

Natural Resource Management and Policy

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There is a growing awareness to the role that natural resources, such as water, land, forests and environmental amenities, play in our lives. There are many competing uses for natural resources, and society is challenged to manage them for improving social well-being. Furthermore, there may be dire consequences to natural resources mismanagement. Renewable resources, such as water, land and the environment are linked, and decisions made with regard to one may affect the others. Policy and management of natural resources now require interdisciplinary approaches including natural and social sciences to correctly address our society preferences.

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New Frontiers in Natural Resources Management in Africa

 Springer

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*To everyone on the path to the sustainable
management of natural resources in Africa*

Foreword

Recent global agreements and consensus as exemplified by the adoption of the Sustainable Development Goals, the 2030 Agenda, and the Paris Agreement have clearly signalled that business as usual is no longer an optimal pathway for achieving sustainable development. For the African continent, whose natural capital contributes to about 25% of its gross domestic product, its development trajectory must rely on the judicious and efficient use of its natural resources. Biophysical challenges ranging from soil degradation (through soil and wind erosion), desertification, environmental degradation, to climate change are exerting undue pressure on the region's natural resources and disabling vital life support systems. The challenges are exacerbated by a combination of biophysical problems and megatrends, not least, shifting consumption patterns, continuing population growth, trade globalization, frictions in subsidy regimes, and the impacts of local and global environmental change. Cumulatively, or not, these drivers and risks pose new and serious risks to sustainable management of water systems, land, forests, rangelands, and other natural resources. Recently, environmental and natural resource problems have increasingly emerged as global threats, giving greater sway to the centrality of science as a key enabler in addressing sustainable natural resource management as well as related policy development. Whether in discerning development options for national- and regional-level targets, the list of Natural Resource Management (NRM) issues has expanded beyond traditional concerns of biophysical processes in air, land, and water to new frontiers of integrated natural resource management and mainstreaming of global climate change. The paradigm of resource management that guided our approach to these matters throughout the twentieth century is clearly unsuitable for addressing environmental problems that have become global in nature. Consequently, the treatment of natural resource issues from a cross-disciplinary and comparative perspective is integral to finding acceptable solutions for the fundamental and often contentious environmental and natural resource management problems that bedevil Africa's development.

The livelihoods of African populations are closely linked to their access to, and responsible utilization of, natural resources. Majority of the region's populations live in the rural areas and are among the most vulnerable and insecure. This growing insecurity is manifested in several forms – higher incidence of poverty, poor access to health care, food insecurity and dysfunctional food systems, insecurity arising from rapid depletion of natural resources and resulting economic and cultural losses, and conflicts resulting from competitive access to natural resources, among other factors.

The monograph *New Frontiers in Natural Resources Management in Africa* aims to identify some of the emerging areas for research and policy-making related to natural resource management.

The book aims at presenting a holistic approach on NRM consistent with aspirations for integrated approaches to resource custodianship and scientific rigor. The production of *Natural Resource Management in Africa* focuses on the evolving landscape of resource governance and management, issues, and potential opportunities to redirect the current NRM system to realize adaptive research and policy support. It addresses, in a holistic manner, issues critical to integrating community participation, project management, gender, climate change adaptation, and policy formulation.

It is my sincere hope that readers will find the material presented in this book a useful piece of scholarship.

Fatima Denton

United Nations University – Institute
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Preface

The challenges and prospects for *New Frontiers in Natural Resources Management in Africa* are embedded in the mission and work of the United Nations University-Institute for Natural Resources in Africa (UNU-INRA). Since its establishment in 1986, UNU-INRA has a long-standing reputation for supporting applied research on environment and natural resource management (NRM) in Africa and other developing countries by extension. A key thrust of UNU-INRA investments in the past three decades has been the emphasis of interdisciplinary, multi-stakeholder gender-responsive participatory research approaches to natural resource management that recognise the competing demands on their use and conservation for social, economic and environmental benefits. In Africa, UNU-INRA has supported applied research in the strategic areas of community-based natural resources management; rural development, land and water management; and biodiversity, food systems, health and the environment, environmental economics and climate change adaptation. And we are pursuing our efforts.

As the African continent continues its search for sustainable development, it will rely more on its natural resources. In line with this, UNU-INRA will continue to support research undertaken by African scientists and their partners to confront the biggest challenges of the twenty-first century: food insecurity, climate change, water and energy scarcity, emerging infectious diseases and globalisation. Many of these challenges and opportunities require innovative integrated and multidisciplinary approaches. This book reflects these emerging challenges and demonstrates that African researchers are prepared to contribute to meeting sustainable development goals of managing natural resources more effectively.

The nine chapters of this book attempt, through some conceptual and theoretical frameworks along with case studies, to illustrate some of the emerging frontiers in natural resource management in Africa. The identified frontier areas include sustainable soil and land water management; sustainable mining; exploring and promoting a blue economy; energy, climate and the environment; and the holistic analysis of natural resources in global value chains. The identified frontier areas would require concerted efforts for interdisciplinary research and for developing new conceptual and theoretical frameworks. For example, analysis of stranded

assets mentioned under the energy, climate and the environment area would require a rethinking of investment models.

We hope that many other research programmes will be encouraged by these reflections on emerging frontiers in natural resources management and inspired to become champions of transforming research into policies that will promote the effective management of natural resources in Africa to spur African's development.

Accra, Ghana

Elias T. Ayuk

About the Book

Harnessing natural resource wealth is an important transformative opportunity for Africa. Natural resources, which are raw materials occurring in nature, serve as the foundation for economic production and consumption. By managing natural resource wealth carefully, Africa can achieve sustainable development and growth. As stewards of their natural resources, African governments have the responsibility to manage and regulate their use, transforming natural assets into sustained prosperity for both current and future generations. Associated extractive industries also need to commit to the effective and transparent management of minerals, hydrocarbon resources and agricultural land or forest holdings in order to support inclusive and sustainable economic development.

This book is a compendium by the United Nations University Institute for Natural Resources in Africa, in which African scholars focus on policy directions for the effective management of the continent's natural resources, within the context of the Sustainable Development Goals. It highlights key opportunities and solution for harnessing natural resources for sustained economic development and explains how such approaches should be incorporated into the Sustainable Development Goals agenda. It demonstrates that sustainable development improvements have to originate within each country, but external trigger points can be important.

The book therefore describes innovative best practices and available solutions to catalyse improved governance of natural resources and promote resource-driven growth and development. It provides insights into policy options that will support the sustainable and transparent management of resources for sustainable development in Africa.

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Abbreviations

ABA	Acid Base Accounting
AFOLU	Agriculture, Forestry and Other Land Use
AMD	Acid Mine Drainage
CFA	Community Forest Association
CGE	Computable General Equilibrium
DST	Decision Support Tool
ELISA	Enzyme-Linked Immunosorbent Assay
EPPA	Emissions Prediction and Policy Analysis
FFA	Free Fatty Acid
HDR	Human Development Report
ICP-AES	Inductively Coupled Plasma-Atomic Emission Spectroscopy
INDC	Intended Nationally Determined Contribution
IPCC	Intergovernmental Panel on Climate Change
MCA	Multi-Criteria Analysis
NNP	Net Neutralizing Potential
PGR	Plant Growth Regulators
PVCCI	Physical Vulnerability to Climate Change Index
SDGs	Sustainable Development Goals
SOM	Soil Organic Matter
TEV	Total Economic Value
ToTV	Tomato Torrado Virus
VBA	Vulnerability-Based Allocation
WCMC	World Conservation Monitoring Centre