientific concept; it is also a theological and moral one. The habitability of the Earth is increasingly under threat, not only from natural

processes but also from patterns of production, consumption, and ecological exploitation, as examined in earlier chapters of this volume. Environmental degradation—manifested through droughts, floods, and food insecurity—represents the lived human consequences of planetary boundary transgressions¹ and reflects the inward self-centredness identified as a key spiritual root of ecological crisis.²

Preserving the Earth's habitability is therefore not an optional environmental concern. It is a responsibility grounded in creation theology,³ demanded by ecological justice, and enacted in concrete practices—such as those demonstrated in the CCAP project—in soil, in seedlings, and in communities gathered around shared ecological and spiritual commitments.

The Church as Steward of Creation

Churches are called to care for creation (Gen. 2:15). This calling, explored theologically throughout this volume, also has a concrete institutional dimension. Churches are embedded within communities where ecological destruction is most acutely experienced. They carry moral authority through trusted relationships and possess established organisational structures—parishes, youth groups, networks, and educational institutions—that enable sustained and coordinated collective action.

Climate action is therefore not merely an environmental undertaking; it is a spiritual responsibility. Protecting the Earth is directly linked to securing the inheritance of future generations.⁴ The engagement of the Evangelical Lutheran Church in Tanzania, Victoria Diocese (ELCT–ELVD), in the CCAP project represents a direct expression of this theological conviction. The project is not an external development programme imposed upon the church. Rather, it is the church's mission itself—creation care as an integral dimension of the gospel—made visible through concrete ecological action.

The ELVD–Germany Partnership

The CCAP project is rooted in a broader and long-standing partnership between the ELCT–ELVD and the Northern Church of Germany, a relationship that has now extended over a decade. This partnership encompasses collaboration in environmental care, spiritual exchange, and social as well as economic development initiatives. It represents a model of North–South ecumenical partnership that moves beyond traditional donor–recipient dynamics. Instead, it emphasises mutual learning, shared responsibility, and theological solidarity across cultural and geographical differences. Such a partnership reflects an ecclesial vision grounded in reciprocity, equality, and shared vocation, rather than dependence. This relational model strengthens the credibility and sustainability of climate action initiatives, as it is built not merely on financial support but on shared faith, mutual accountability, and long-term commitment.

2. The CCAP Project

Project Overview

The Church Climate Action Partnership (CCAP) is a three-year project running from 2023 to 2026. It operates through eight Action Teams—seven parish-based teams and one educational institution—distributed across the Evangelical Lutheran Church in Tanzania, Victoria Diocese (ELCT–ELVD), as well as the Centre for Ecumenical Relations. The project maintains a dual focus on climate change adaptation and mitigation: responding to the ecological impacts already experienced by communities while simultaneously reducing human contributions to further environmental degradation.

The CCAP project is co-funded by a consortium of ecumenical and development partners, reflecting the breadth of collaboration within the global church community engaged in climate action. The structure of this partnership is outlined below:

Table 1. CCAP Partnership Structure and Co-Funding Roles

Partner	Full Name	Role in CCAP
ELVD	Evangelical Lutheran Church in Tanzania – Victoria Diocese	Lead implementing church partner in Tanzania
Centre for Ecumenical Relations (Ökumenewerk)	Ecumenical coordination body	Facilitates North–South church dialogue and partnership
Northern Church of Germany	German Lutheran partner church	Long-term bilateral partner; co-implementer of CCAP
KED	Kirchlicher Entwicklungsdienst	Co-funder and ecumenical development partner
Bingo e.V.	Bingo e.V.	Co-funder supporting civil society ecological initiatives
Bread for the World (BfW)	Brot für die Welt	Co-funder; mission-aligned development and climate partner

The scope of this partnership—linking Tanzanian and German church bodies, ecumenical institutions, and development organisations—demonstrates that ecological transformation requires collective engagement. It affirms that meaningful climate action emerges not from isolated institutions but from coordinated, faith-based collaboration grounded in shared commitment and mutual accountability.

Theological Foundation

The CCAP project is explicitly grounded in creation theology, which informs both its vision and its practical implementation. Three central theological convictions sustain the project and connect it directly to the wider argument of this conference volume.

First, Genesis 2:15 establishes that humanity is called “to till and to keep” the garden. This mandate is not merely individual but communal and institutional. The church, as a collective body of believers, is called to embody this stewardship in its structures, teachings, and actions.

Second, climate action is a spiritual responsibility. It is not an external or secular imposition upon religious communities but an expression of faith in the Creator and of covenantal faithfulness toward creation.⁵ Caring for the environment is therefore part of discipleship and a visible expression of lived theology.

Third, protecting the Earth secures the future of coming generations. This intergenerational dimension of stewardship underscores the moral responsibility of the present generation to ensure that ecological systems remain viable for those who follow.⁶ Within CCAP, this principle is operationalised through activities such as tree nurseries and environmental clubs, which extend ecological awareness and responsibility beyond the formal duration of the project.

The Partnership as Ecclesial Praxis

Beyond its organisational and theological dimensions, CCAP embodies a lived ecclesial praxis in which faith is expressed through collaborative environmental action. The partnership between ELCT-ELVD, the Northern Church of Germany, and ecumenical development partners is not merely administrative but theological in nature. It reflects a shared vocation to participate in God’s ongoing work of sustaining creation. Through this partnership, ecological action becomes an expression of unity within the global church, transcending geographical, cultural, and economic differences. This demonstrates that creation care is not confined to local responsibility alone but is a shared global Christian commitment.

3. CCAP Project Roadmap: Key Activities

The activities of the Church Climate Action Partnership (CCAP) project span multiple dimensions, including awareness-building, governance, community mobilisation, media engagement, and bilateral exchange. Together, these activities form a comprehensive roadmap for practical ecological action within the framework of church partnership. The following table outlines the key activities implemented during the 2023–2026 project period:

Table 2. CCAP Project Roadmap: Key Activities

Activity	Description and Significance
Project Launch	Formal initiation of the three-year CCAP project, including the establishment of eight Action Teams across participating parishes and one educational institution.
Six Seminars	Thematic seminars addressing climate change, adaptation, mitigation, and creation theology. These sessions build knowledge and capacity among participants and strengthen theological grounding for ecological action.
Five Steering Committee Meetings	Governance and coordination meetings ensuring accountability, shared learning, and strategic alignment among project partners.
Eight Inter-Parish Visits	Cross-parish visits promoting peer learning, the sharing of best practices, and the strengthening of solidarity within the ELVD network.
Four Management Visits	Oversight visits conducted by project leadership to monitor implementation, provide support to Action Teams, and document lessons learned.
Two Encounter Trips (Tanzania ↔ Germany)	Bilateral exchange visits between Tanzanian and German partners. These encounters embody the North–South partnership through shared ecological experiences and mutual learning.

Three Environmental Clubs Formed	Establishment of youth-led environmental clubs designed to sustain ecological awareness and action beyond the formal project period.
Two Action Team Competitions	Inter-team competitions encouraging excellence in environmental stewardship and enhancing motivation and community engagement.
Media Engagement	Dissemination of project activities through Star TV, Channel 10, Upendo TV, Instagram, Facebook, project websites, and Radio Kwizera, thereby extending the project's reach and influence.

A particularly significant dimension of this roadmap is the encounter trips between Tanzania and Germany. In a project that addresses the North–South dimensions of ecological justice—namely, the unequal distribution of environmental burdens and benefits—these bilateral visits embody the principle of mutuality.

German partners encounter directly the lived realities of climate change impacts in Tanzania, while Tanzanian partners engage with ecological transitions and sustainability practices within the German context. Both perspectives are transformed through this exchange. These encounters therefore go beyond programme implementation; they constitute a process of ecumenical formation, in which participants grow in shared theological understanding and ecological responsibility.

Such activities demonstrate that the CCAP project is not limited to technical environmental interventions. Rather, it integrates education, governance, spirituality, and partnership into a holistic model of ecological engagement. In doing so, it bridges the gap between theological conviction and practical action, enabling communities to embody creation care in tangible and sustained ways.

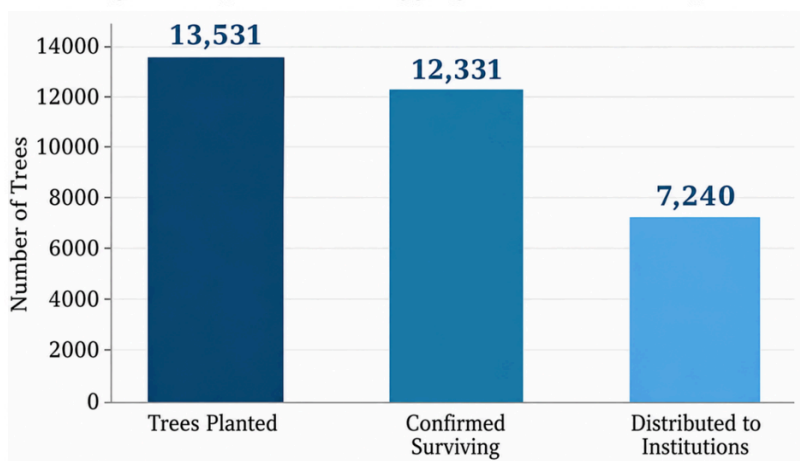
4. CCAP Achievements: Measurable Ecological Impact

Trees Planted: The Headline Figures

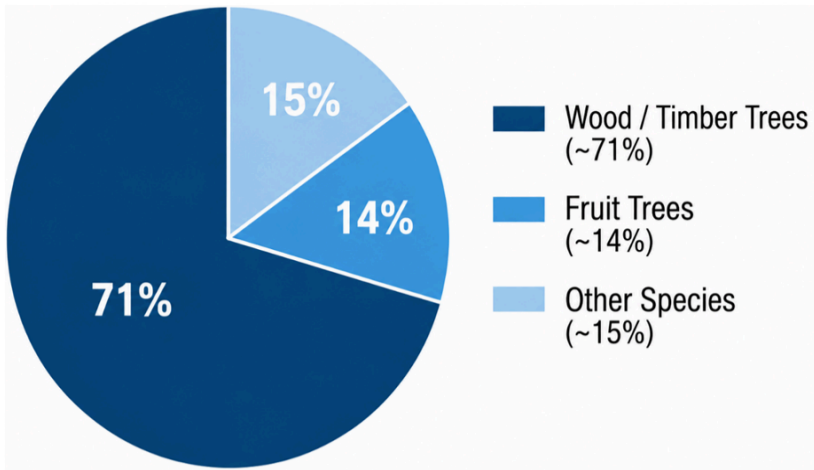
The most visible and quantifiable achievement of the Church Climate Action Partnership (CCAP) project is its tree-planting programme. This initiative constitutes a concrete and measurable contribution to ecological restoration and climate mitigation within the Victoria Diocese. The CCAP project's most visible and quantifiable achievement is its tree planting programme. The headline figures are as follows:

Figure 1. CCAP Tree-Planting Achievement Figures (2023–2026)

These figures represent the aggregate data of trees planted, sur-



vival rates, and seedlings distributed across the CCAP project period. They demonstrate not only the scale of the initiative but also its effectiveness, particularly in terms of sustainability as reflected in the high survival rate. The survival of planted trees indicates ongoing care, community engagement, and appropriate ecological management practices beyond the initial act of planting.

Figure 2: Tree Species Composition

The 13,531 trees planted under the CCAP project do not constitute a monoculture. Rather, their composition reflects a deliberate and strategic integration of ecological, nutritional, and social objectives. This diversity embodies the principle that ecological restoration and human well-being are mutually reinforcing rather than competing priorities. Figure 2. Tree Species Composition of the CCAP Planting Programme

The figure categorises trees into major groups: timber/wood species, fruit trees, and other species. Approximately **71 per cent** of the planted trees consist of wood and timber species. This reflects the project's primary ecological focus on reforestation, carbon sequestration, and the restoration of degraded forest cover, particularly in areas affected by deforestation and agricultural expansion in the Lake Victoria region.

Fruit trees account for approximately **14 per cent** of the total planting. This component directly addresses food security, which is one of the most pressing manifestations of ecological vulnerability in local communities. By providing a sustainable source of nutrition, fruit trees contribute not only to environmental restoration but also to livelihoods and household resilience. The remaining species contribute to biodiversity enhancement, soil health, and

ecological balance. Together, these categories form an integrated ecological and socio-economic strategy. The planting programme is therefore not merely an environmental intervention but also a livelihood-supporting initiative, aligning ecological sustainability with human well-being.

Community Reach and Media Engagement

The impact of the CCAP project extends beyond the quantitative achievement of tree planting. Through a comprehensive media engagement strategy, the project has significantly expanded its reach and influence. Media platforms utilised include *Star TV, Channel 10, Upendo TV, Instagram, Facebook, the project website, and Radio Kwizera*. This broad range of communication channels serves multiple purposes:

- **Awareness:** Increasing public understanding of climate change, adaptation strategies, and the church's ecological responsibility.
- **Accountability:** Making project activities visible to funders, partner institutions, and the wider ecumenical community.
- **Inspiration:** Demonstrating that faith-based ecological action is tangible, measurable, and impactful, thereby encouraging replication by other churches and institutions.

A particularly significant achievement is the establishment of **three environmental clubs**, led primarily by young people. These clubs are designed to sustain ecological awareness, education, and action beyond the formal duration of the CCAP project. They represent an intentional investment in intergenerational stewardship and long-term behavioural change. By engaging youth, the project ensures that ecological responsibility is not confined to a single generation but becomes embedded within the cultural and spiritual life of communities. This aligns with the broader theological commitment to stewardship as a continuous and multigenerational vocation.

5. CCAP and Earth's Habitability: Connecting Local Action to Global Challenge

The Church Climate Action Partnership (CCAP) project is explicitly framed around the concept of Earth habitability—the capacity of the Earth to sustain life both in the present and for future generations. Its achievements are not merely local environmental interventions; they are directly connected to the broader dimensions of planetary health and theological responsibility articulated throughout this volume.

Tree planting and land restoration contribute significantly to environmental stability. Increased vegetation cover enhances water retention, reduces soil erosion, and regulates local microclimates. These effects are particularly important in addressing the vulnerability of communities within the Victoria Diocese to drought. Furthermore, improved soil structure and restored vegetation enable rainfall to be absorbed more efficiently, thereby reducing surface runoff and mitigating the risk of flooding in areas surrounding Lake Victoria.⁷

The distribution of fruit trees to households and institutions contributes directly to food security. At the same time, restored ecosystems support sustainable agricultural practices and biodiversity, both of which are essential for resilient food systems. In this way, ecological restoration and human well-being are closely intertwined. The approximately 12,331 surviving and healthy trees actively sequester carbon, thereby contributing to global climate change mitigation efforts. In addition, they improve local air quality and increase canopy cover, enhancing environmental conditions for surrounding communities. The diversity of species planted—including timber, fruit, and other varieties—supports habitat restoration and strengthens ecological resilience, helping to reverse localised biodiversity loss.

Tree nurseries, which hold more than 7,000 seedlings, represent a particularly significant aspect of the project's sustainability strategy. These nurseries ensure that ecological restoration continues beyond the project's formal duration, providing a living resource

for future planting efforts. They therefore embody an intergenerational commitment to environmental care, serving as a form of ecological inheritance for coming generations.

Taken together, these outcomes demonstrate the integration of local and global dimensions of ecological action. The planting of 13,531 trees within the parishes of the Victoria Diocese contributes, in a measurable way, to the stability of broader planetary systems. Local actions—rooted in faith and community—thus participate in global ecological restoration.

This integration is not merely technical but symbolic and theological. It demonstrates that communities acting in faith, and in partnership across North and South, can play a meaningful role in enhancing the Earth's habitability. The CCAP project stands as a concrete sign that ecological responsibility, grounded in theological conviction, can produce measurable environmental transformation.

6. The Power of Partnership: Why Church Collaboration Succeeds

The Church Climate Action Partnership (CCAP) project demonstrates that its effectiveness lies not merely in its activities—such as tree planting—but in the nature of the partnerships that sustain it. It represents a model of collaboration between churches in the Global North and South, between faith communities and development organisations, and between local communities and the ecological systems they are called to steward. Six interrelated factors explain why this model of church-based partnership is particularly effective.

First, unity increases impact. Collaboration among church institutions enables the pooling of resources, knowledge, and capacities. Through coordinated action, partners achieve outcomes that would be unattainable for individual parishes acting in isolation. Shared responsibility strengthens both implementation and accountability within the project.

Second, the sharing of resources and knowledge across North–South partnerships is a key strength. These partnerships facilitate not only financial and technical support but also the exchange of contextual knowledge, theological insights, and practical experiences. Importantly, this exchange is not unidirectional. Both Tanzanian and German partners contribute to and learn from each other, reinforcing principles of reciprocity and mutual enrichment.

Third, partnership strengthens advocacy capacity. Churches collaborating across contexts carry a stronger collective voice, both morally and institutionally. This amplifies their ability to advocate for ecological justice at local, national, and global levels. A united ecclesial voice is more influential in addressing structural causes of environmental degradation.

Fourth, community trust enhances participation. Churches are among the most trusted institutions in many Tanzanian communities. This trust translates into higher levels of participation, sustained behavioural change, and long-term commitment to ecological initiatives. Communities are more likely to engage in environmental activities when they are led by institutions they recognise and trust.

Fifth, existing church structures provide effective implementation networks. Parishes, youth groups, and educational institutions offer ready-made infrastructure for mobilising communities. These pre-existing networks reduce the time and cost required to initiate projects, enabling efficient implementation of awareness campaigns, tree planting, and training programmes.

Sixth, and perhaps most significantly, faith-based motivation sustains long-term commitment. Ecological action rooted in theological conviction—that stewardship is a sacred responsibility entrusted by God—extends beyond project timelines and financial incentives. When environmental care becomes part of religious identity and practice, it is more likely to be sustained over time.

These six factors are not incidental features unique to the CCAP project. Rather, they are structural characteristics of church-based ecological action more broadly. Wherever faith communities take their ecological vocation seriously, similar dynamics can emerge. As such, the CCAP model is both replicable and scalable. It can be

extended to other dioceses within Tanzania, adapted by ecumenical partners across East Africa, and applied in wider global contexts.

7. Conclusion: From Conviction to Creation

This chapter has demonstrated how an ecumenical partnership involving the Evangelical Lutheran Church in Tanzania, Victoria Diocese (ELCT-ELVD), the Northern Church of Germany, and a consortium of ecumenical funding partners has translated theological conviction into measurable ecological impact. The Church Climate Action Partnership (CCAP) project provides concrete evidence of a central argument advanced throughout this volume: that the climate crisis requires responses that are simultaneously scientific, political, economic, spiritual, and communal. The outcomes of the project are both tangible and verifiable. The trees planted are real. The reported 91 per cent survival rate is real. The fruit trees nourishing households, the nurseries sustaining future planting efforts, and the environmental clubs that will continue beyond the project's formal duration are all concrete expressions of ecological stewardship. At the same time, they are signs of what becomes possible when churches take their ecological vocation seriously and when communities across the North-South divide work together in faith-based partnership.

This chapter should also be understood within the broader framework of the volume. Earlier chapters examined the scientific dimensions of the planetary crisis, developed theological perspectives on stewardship and responsible consumption, and identified the spiritual roots of ecological degradation. Building on these foundations, this chapter has presented a practical model of implementation, demonstrating how theological convictions can be embodied in measurable ecological action at the community level. Together, these contributions trace a coherent movement from diagnosis to theology and from theology to practice.

The significance of the CCAP project extends beyond its immediate ecological achievements. It demonstrates that the church's response to climate change need not remain at the level of advocacy

or theological reflection alone. Rather, it can be expressed through practical, community-based initiatives that restore ecosystems, strengthen livelihoods, and foster long-term environmental responsibility. The integration of faith, partnership, and action illustrates that sustainable ecological transformation requires both conviction and collaboration.

The chapter therefore concludes with a simple but important insight: the church's ecological witness is fulfilled only when it is translated into action. Creation care must be rooted in theological conviction, embodied within communities, and sustained across generations. In this respect, the CCAP project represents more than a successful environmental initiative. It serves as a model of faith-driven ecological engagement and a sign of hope. It demonstrates that when communities are grounded in faith, strengthened through partnership, and committed to stewardship, they can make a meaningful contribution to preserving the Earth's habitability for present and future generations.

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16. The Church's Engagement in Sustainable Agriculture and Creation Care: KARUCO as a Case Study

BRIGHTON KATABARO

Abstract

KARUCO College, an institution established by the Evangelical Lutheran Church in Tanzania (ELCT), Karagwe Diocese, serves here as a case study of the Church's engagement in sustainable agriculture, care for creation, and rural transformation. Located in Karagwe District in north-western Tanzania, KARUCO was founded on the conviction that education can serve as an instrument of social transformation, environmental stewardship, and economic empowerment. Rather than viewing agriculture merely as a means of subsistence, the college promotes it as a pathway to prosperity, human flourishing, and ecological sustainability. Through education, applied research, community outreach, and initiatives such as Project FURSA, KARUCO demonstrates how a faith-based institution can strengthen the interconnections between people and the land, knowledge and practice, and present needs and future aspirations. In doing so, it illustrates how agricultural education can contribute to sustainable development, environmental responsibility, and the flourishing of rural communities.

Keywords: Church engagement; agricultural education; rural transformation; care for creation; women's empowerment; value addition

1. Introduction

As earlier chapters in this volume have shown, agriculture remains the foundation of rural livelihoods, food security, and local economies across much of sub-Saharan Africa. The overwhelming majority of rural households depend, directly or indirectly, on farming for their survival and well-being. Yet agriculture faces interconnected challenges that raise pressing questions about how rural communities might achieve sustainable and dignified futures. This chapter presents KARUCO as an example of the Church's engagement in sustainable agriculture and its contribution to human flourishing and the habitability of the Earth for both human beings and the wider creation.

KARUCO College, established by the Evangelical Lutheran Church in Tanzania (ELCT), Karagwe Diocese, represents one response to these challenges. Located in Karagwe District in north-western Tanzania, KARUCO was founded on the conviction that education can serve as a powerful instrument of social transformation, environmental stewardship, and economic empowerment. Rather than viewing agriculture merely as a means of subsistence, the institution promotes it as a pathway towards prosperity, sustainability, human flourishing, and care for creation.

More than an agricultural training institution, KARUCO embodies a holistic approach to rural transformation that seeks to restore and strengthen the relationships between people and the land, knowledge and practice, education and community development, economic opportunity and social justice, and present needs and future aspirations. Through education, research, community outreach, environmental stewardship, and entrepreneurship, KARUCO demonstrates how a church-based institution can contribute meaningfully to the sustainable transformation of agriculture and to the flourishing of rural communities.

2. Vision Rooted in Rural Realities

The establishment of KARUCO emerged from a sober recognition of the realities facing rural communities in Tanzania. Although agriculture remains the backbone of the national economy and the principal source of livelihood for most households, many farming families continue to experience low productivity, limited market access, inadequate infrastructure, and vulnerability to climate change. Young people increasingly migrate to urban centres in search of opportunity, often leaving behind ageing rural populations and weakened agricultural systems. Declining soil fertility, climate variability, youth unemployment, weak market systems, and persistent rural poverty compound one another.

Against this backdrop, the ELCT Karagwe Diocese envisioned an institution capable of addressing the root causes of rural underdevelopment rather than merely responding to its symptoms. Instead of focusing solely on immediate needs, the Diocese chose to invest in human capacity, knowledge creation, and innovation. The result was KARUCO: a college dedicated to sustainable agriculture, environmental awareness, climate change mitigation, and the transformation of rural communities in service of a more prosperous, just, and sustainable society.

The significance of this vision extends beyond education alone. It reflects an understanding that sustainable development begins with people, with those who possess the knowledge, skills, ethical values, and confidence necessary to improve their communities and manage natural resources responsibly. In this sense, KARUCO represents an investment in human development and environmental sustainability together, refusing to treat the two as separate concerns.

Figure 1: KARUCO's Vision



3. The Church as a Partner in Sustainable Development

Throughout history, churches have played significant roles in education, healthcare, social welfare, and community development. In many parts of Africa, faith-based institutions continue to serve communities where state resources remain limited. The establishment of KARUCO reflects this broader ecclesial commitment to social transformation.

The Church's concern for agriculture in rural communities is both practical and moral. Agriculture affects food security, household income, nutrition, employment, environmental sustainability, and social stability. When agricultural systems fail, the consequences are often expressed in poverty, migration, food insecurity, and social vulnerability. Conversely, where agriculture flourishes, communities become more resilient and better able to pursue their own developmental aspirations.

For the Church, engagement in agriculture is also rooted in theological convictions concerning stewardship, justice, human dignity, and care for creation. The biblical vision of humanity as steward of God's creation places upon believers the responsibility to use natural resources wisely and sustainably. Caring for the land, ensuring food security, and promoting the well-being of communities are therefore inseparable from the broader mission of serving God and neighbour.

KARUCO illustrates how the Church can address contemporary development challenges through long-term investment in education and capacity-building rather than temporary relief. Through teaching, research, innovation, and outreach, the college builds local capacities for development and self-reliance. In doing so, it participates in forms of sustainable agriculture that go well beyond charitable assistance, strengthening the foundations upon which lasting prosperity and environmental resilience can be built.

4. Education as a Tool for Transformation

At the heart of KARUCO's mission lies a commitment to transformative education, captured in a simple but demanding principle: learning by doing. Students are encouraged to combine theoretical knowledge with practical experience so that learning remains closely connected to the realities of agriculture and rural development.

This approach recognises that agriculture is both a science and a practice. Effective farming requires technical knowledge, critical thinking, observation, experimentation, and innovation. By integrating classroom instruction with fieldwork, laboratory activities, livestock management, and community engagement, KARUCO equips its students to address the real challenges faced by farming communities rather than a merely theoretical version of them.

The college's programmes aim to produce not only technically competent graduates but also problem-solvers, entrepreneurs, innovators, and community leaders capable of identifying opportunities

within local agricultural systems and developing practical responses to the challenges affecting productivity, sustainability, and livelihoods.

Education, in this context, becomes transformative because it changes how students perceive agriculture and rural development. It enables them to regard agriculture not as a symbol of poverty or limitation but as a field of opportunity, innovation, and service. The ultimate goal is not employment alone but the formation of individuals capable of contributing to the well-being of their communities and the sustainability of their environments. By linking knowledge with practical application, KARUCO demonstrates that higher education can itself be a catalyst for rural transformation.

5. Restoring Confidence in Agriculture

One of the greatest challenges confronting rural Africa today is the declining attractiveness of agriculture among young people. For many, agriculture is associated with hard labour, uncertainty, and limited economic returns, while migration to urban areas is often perceived as a more promising path to progress.

KARUCO seeks to challenge this perception by presenting agriculture as a modern, dynamic, and rewarding profession. Through practical training, exposure to scientific methods, entrepreneurship education, and technological innovation, students come to understand agricultural opportunities in new ways. Agriculture is presented not merely as food production but also as enterprise management, employment creation, value addition, technological innovation, resource conservation, and economic development.

This contribution should not be understated. The future of African agriculture depends substantially on whether young people are willing and able to participate actively in the sector. Building sustainable rural futures therefore requires educational institutions capable of inspiring and preparing a new generation of agricultural leaders. By exposing students to the broader possibilities within

agriculture, KARUCO helps restore confidence in farming as a viable and respected vocation capable of generating income, creating jobs, and driving local economic growth.

6. Sustainable Agriculture and Environmental Stewardship

Sustainability and environmental stewardship occupy a central place within KARUCO's vision and mission. The institution recognises that agricultural productivity cannot be separated from the health of the natural environment. Soil, water, biodiversity, forests, and climate systems all shape the capacity of communities to sustain agricultural production over time.

Through its teaching and outreach, KARUCO promotes approaches that seek to balance productivity with environmental responsibility, including soil conservation, agroforestry, composting and organic fertilisation, integrated farming systems, water conservation, and climate-resilient agricultural practices. Such approaches are becoming increasingly indispensable in an era of climate change, as farmers across Tanzania confront growing uncertainty arising from shifting rainfall patterns, droughts, floods, and the degradation of natural resources.

Environmental stewardship, in other words, is not separate from agricultural development; the two are fundamentally interconnected. Long-term prosperity requires healthy ecosystems, just as healthy ecosystems require responsible human management. The Church's contribution here is significant precisely because it offers not only technical guidance but also ethical motivation. By framing care for creation as a moral responsibility, KARUCO encourages students and communities to regard environmental conservation as an integral component of sustainable development.

7. Community Engagement and Rural Development

KARUCO's mission extends beyond its campus. The institution regards community engagement as essential to its contribution to rural transformation, ensuring that knowledge generated within the college benefits surrounding communities and supports wider regional development.

This engagement takes various forms, including farmer training, applied research, demonstration projects, extension services, and collaboration with local stakeholders. Through these activities, the college functions as a bridge between academic knowledge and community practice. Such engagement strengthens the institution's relevance while ensuring that its teaching and research remain grounded in local realities. It also promotes mutual learning, as farmers gain access to new knowledge and innovations while students and staff gain a deeper understanding of the challenges rural communities face.

Through these relationships, KARUCO contributes to the strengthening of local capacities, social networks, and development opportunities. The college therefore functions not simply as a place of learning but as a catalyst for wider community transformation.

8. Promoting Inclusion and Women's Empowerment

Sustainable rural development requires inclusive participation. Women play vital roles in agricultural production, household welfare, food security, and community life, yet they frequently face barriers to education, resources, land ownership, and economic opportunity.

Recognising these realities, KARUCO and its partners have sought to expand educational opportunities for girls and young women through scholarship programmes and other supportive initiatives, helping to ensure that higher education becomes accessible to those who might otherwise be excluded by economic constraints or social barriers. Investing in women's education carries far-reaching

implications. Educated women contribute to agricultural innovation, entrepreneurial activity, community leadership, and improved household welfare, and their participation strengthens both economic development and social justice.

Women's empowerment also carries intergenerational benefits. Research consistently demonstrates that educating women improves family health, educational outcomes for children, and community well-being more broadly. Supporting women's participation in higher education is therefore not merely a matter of equity but also a strategy for wider societal transformation, one that is entirely consistent with KARUCO's vision of a prosperous and sustainable society in which development opportunities are shared more equitably across rural communities.

9. From Production to Value Addition: Project FURSA

The challenges facing rural communities often extend beyond agricultural production itself. Farmers may produce substantial quantities of crops yet receive only limited economic returns because of weak value chains, poor market access, post-harvest losses, and dependence on intermediaries. The experience of pineapple farmers in Karagwe illustrates this reality. Although the region produces high-quality pineapples, many farmers continue to struggle with low incomes and unstable markets, while significant value is lost before products ever reach consumers.

Project FURSA, Kiswahili for "opportunity", was developed in response to this challenge. The initiative seeks to establish local food-processing capacity capable of adding value to pineapple and other agricultural products. Through processing, preservation, packaging, and marketing, farmers can potentially secure more stable and equitable returns for their labour.

An important feature of the project is its commitment to gender inclusion. Because opportunities within agricultural value chains are not always distributed equitably, Project FURSA is designed to ensure that women farmers participate fully in the economic benefits

generated by the new processing facility. In this way, the project seeks to advance social equity alongside economic growth.

The project reflects a broader understanding of rural transformation. Development is not simply a matter of increasing production but of creating opportunities for entrepreneurship, employment, value addition, and local economic growth. By strengthening agricultural value chains, initiatives such as Project FURSA help ensure that a greater share of agricultural value remains within farming communities themselves. In doing so, they complement KARUCO's educational mission by translating knowledge and innovation into livelihoods that strengthen rural resilience.

10. Challenges and Future Prospects

While KARUCO has made important contributions to agricultural development and rural transformation, significant challenges remain. Financial constraints, climate change, infrastructural limitations, and the need for expanded research and technological innovation continue to affect both the institution and the farming communities it serves.

Rapid environmental change requires ongoing adaptation and innovation. New approaches to climate-smart agriculture, renewable energy, water management, and sustainable resource utilisation will become increasingly important in the years ahead. Institutions such as KARUCO therefore have a critical role to play in generating and disseminating the knowledge that communities need to respond effectively.

At the same time, opportunities for collaboration with government agencies, international organisations, private-sector actors, and local communities continue to expand. Such partnerships can strengthen research, improve access to technology, and widen opportunities for rural development. The future success of KARUCO will depend not only on its ability to educate students but also on its capacity to remain responsive to changing realities while continuing to serve as a centre of innovation, learning, and community engagement.

11. Conclusion

KARUCO represents a practical example of the Church's engagement in sustainable agriculture, care for creation, and rural transformation. Its contribution lies not only in agricultural education but also in a broader commitment to community development, environmental stewardship, entrepreneurship, social inclusion, and human empowerment.

At its core, KARUCO is an effort to restore and strengthen relationships: between people and the land that sustains them, between knowledge and practice, between education and community development, between economic opportunity and social justice, and between present challenges and future possibilities. It recognises that sustainable development depends not only on infrastructure, technology, or financial resources but also on people who are equipped, motivated, and empowered to transform their own communities.

The institution demonstrates that agriculture can be understood as more than an economic activity. It is also a means of enhancing human dignity, strengthening community, promoting justice, and caring for creation. Through its educational programmes, environmental initiatives, community engagement, and entrepreneurial projects, KARUCO contributes to a more sustainable, inclusive, and resilient rural future.

By educating, innovating, and transforming lives, KARUCO demonstrates how a faith-based institution can contribute meaningfully to sustainable development. Its experience suggests that when education, innovation, community engagement, environmental responsibility, and ethical conviction are brought together, agriculture becomes more than a means of survival; it becomes a foundation for dignity, prosperity, resilience, and hope. In this way, KARUCO offers valuable lessons for churches, educational institutions, development practitioners, and policymakers seeking to build flourishing rural communities in Tanzania and beyond.

17. Religion and the Habitability of Creation

BRIGHTON KATABARO

Abstract

The habitability of creation depends not only on ecological and economic conditions but also on the religious worldviews through which human beings understand and inhabit the earth. Drawing on the cosmology and lived practices of the Bahaya and Banyambo of north-western Tanzania, this chapter argues that African Traditional Religion has historically functioned as a mechanism of ecological stewardship and intergenerational justice. Sacred geography, taboo, ritual, and ancestral responsibility are interpreted not as remnants of a pre-scientific past but as religious and ethical resources that understand human beings as participants within a wider community of life encompassing ancestors, future generations, and the natural world. The chapter also considers the historical disruption of these traditions under colonial and missionary influence and highlights their continuing relevance for contemporary ecological reflection. It argues that indigenous ecological wisdom remains an important conversation partner in efforts to sustain the habitability of creation.

Keywords: Religion and nature; habitability of creation; African Traditional Religion; Bahaya; Banyambo; relational ontology; Ubuntu; ecological stewardship

1. Introduction

Religions have always shaped the ways in which communities relate to land, water, animals, and the wider environment. They provide the moral vocabulary through which people determine what

may be used, what must be protected, and ultimately to whom the earth belongs.¹ The question of whether religion promotes or hinders ecological responsibility has been the subject of sustained debate since Lynn White Jr.'s influential 1967 essay linked certain interpretations of Christianity to a dominative attitude towards nature. Although White's argument has important limitations, it usefully redirected attention from technology alone to the cultural and religious assumptions that shape human relationships with the natural world.²

Within African contexts, a different starting point emerges from John Mbiti's account of African religious thought. For Mbiti, human existence is fundamentally relational; persons exist not as isolated individuals but as participants in a larger community that includes God, nature, ancestors, and generations yet to come.³ This relational understanding of reality offers an important framework for ecological reflection because it situates humanity within, rather than above, the wider community of life.

This chapter explores what such a worldview looks like in practice through the example of the Bahaya and Banyambo peoples of north-western Tanzania. It examines the ways in which cosmology, sacred geography, taboo, ritual, and ancestral ethics have historically shaped relationships with land and environment. These traditions are interpreted not merely as cultural practices but as forms of ecological knowledge embedded within religious life.

The chapter argues that such religious frameworks contribute significantly to the habitability of creation by cultivating forms of stewardship, restraint, and intergenerational responsibility. In doing so, they challenge the assumption that ecological responsibility depends primarily on scientific knowledge, state regulation, or technological innovation. The preservation of habitable environments also depends upon moral commitments, collective memory, and shared understandings of humanity's place within the wider community of creation.

The discussion proceeds in four stages. First, the chapter examines the relationship between religion and the habitability of creation. Second, it explores African creation spirituality through the cosmology of the Bahaya and Banyambo. Third, it considers how this

worldview is embodied in practices such as sacred geography, taboo, and ancestral responsibility. Fourth, it analyses the historical disruption of these ecological systems through colonial and missionary processes that contributed to the disenchantment of nature. Throughout, the chapter seeks to show how indigenous ecological wisdom can contribute to contemporary discussions concerning environmental stewardship and the future habitability of creation.

2. Religion and the Habitability of Creation

Habitability is more than the capacity for biological survival. It refers to the conditions that enable life to flourish across generations. Such flourishing depends not only on fertile soils, clean water, stable ecosystems, and favourable climatic conditions, but also on the moral and cultural frameworks that shape how human beings relate to the natural world.⁴

Religious traditions contribute to habitability by providing interpretive frameworks through which land, water, and other elements of creation are understood. Whether land is viewed primarily as a commodity, a sacred trust, an ancestral inheritance, or a divine gift profoundly influences the ways in which it is used and managed. Ecological outcomes are therefore shaped not only by scientific knowledge and economic systems but also by the beliefs, values, and narratives through which communities understand their place within the world. Karen Bloomquist's observation that theology must engage public questions concerning the common good is particularly relevant in this context. Ecological crises are not simply environmental or technological problems; they are also crises of meaning, value, and social imagination. Human beings exploit or conserve nature according to the assumptions and stories that guide their behaviour.⁵

Within many indigenous religious traditions, ecological wellbeing and spiritual wellbeing are inseparable. Environmental degradation is not understood merely as damage to ecosystems but as a disruption of relationships—between people and the land, between communities and their ancestors, and between humanity

and the sacred source of life itself. Such perspectives challenge approaches that treat ecological problems as exclusively technical matters requiring only scientific or policy solutions.

The concept of habitability therefore invites a broader understanding of ecological responsibility. It requires attention not only to environmental processes but also to the moral, cultural, and spiritual conditions that enable communities to sustain life over time. Religion contributes to habitability when it cultivates values, practices, and institutions that encourage care, restraint, responsibility, gratitude, and a sense of belonging within the wider community of creation. This perspective is particularly significant in African contexts, where relationships between land, community, spirituality, and livelihood have often been understood as deeply interconnected. Ecological responsibility emerges not simply from concern for resource management but from a broader understanding of life as relational and shared. The example of the Bahaya and Banyambo provides a valuable illustration of how such religious worldviews have historically shaped environmental practices and contributed to the preservation of habitable landscapes.

3. African Creation Spirituality

Cosmology and the Community of Life

According to the worldview of the Bahaya and Banyambo peoples, nature, soil, animals, human beings, ancestors, and spiritual powers belong to a single community of life sustained by **Ruhanga**, or **Nyamuhanga**, the Creator and ultimate source of existence. Ruhanga is understood as the giver of fertility, harvest, life, and communal wellbeing.⁶ Beneath Ruhanga stand spiritual beings associated with particular dimensions of life. Among them is **Kazoba**, the sun, whose life-giving power sustains agriculture and food production. Within this cosmological framework, agricultural prosperity is not viewed as an isolated economic achievement but as part of a larger network of relationships connecting humanity, creation, and the divine.

Families and clans understand themselves as extending beyond the living generation. Communities include ancestors, present members, and generations yet unborn. This understanding generates a distinctive agricultural ethic of responsibility. The living do not possess absolute ownership of the land; rather, they hold it in trust on behalf of those who came before them and those who will come after them. Consequently, misuse of land is not merely an economic failure but a violation of moral and cosmic order.⁷ Within this worldview, spirituality, agriculture, and community are inseparable. Cultivating the land, maintaining social harmony, and fulfilling spiritual obligations are not separate spheres of life but interconnected dimensions of a single reality. Agriculture therefore carries both material and spiritual significance.

Relational Ontology

This cosmology reflects what may be described as a **relational ontology**, an understanding of reality that emphasises interconnect-edness rather than individual autonomy. Similar themes have already emerged in the Ubuntu traditions discussed elsewhere in this volume. Human identity is formed through relationships rather than through isolated individuality.

From this perspective, human beings exist in relationship not only with one another but also with the soil, plants, animals, ancestors, and the wider ecological community.⁸ Reality is therefore understood less as a collection of separate entities and more as a web of relationships sustained by mutual dependence. Within such a framework, the distinction between the sacred and the secular becomes far less pronounced than it is in many Western traditions. Land, agriculture, community life, and spirituality belong to the same moral and cosmological order. The natural world is therefore not simply a physical environment but a relational world in which divine, human, and ecological realities intersect.

This relational understanding finds expression in prayers, rituals, and everyday practices. One striking example appears in the traditional prayer to **Wamala**, in which petitions for household wellbeing are inseparable from concern for other forms of life.

Figure 1: Traditional Family Prayer to Wamala
(Source: Niwagila, 1991, 389-390)

My King Wamala of Bitoma,
Milindi son of Lugaju, I praise you.
This house and everything in it belong to you.
Give me healthh, till I bend 'like the oluti lwa omulyangô
archway'.
Let me eat meat and crack bones with the teeth of Mugasha.
Let my eyelids move as if they were the pupil's mother.
Deliver the entire family from all danger and diseases.
Let my household be strong with children and grand children.
Let my wife go out and come back in freedom.
I plead you to keep our property from destruction,
Yes even the rat, the lizard, the snake and the spider.
But listen to me O Wamala. Mukama agambwa mbele - you
who is mentioned first.

Significantly, the prayer petitions for the wellbeing not only of human family members but also of creatures such as “the rat, the lizard, the snake and the spider.” Such language reveals an understanding that the flourishing of the household depends upon the flourishing of the wider community of life. Even creatures that might appear insignificant, troublesome, or undesirable are recognised as participants in an interconnected ecological order upon which human existence ultimately depends.

The Bahaya and Banyambo case is not unique. Similar patterns can be found across many African societies, although expressed through different languages, symbols, and cosmological traditions.

Among the Agikuyu of Kenya, for example, **Ngai** is understood as the creator of the sun, moon, stars, rain, and all life. Among the Kalenjin, God is known as **Asis**, meaning “Sun,” reflecting associations between divine power and the life-giving forces of nature.

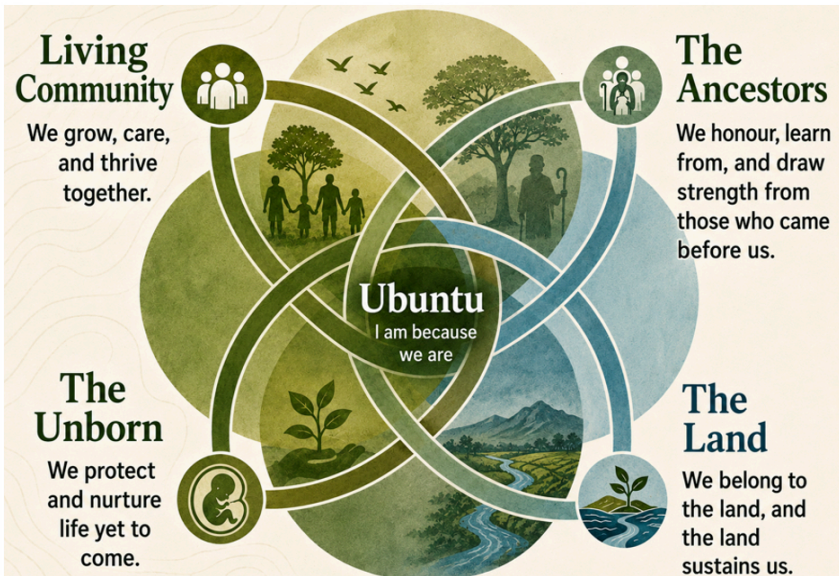
Similar theological ideas are embedded in personal names across East Africa. Names such as **Aganyila** ("God is merciful"), **Amanya** ("God knows"), **Mukiza** ("God is the healer"), and **Alinda** ("God is the Protector") are not merely personal identifiers but confessional statements. They express faith in God's mercy, knowledge, healing power, and protective care, affirming that human wellbeing is ultimately dependent upon divine providence. In this sense, the act of naming itself becomes a theological affirmation, bearing witness to a worldview in which the flourishing of persons, communities, and the land are inseparably connected to God's sustaining presence.

These examples do not suggest a single, uniform African worldview. Rather, they indicate recurring patterns of thought in which divine presence, communal wellbeing, and environmental flourishing are deeply intertwined. The relational ontology observed among the Bahaya and Banyambo therefore belongs to a broader stream of African religious imagination and ecological thought.¹⁷

The implications of this worldview are considerable. If creation is sustained through ongoing relationships between God, humanity, and the natural world, then ecological destruction cannot be regarded merely as an environmental problem. It represents a breakdown within the network of relationships that sustains life itself.⁹

From a broader theological perspective, these indigenous cosmologies offer valuable resources for understanding ecological responsibility as the preservation and restoration of relationships among God, humanity, and the wider community of creation.

Figure 1. Author's illustration, produced with AI assistance.



4. Lived Ecology: Sacred Geography, Taboo, and Ancestral Responsibility

Among the Bahaya and Banyambo, this relational ontology finds expression in a lived ecology rather than remaining merely a set of abstract beliefs. Cosmological convictions are embodied in everyday practices that regulate relationships with land, water, forests, animals, and sacred places. Ecological responsibility is therefore woven into the moral and spiritual fabric of communal life rather than imposed externally through formal regulation.

Sacred Geography

One of the clearest expressions of this worldview is found in sacred geography. Certain forests, hills, rivers, springs, wetlands, and ancient trees are regarded as sacred places and treated with particular reverence. These sites are not understood as neutral physical spaces but as locations associated with spiritual presence, ancestral memory, or divine activity. Consequently, human activities within them are often restricted by religious beliefs and communal norms.

Among the Bahaya and Banyambo, particular trees and groves have traditionally been regarded as dwelling places of ancestral spirits or as sites associated with ritual practices. As a result, tree felling, agricultural cultivation, hunting, or settlement within such areas has often been prohibited. Long before the emergence of modern conservation policies, these sacred sites functioned as protected ecological zones, preserving biodiversity, safeguarding water sources, and maintaining ecological stability. Their protection rested not upon state authority but upon religious conviction and communal responsibility.¹⁰

What modern environmental discourse describes as conservation was understood within these communities as faithfulness to the moral and spiritual order of creation. The protection of sacred sites was therefore simultaneously ecological, cultural, and religious. Sacred geography served as a practical mechanism through which religious belief translated into environmental stewardship.

Taboo as Ecological Governance

A second mechanism of ecological stewardship was the system of taboos governing the use of natural resources. Certain actions were prohibited not simply because they were economically unwise but because they violated moral and spiritual norms. Restrictions on cutting particular tree species, limitations on hunting and fishing during specific seasons, and rules protecting springs, rivers, and wetlands formed part of a broader socio-ecological system of environmental governance.¹¹

Although colonial authorities and missionaries frequently dismissed such practices as irrational superstition, they often performed important ecological functions. Seasonal restrictions on hunting allowed wildlife populations time to reproduce and recover. Prohibitions against disturbing water sources contributed to the preservation of clean and reliable supplies of water. Limitations on the harvesting of particular tree species helped maintain ecological balance and reduce environmental degradation.

These taboos reflected a fundamental theological insight: human freedom must operate within limits that sustain the wider community of life. Not everything that could be done should be done. Ecological restraint was therefore understood not as a limitation of wellbeing but as a condition for its preservation.

Ancestral Responsibility and Intergenerational Justice

The ethic of ecological responsibility extends beyond space into time through the role of the ancestors. Among the Bahaya and Banyambo, land is understood to belong simultaneously to the dead, the living, and the unborn. Human beings therefore possess neither absolute ownership nor unrestricted rights over the land they occupy. Instead, they serve as custodians within a much longer chain of responsibility extending across generations.¹² Ancestors function as moral guardians who observe the conduct of the living and hold them accountable for their treatment of the land. This belief reinforces the conviction that decisions concerning natural resources must take account not only of present needs but also of the wellbeing of future generations. The fertility of the soil, the integrity of forests, and the protection of water sources become matters of obligation extending beyond the interests of any single generation.

This understanding fosters a powerful sense of intergenerational justice. Future generations are not treated as abstract beneficiaries of present actions but as members of the wider community to whom responsibilities are already owed. The land is received from previous generations and must be handed on in a condition that enables those who come after to flourish. Stewardship thus becomes embedded within religious consciousness and communal identity

rather than imposed externally through legal or administrative systems.

Ecological Wisdom and the Habitability of Creation

Taken together, sacred geography, taboo, and ancestral responsibility reveal a sophisticated religious ecology grounded in relationality, restraint, and accountability. These practices function as mechanisms through which ecological knowledge is transmitted, environmental limits are respected, and communal responsibilities are reinforced.

From the perspective of habitability, their significance lies not only in their environmental effectiveness but also in the worldview that sustains them. They cultivate an understanding of human beings as participants within a broader community of life rather than autonomous owners of nature. Land, forests, rivers, animals, ancestors, and future generations are bound together within a moral and spiritual order that encourages care rather than exploitation.

Such traditions do not provide ready-made solutions to contemporary environmental challenges. Nevertheless, they preserve important insights. They remind us that ecological sustainability depends not only on scientific knowledge, technological innovation, and governmental regulation but also on moral commitments, communal memory, and shared understandings of humanity's responsibilities within creation. It is precisely these insights that make the subsequent disruption of such traditions through colonialism and missionary activity ecologically significant, a development to which we now turn.

5. The Disenchantment of Nature

The ecological significance of Bahaya and Banyambo traditions becomes most apparent when their disruption is taken into account. Colonial rule and missionary expansion weakened many indigenous ecological systems by delegitimising traditional practices and forms of knowledge. Sacred landscapes were frequently reinterpreted as superstition, while indigenous environmental wisdom

was often dismissed as incompatible with Christianity and modernity.¹³

A particularly significant consequence of this process was the introduction of a sharp distinction between the sacred and the secular, spirit and matter, God and nature. Such distinctions were largely foreign to indigenous cosmologies, within which spiritual and material realities formed an integrated whole. As traditional beliefs and practices lost social legitimacy, nature increasingly came to be understood in utilitarian terms. What had once been sacred space became exploitable space. In this sense, colonial and missionary influences contributed to a process of disenchantment in which the natural world lost much of its moral and religious significance and became correspondingly more vulnerable to exploitation.¹⁴

Local memory preserves examples of this transformation. In the Bugabo area of Bukoba during the 1960s, missionaries reportedly encouraged converts to cut down sacred trees as a demonstration of Christianity's superiority over traditional religion. According to community accounts, the destruction of these sites was followed by drought, crop failure, and food insecurity.¹⁵ Whatever the precise relationship between these events, the episode highlights the ecological functions that sacred sites had historically performed. Their removal weakened locally established systems of environmental protection and increased ecological vulnerability.

At the same time, colonial economic structures introduced new patterns of land use and resource management. Export-oriented agriculture, commercial production, and forms of monoculture increasingly displaced communal approaches to land stewardship. Land came to be viewed less as a shared trust and more as an economic commodity. Traditional mechanisms that regulated access to resources and imposed limits on exploitation were weakened, while market considerations assumed greater influence over environmental decision-making.

As J. N. K. Mugambi has argued, continuing environmental degradation driven by extractive economic models threatens the long-term sustainability of human habitation on the planet.¹⁶ The erosion of

indigenous ecological systems therefore represents more than a cultural loss; it also carries significant ecological consequences.

At this point, however, two equal and opposite errors must be avoided. The first is the tendency to dismiss indigenous traditions as mere superstition, thereby overlooking their ecological significance and practical wisdom. The second is the tendency to romanticise them uncritically, treating them as if they offered complete or infallible solutions to contemporary environmental problems.

Kwabena Asamoah-Gyadu cautions against this latter tendency. While indigenous religious traditions often preserve valuable ecological insights, excessive sacralisation can also diminish human responsibility by attributing environmental outcomes primarily to spiritual forces or ancestral intervention.¹⁸ In such cases, ecological degradation may be interpreted chiefly as a sign of spiritual displeasure rather than as the result of human choices and actions.

For this reason, the retrieval of indigenous ecological wisdom must be both appreciative and critical. The aim is neither a return to a romanticised pre-colonial past nor the rejection of modern scientific knowledge. Rather, it is the recovery of theological and ethical insights capable of enriching contemporary ecological reflection. Indigenous traditions remind us that environmental sustainability requires more than technical management and scientific expertise; it also depends upon moral responsibility, communal accountability, and a sense of belonging within the wider community of creation.¹⁹

The challenge, therefore, is not simply to preserve traditional practices or to replace them with modern alternatives. It is to discern how the ecological wisdom embedded within religious traditions can contribute to contemporary efforts to sustain the habitability of creation. Such a task requires dialogue between indigenous knowledge, scientific understanding, and theological reflection, recognising that each offers important insights into humanity's relationship with the earth.

6. Conclusion

This chapter has argued that the habitability of creation depends not only upon ecological and economic conditions but also upon the religious worldviews through which human beings understand and inhabit the earth. Through the example of the Bahaya and Banyambo of north-western Tanzania, it has shown that African Traditional Religion historically functioned as an important mechanism of ecological stewardship and intergenerational responsibility.

The cosmology examined in this chapter presents creation as a community of life sustained by God and encompassing human beings, ancestors, future generations, and the natural world. Within such a framework, land is more than a resource, rivers and forests are more than physical objects, and agriculture is more than an economic activity. Each belongs within a network of relationships that carries moral and spiritual significance. Ecological responsibility therefore emerges not primarily from regulation or technical expertise but from a sense of belonging, accountability, and obligation within the wider community of creation.

The discussion of sacred geography, customary taboos, and ancestral responsibility has demonstrated how these beliefs were translated into lived ecological practices. Sacred forests, protected springs, restrictions on resource use, and obligations toward future generations functioned as mechanisms through which environmental stewardship became embedded within communal life. These practices illustrate that ecological sustainability often depends as much upon cultural and spiritual commitments as upon scientific knowledge and institutional governance.

At the same time, the chapter has shown how colonial and missionary interventions contributed to the erosion of many indigenous ecological systems. The disenchantment of nature and the increasing commodification of land weakened traditional mechanisms of environmental restraint and altered the relationship between communities and the landscapes upon which they depended. Yet the response to this history cannot be either the uncritical rejection or the romanticisation of indigenous traditions. Rather, it requires a critical retrieval of the ecological insights they preserve.

The significance of these insights extends beyond the Bahaya and Banyambo context. The questions raised by this chapter—concerning land, food, stewardship, community, memory, responsibility, and the flourishing of creation—recur throughout many of the contributions in this volume. They point toward a broader theological challenge: how to bring ecological science, agricultural practice, biblical faith, indigenous wisdom, and contemporary environmental concerns into meaningful conversation.

The concluding chapter takes up that challenge. Drawing together the empirical findings, theological reflections, and practical initiatives presented throughout this volume, it explores how these diverse strands may contribute to a more integrated theological vision of earth's habitability. It is to that constructive task that we now turn.

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18. Conclusion: Toward Agrartheology

BRIGHTON KATABARO

Abstract

This concluding chapter draws together the empirical, theological, and practical insights developed throughout *Soil & Soul* and returns to the question that has guided the volume from the outset: how might humanity inhabit the Earth responsibly at a time when the conditions that sustain life are becoming increasingly fragile? The chapter argues that the contributions gathered in this volume converge on a common insight: the ecological crisis is fundamentally a crisis of relationships. Environmental degradation emerges not merely as a scientific, technological, economic, or political problem but as a manifestation of disrupted relationships between human societies and the ecological systems that sustain life, between affluent and vulnerable communities, between present and future generations, and ultimately between humanity and God. Synthesising insights from agroecology, biblical and theological reflection, African intellectual traditions, and practical initiatives undertaken by churches and communities, the chapter identifies recurring patterns of relational disruption that threaten the habitability of creation. It further argues that agriculture repeatedly emerges throughout the volume as a privileged site in which ecological realities, theological questions, social justice concerns, and human flourishing converge. It is from this convergence that Agrartheology emerges. Agrartheology is presented not as a finished system but as an emerging field of theological inquiry capable of bringing agriculture, ecology, theology, and Earth's habitability into closer dialogue. The chapter concludes with recommendations for theological education, church practice, public policy, and future research.

Keywords: Agrartheology; Earth's habitability; agroecology; ecological justice; ecological memory; stewardship; transformation

1. Returning to the Question of Earth's Habitability

This volume opened by asking how humanity might inhabit the Earth responsibly at a time when the conditions that sustain life are becoming increasingly fragile—a question of habitability in the fullest sense, encompassing not only biological survival but ecological integrity, social justice, economic viability, cultural continuity, and spiritual well-being. Across their diverse disciplinary, cultural, scientific, and theological perspectives, the contributors converge on a single answer: ecological degradation is fundamentally a crisis of relationships. That conclusion provides the interpretive key not only to this chapter but to the volume as a whole.

2. What This Volume Has Revealed

The Ecological Crisis as a Crisis of Relationships

A central conviction running throughout this volume is that the ecological crisis is fundamentally a crisis of relationships.

The Introduction identified a wide network of disrupted relationships: between production and ecological sustainability, consumption and responsibility, producers and consumers, affluent and vulnerable populations, present and future generations, humanity and non-human creatures, and ultimately between humanity, creation, and God. Ecological degradation is often described through measurable indicators such as climate instability, biodiversity decline, shrinking forests, degraded soils, water scarcity, and food insecurity. Such indicators remain indispensable. Yet they do not exhaust the meaning of the crisis. Beneath them lies a deeper reality: a growing disconnect between human societies and the ecological systems that sustain life.

Human flourishing depends upon healthy soils, functioning ecosystems, resilient biodiversity, stable climatic conditions, and productive agricultural landscapes. Yet modern social and economic arrangements often obscure these dependencies. Food becomes detached from soil. Consumption becomes detached from production.

Markets become detached from ecological limits. Human beings increasingly behave as though they can flourish independently of the systems upon which they depend. The ecological crisis therefore represents more than environmental decline. It reflects a weakening of relationships characterised by dependence, reciprocity, stewardship, solidarity, and care. Ecological restoration consequently requires not only environmental repair but also relational renewal.

Recurring Patterns of Relational Disruption

The Introduction identified numerous relationships under strain. These disruptions are diverse and interconnected and cannot be reduced to a single explanatory framework. Nevertheless, several recurring patterns emerge across the volume. These should be understood not as a fixed typology but as representative expressions of a broader relational crisis.

Theology and Agriculture

A recurring theme throughout the volume is the tendency to separate theological reflection from the material conditions that sustain life. This separation appears in various forms: soul from soil, salvation from creation, and worship from cultivation. Such divisions have frequently contributed to the marginalisation of agriculture, food systems, and ecological responsibility within theological discourse. The volume consistently challenges this divide. Human beings are embodied creatures whose lives depend upon food, water, fertile soils, biodiversity, and climatic stability. Questions of agriculture, food systems, ecological degradation, and environmental justice therefore belong at the heart of theological reflection.

People and the Ecological Systems that Sustain Life

A second recurring pattern concerns the growing disconnection between people and the ecological systems that sustain life. Modern food systems allow consumption to occur at considerable distance from production. Urbanisation often separates populations from agricultural landscapes, while technological mediation can obscure the ecological processes through which food and water are produced. Yet soil degradation, biodiversity loss, food insecurity, and

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climatic instability continually remind humanity that such independence is illusory.

Global North and Global South

A third recurring pattern concerns relationships between the Global North and the Global South. Historical patterns of colonial extraction, unequal exchange, and uneven development continue to shape ecological realities. Communities that contribute least to environmental degradation frequently bear its most severe consequences. The volume repeatedly emphasises that sustainability cannot be separated from justice. Ecological responsibility must therefore be accompanied by ecological solidarity.

Present and Future Generations

A fourth recurring pattern concerns relationships across time. Environmental degradation often reflects decisions that prioritise short-term gains while transferring ecological costs to future generations. Forests are cleared, soils depleted, biodiversity diminished, and climatic stability undermined in ways that constrain future possibilities. Ecological responsibility is therefore inseparable from intergenerational responsibility.

3. A Synthesis of the Volume

Part I, Understanding the Ecological Crisis, established the ecological realities within which the crisis unfolds. The chapters moved deliberately between memory and measurement, between lived experience and scientific analysis. The contributors demonstrated that ecological degradation is already affecting agricultural systems, food production, biodiversity, soils, and livelihoods. Equally significant was the emergence of ecological memory as a moral category. Communities remember forests that have disappeared, rivers that have diminished, soils that were once more fertile, and agricultural practices that sustained greater resilience. Memory therefore functions as a moral archive through which ecological loss becomes visible and meaningful. Part I demonstrated that the ecological crisis is not a distant possibility but a present reality.

Part II, Biblical and Theological Foundations, turned from diagnosis to interpretation. Read together, these chapters converge around a common conviction: creation is not a collection of resources available for unlimited human exploitation. It is an interconnected community of life within which humanity participates. Ubuntu, stewardship, sufficiency, cultivation, responsibility, and care emerged repeatedly as interpretive frameworks. The contributors challenge assumptions that legitimise domination, limitless accumulation, and ecological extraction. Instead, they propose a vision of human vocation grounded in stewardship, reciprocity, responsibility, and care. The ecological crisis therefore raises questions that cannot be answered by science alone. It raises questions concerning meaning, vocation, limits, justice, and responsibility.

Part III, Faith as a Transformative Power, turned from interpretation to transformation. A recurring insight throughout this section is that ecological restoration requires more than technological innovation, policy reform, or economic adjustment. It requires transformed forms of life. Faith functions not simply as a source of belief but as a source of motivation, resilience, identity, and action. Churches, institutions, local communities, and indigenous traditions all possess resources capable of supporting ecological renewal. The contributors repeatedly demonstrate that meaningful change occurs simultaneously at personal, communal, institutional, national, and global levels.

Taken together, the three parts reveal that the ecological crisis cannot be adequately understood through scientific analysis alone, nor through theological reflection alone, nor through practical intervention alone. Only when empirical knowledge, theological interpretation, and transformative practice are brought into sustained dialogue does a genuinely holistic response become possible.

4. Relationship as the Ground of Life

Read together, the chapters of this volume converge around a simple but far-reaching insight. Life flourishes where relationships are characterised by justice, reciprocity, responsibility, stewardship,

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and care. Life becomes fragile where those relationships are damaged or neglected. Ecological degradation is therefore not merely environmental decline. It is a symptom of fractured relationships between humanity and creation, among communities and nations, across generations, and with God.

The restoration of those relationships frequently begins with remembering. Communities remember ecosystems that have been damaged, species that have disappeared, and agricultural systems that once sustained life more effectively. *Memory gives rise to lament. Lament creates responsibility. Responsibility generates action. Action opens possibilities for transformation.* This movement, developed throughout the volume, may be represented as follows: *Ecological Crisis → Ecological Memory → Lament → Responsibility → Action → Transformation → Earth's Habitability.* It is from within this relational horizon that **Agrartheology** emerges.

5. Toward Agrartheology

The preceding chapters have consistently demonstrated that ecological crises are not simply failures of technology, policy, economics, or resource management. They are manifestations of deeper disruptions in the relationships through which life is sustained. If this diagnosis is correct, then theological reflection must attend more carefully to the concrete practices through which human beings engage creation. Among those practices, none is more fundamental than agriculture.

A striking observation emerges from the volume as a whole. Although contributors approach ecological questions from different disciplinary, methodological, and ecclesial perspectives, agriculture repeatedly appears as the point at which ecological realities, social relations, economic structures, cultural traditions, theological commitments, and practical questions of sustainability converge. Agriculture constitutes one of the primary ways through which human societies engage the ecological systems that sustain life. Through cultivation, harvesting, food preparation, and consumption, human beings remain dependent upon soil, water, biodiversity, climatic stability, and the wider community of creation.

The contributors repeatedly demonstrate that many of the relationships identified in the Introduction are mediated through agriculture. Relationships between production and ecological sustainability, consumption and responsibility, local communities and global systems, present and future generations, affluent and vulnerable societies, and humanity and the ecological systems that sustain life all become visible within agricultural practice.

It is from this convergence that Agrartheology emerges.

The concept has been developed in more systematic form elsewhere. The purpose of this chapter is therefore not to repeat that discussion in detail but to demonstrate that the collective wisdom of *Soil & Soul* consistently points in the same direction.¹

Read together, the chapters suggest that agriculture is far more than an economic sector or technical activity. It is one of the primary ways through which human societies engage the ecological systems that sustain life. Agriculture therefore occupies a distinctive position at the intersection of ecological processes, human labour, social organisation, economic systems, cultural meaning, and spiritual practice. The volume also helps explain why agriculture has often remained marginal within theological reflection. The recurring rupture between spirit and matter identified earlier in this chapter has frequently encouraged forms of theology detached from the material conditions that sustain life. Where salvation is separated from creation, worship from cultivation, or soul from soil, agriculture easily appears as a merely practical concern rather than a subject worthy of sustained theological attention.

Agrartheology may therefore be understood as an emerging field of theological inquiry that treats agriculture as a significant *locus theologicus*. It explores how engagement with soil, seed, food, land, water, biodiversity, cultivation, and food systems may illuminate broader theological questions concerning creation, stewardship, providence, justice, community, hope, and human flourishing.² Agrartheology occupies a constructive space between ecotheology and agroecology. It builds upon both conversations while drawing attention to the agricultural practices through which ecological relationships become concrete and visible.³

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Theologically, contributors repeatedly return to cultivation, stewardship, sufficiency, reciprocity, and responsibility as defining features of humanity's vocation within creation. Ethically, they emphasise justice, solidarity, and intergenerational accountability. Practically, they demonstrate the importance of soil health, biodiversity, food security, ecological resilience, and sustainable agricultural livelihoods. Together, these concerns suggest that agricultural systems constitute a particularly important meeting place where ecological realities, moral obligations, and theological commitments intersect.

Agrartheology also provides a constructive response to the recurring patterns of relational disruption identified earlier in this chapter. It challenges the separation of spirit and matter by reconnecting theological reflection with the material conditions of life. It responds to the growing disconnect between human societies and the ecological systems that sustain life by drawing attention to food, soil, land, and cultivation. It contributes to ecological justice by highlighting inequalities embedded within agricultural and food systems. It encourages intergenerational responsibility by understanding ecological resources as gifts held in trust rather than commodities available for unlimited exploitation.⁴

At its deepest level, Agrartheology reminds theology of a reality that modern societies frequently forget: human beings remain creatures. Human flourishing continues to depend upon agricultural and ecological relationships that cannot be transcended by technology, markets, or urbanisation. Agrartheology therefore emerges not from a single chapter but from the collective wisdom of this volume. It is offered not as a finished system but as a constructive horizon for future theological reflection, ecclesial practice, ecological engagement, and research.

6. Implications and Recommendations

The arguments developed throughout this volume carry important implications for churches, theological institutions, researchers, policymakers, and development practitioners. If the ecological crisis is fundamentally a crisis of relationships, and if the future habitability

of the Earth depends upon restoring those relationships, then ecological responsibility can no longer be treated as a peripheral concern. The recommendations that follow emerge directly from the empirical findings, theological reflections, and practical experiences explored throughout *Soil and Soul*.

Recommendation 1: Reform Theological Education

Theological institutions should recognise agriculture, food systems, and ecological stewardship as legitimate areas of theological inquiry. Agrartheology and agroecological literacy should become integral components of ministerial formation.

Recommendation 2: Strengthen Ecclesial Ecological Practice

Churches and ecumenical bodies should incorporate ecological memory, lament, creation care, and agricultural engagement into their ministries and institutional priorities.

Recommendation 3: Address Structural Agricultural Vulnerability

Policymakers should address land tenure insecurity, unequal trade structures, agricultural marginalisation, and climate vulnerability through integrated and justice-oriented policy frameworks.

Recommendation 4: Value Indigenous and Smallholder Knowledge

Governments, researchers, and development agencies should recognise Indigenous ecological knowledge and smallholder experience as valuable sources of environmental understanding.

Recommendation 5: Renew North-South Ecological Partnerships

A renewed North-South covenant grounded in ecological justice, mutual accountability, and Christian solidarity should become a central priority for churches, institutions, researchers, and policy-makers alike.

Recommendation 6: Strengthen Interdisciplinary Research

Future research should strengthen dialogue among theology, ecology, agriculture, economics, development studies, and Indigenous knowledge systems in order to foster more holistic approaches to

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ecological and social transformation. The avenues outlined below indicate some of the directions this agenda might take.

Continuing the Conversation

The emergence of Agrartheology within this volume should be understood not as the conclusion of a conversation but as an invitation to deepen it. The contributors have demonstrated that questions of agriculture, ecology, theology, and Earth's habitability are profoundly interconnected. In doing so, they have laid important foundations for Agrartheology as an emerging field of interdisciplinary inquiry. Building on these foundations will require further exploration in at least four interconnected areas.

First, questions of **method** deserve sustained attention. Many chapters already demonstrate the value of bringing agroecological science and theological inquiry into productive dialogue, generating insights that neither discipline could readily achieve on its own. Building on these contributions, future scholarship could further develop the methodological frameworks that enable such interdisciplinary engagement. In doing so, it would strengthen the coherence and transferability of Agrartheological research while extending the foundations established in this volume.

Second, the concept of **habitability** itself warrants further investigation. Throughout this volume, habitability has functioned as a rich theological and ethical lens through which relationships among land, communities, food systems, and creation can be interpreted. Future work might extend these insights by placing theological accounts of habitability into closer dialogue with scientific approaches to ecological resilience, sustainability, and planetary health. Such engagement would enrich both theological reflection and empirical analysis while contributing to a more holistic understanding of what it means for people and ecosystems to flourish together.

Third, there is a need for greater **geographical and cultural breadth**. The volume's empirical richness derives largely from East and Central African contexts, particularly Tanzania, reflecting both

the origins of the project and the importance of local ecological knowledge, ecological memory, and smallholder experience. This grounding constitutes one of the volume's significant strengths. At the same time, the questions explored throughout this volume are not confined to any single region. Future research across diverse agricultural, cultural, and ecological settings would provide opportunities to explore how Agrartheological insights are expressed, adapted, and enriched in different contexts around the world, thereby strengthening the field's comparative and global dimensions.

Finally, greater attention could be given to the **structural and systemic dimensions of agrarian life**. Many contributors highlight the significance of ethical responsibility, faith-based action, local knowledge, and community-centred responses to ecological challenges. Future research could build upon these insights by engaging more extensively with questions of political economy, governance, multinational agribusiness, financial systems, and global trade. Such structures profoundly shape agricultural livelihoods, ecological vulnerability, and opportunities for environmental justice, and therefore form an important complement to the local and community-focused perspectives developed throughout this volume.

7. Final Conclusion

The argument emerging from this volume is both simple and demanding. Ecological degradation cannot be understood apart from the relationships through which life is sustained. The contributors to *Soil & Soul* demonstrate that the ecological crisis is not merely a scientific or environmental problem; it is also a crisis of responsibility, justice, memory, vocation, and hope. It reflects damaged relationships between human societies and the ecological systems that sustain life, between affluent and vulnerable communities, between present and future generations, and between humanity and God. Ecological transformation therefore requires more than technological innovation or policy reform. It calls for the restoration of relationships characterised by stewardship, reciprocity, solidarity, responsibility, and care. Within this broader horizon, agrartheol-

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ogy emerges as the volume's central constructive proposal. By re-connecting theological reflection with the realities of land, labour, food, and ecological interdependence, it offers a framework through which faith communities can contribute meaningfully to the pursuit of ecological justice and sustainable futures. If this volume began with smallholder farmers whose wisdom taught that care for the soil and care for the soul belong together, it ends with the same conviction, now deepened into a constructive theological proposal: Earth's habitability, and humanity's own flourishing within it, depend upon holding soil and soul, body and spirit, cultivation and worship, in the single, undivided relationship for which they were created.

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