Environment and Health in Sub-Saharan Africa: Managing an Emerging Crisis

Isaac N. Luginaah · Ernest K. Yanful
Editors

Environment and Health in Sub-Saharan Africa: Managing an Emerging Crisis

Selected Papers from ERTEP 2007, July 17-19 2007, Ghana, Africa

Springer

Editors
Dr. Isaac N. Luginaah
University of Western Ontario
Dept. Geography
London ON N6A 5C2
Canada

Dr. Ernest K. Yanful
University of Western Ontario
Dept. Civil & Environmental
Engineering
London ON N6A 5B9
Canada

ISBN 978-1-4020-9381-4 e-ISBN 978-1-4020-9382-1
DOI 10.1007/978-1-4020-9382-1
Springer Dordrecht Heidelberg London New York

Library of Congress Control Number: 2009926884

Preface

This book is the second edited compilation of selected, refereed papers submitted to ERTEP 2007. The book is organized into 10 chapters along four of the key themes that were discussed at the conference: Environmental Health Management; Mining and Environment; Environmental Monitoring and Policy Development; and Sustainability and Social Responsibility. It is hoped that the contents of the book will provide an insight into some of the environmental and health management challenges confronting the developing world and the steps being taken to address them.

The first three chapters under the Environmental Health and Management theme discusses issues related to food security and related environmental distress in sub-Saharan Africa. Chapter 1 argues that pervasive poverty and low agricultural productivity are important factors in understanding food insecurity in the region, and broader global processes are examined. This chapter maintains that while poverty undermines individual and household access to sufficient food through market purchase, land inequalities, corruption, structural adjustment programs, civil conflict, HIV/AIDS and the role of the World Trade Organization Agreement on Agriculture are decisive. The authors argue that achieving food security in sub-Saharan Africa requires policies and actions that are integrated with efforts to reduce poverty, enhance livelihoods and incomes and increase agricultural output, while also paying attention to underlying structural factors that bear on agriculture in the region.

Chapter 2 discussed the notions that environmental conditions in dry regions of Sahelian Africa projected to worsen with climate change, and that the agricultural capacity of many areas are likely to deteriorate further in coming years, with migratory pressures therefore continuing to rise with several consequences. The chapter examines the evolving environmental distress migration patterns from the Upper West Region of Ghana to the more fertile lands of the Brong-Ahafo Region where migrants are able to access farmland in different leasehold relationships; and how these migrant farmers are connected to an intensifying system of domestic 'food aid' (i.e. non-market transfers) back to the region, providing a crucial means of coping with its precarious food insecurity.

Chapter 3 examines how best to integrate environmental quality and conservation of natural resources into food security and rural development policies in resource-poor settings. Using agroforestry as a case study, this chapter synthesizes empirical field studies carried out in the southern Africa region for over a decade, and

discusses how the potential impacts of the technological advances made in research and development have been compromised by policy and institutional gaps. With particular cognizance of the socioeconomic context in southern Africa, the chapter identifies options for removing institutional and policy constraints in order to facilitate the diffusion of agroforestry and unlock its potential to satisfy both food production and global environmental goods.

The Mining and Environment theme examined the potential environmental impacts of mining on local communities in increasingly fragile ecosystems. The aim is to increase awareness of the risks and impacts of mining and other human–environmental health threats among miners by placing these hazards into the broader livelihood context of the miners. The chapters under this theme explain miners' risk perceptions and an evaluation of potential livelihood alternatives. Chapter 4 presents the results of research that were conducted in the vicinity of Satellite Goldfields Limited in Mporhor Wassa East District, Ghana. The increasing number of surface mines in Ghana and the consequent adverse effects of mining operations on the environment have been of great concern to the local communities, government and non-governmental organizations over the last decade. This chapter identifies the potential environmental impacts of mining and ore processing at Satellite Goldfields Limited on the environment. The results show that fugitive dust levels were generally high during the dry seasons and that the fugitive dust levels far exceeded the Australian and New Zealand maximum guideline value of 4.0 g/m^2/month when the project was under construction. The levels reduced markedly over the years. Total suspended solids and iron levels exceeded the Environmental Protection Agency (EPA) guideline values in streams that received direct discharge from the mining and ore-processing areas. Furthermore, ground vibration and airblast levels were predominantly below the set trigger limit of the seismograph. Waste management practices at the mine, especially segregation of contaminated and uncontaminated waste at disposal sites, were found to be inadequate and require some attention.

Chapter 5 presents the findings of research that aimed at increasing awareness of the risks and impacts of mercury and other human–environmental health threats among small-scale miners in Ghana by placing these hazards into the broader livelihood context of the miners themselves. This chapter outlines the two main components of the partnership project on human and environmental health with small-scale gold miners in Ghana: the understanding of miners' risk perceptions and an evaluation of potential livelihood alternatives. Through participatory approaches, the authors assessed community perceptions of bodily exposure to mining-related toxicants and proposed culturally and gender-sensitive risk communication and mitigation tools. The ultimate goal of this research is to further interdisciplinary studies among African scientists and mining communities to enhance livelihood conditions in a high-risk environment.

The rapid increase in international environmental norms has contributed to the establishment of substantive and procedural regulations that have influenced national environmental legislative enactments and judicial pronouncements. Under the Environmental Management and Policy Development theme, three chapters are featured. Chapter 6 draws linkages on environmental management, development

and human health. It is argued that poverty in Africa is a leading factor contributing to environmental degradation. Overexploitation of the natural environment has led to widespread deforestation and serious land degradation. In other regions, urban growth, industrialization and mining activities have put the environment under stress, and have also led to the outbreak of diseases posing significant threats to human health. Slow and uneven progress has been made towards sustainable environmental management in Africa. Examples are provided on countries that have adopted environmental management tools, and those that have sought ways of reclaiming degraded environments.

Chapter 7 discusses the availability and effectiveness of environmental legislations in sub-Saharan Africa. It is observed that while governments in the region have moved rapidly in putting together policies and legislations to deal with the environmental crisis, practical action on the ground continues to lag behind. Some of the reasons for this include lack of financial and human resources and lack of appropriate legal frameworks. Further, it is argued that key environmental policies adopted by sub-Saharan countries do not only amplify environmental discourses from rich countries, but also that they in many ways serve strategic interests of rich nations. Environmental policies of countries in Africa are largely dictated by developed nations, through various mechanisms including international conservation organizations, and tend to militate against the livelihoods of poor communities in developing countries. The chapter also points to potential pitfalls that may arise due to the wholesale adoption of these environmental policies. The chapter concludes proposing that sustainable solution to the current environmental crisis lies in beyond tinkering with bureaucratic details of developing countries and criminalizing livelihoods of the poor. The root of the problem lies at the current pattern of production and consumption.

In Chapter 8, the authors examine how industrial clustering can be used to improve the impact of green manufacturing practices by enabling reduced energy and water consumption levels, solid waste and wastewater minimization strategies and increased participation in corporate socially responsible activities. The performance of the Old Ardbennie Industrial cluster in Harare, Zimbabwe, is presented as an example. Levels of water and energy savings, solid waste minimization, wastewater reduction and corporate social responsibility achievements by members of the cluster are determined through both questionnaire surveys and interviews, in addition to monitored data. The results show that the cluster had 15.76% savings in water consumption. However, effluent management by cluster members was still poor with most companies using the municipal pipes for untreated effluent disposal. Potential for trading in waste was identified. Reduction in solid waste was 2.71% and no effective reduction in energy consumption was observed. In general, the results showed that a positive relationship existed between participation in cluster activities and achievement of green manufacturing.

The chapters under the Sustainability and Social Responsibility theme assessed sustainability in the context of the current environmental assessment methods and their shortcomings within a rather bleak and precarious environmental situation in sub-Saharan Africa's future. Chapter 9 advances the area of environmental

assessment by developing a method of evaluating the sustainability implications of industrial activity (products and processes). The authors conclude that it is evident that assessing sustainability requires a cross-disciplinary study of factors and interactions linking demography, consumer demand, economic activity, industrial activity and resource use to sustainability.

Chapter 10 presents a discussion of the future of environmental degradation in sub-Saharan Africa. While acknowledging the relative role of population growth and unsustainable agriculture practices in environmental degradation in the region, the chapter considers the role played by excess consumption, poverty and HIV/AIDS, corrupt African states and international capital in determining the future of natural resources in Africa as critical. The authors argue that the relationship between states and international business corporation has been particularly detrimental to the region's environment, and will continue to present a formidable threat to natural resources, especially as the World Trade Organization becomes more influential in ensuring unrestricted movement of international capital. Alternative imagination by the New Partnership for Africa Development (NEPAD) that sees Africa's development beyond the current economic and political order is critical for arresting future environmental degradation.

London, ON Isaac N. Luginaah
London, ON Ernest K. Yanful

Acknowledgements

The Editor wishes to thank the authors of the chapters for their contribution to this volume. Publications coordinator, Robyn Gaebel, did an excellent job handling the selected manuscripts and communicating with the authors. Alex Dolson, Shahenda Abou-Aly, Cindy Quintus and Erin Cullen provided editorial assistance in the compilation of chapters for the original conference proceedings. Funding for the conference was provided by the Geotechnical Research Centre and Research Western at The University of Western Ontario, Duke University Pratt School of Engineering, the Canadian International Development Agency, Ministry of Local Government, Rural Development and Environment, Ghana, Goldfields Ghana Limited, Newmont Ghana Gold, AngloGold Ashanti, Tema Oil Refinery, Shell Ghana Limited, Volta River Authority, Ghana, Zoomlion Environmental Limited, New Times Corporation, Graphic Communications Group Limited and Ghana Telecom.

Contents

Contributors

Nathaniel D. Aguda Department of Geography, Queen's University, Kingston, ON, Canada K7L 3N6, 1nda@queensu.ca

Albert O. Ainoo Gold Fields Ghana Ltd. (Tarkwa Mine), P. O. Box 26, Tarkwa, Ghana, aainoo@goldfieldsghana.com

Oluyede Clifford Ajayi ICRAF Agroforestry Programme, P.O. Box 30798, Lilongwe 03, Malawi, ajayi@gmx.net or o.c.ajayi@cgiar.org

Festus K. Akinnifesi ICRAF Agroforestry Programme, P.O. Box 30798, Lilongwe 03, Malawi, f.akinnifesi@cgiar.org

Newton Amegbey University of Mines and Technology, P. O. Box 237, Tarkwa, Ghana, na.amegbey@umat.edu.gh

Godwin Arku Department of Geography, Social Science Centre, The University of Western Ontario, London, ON, Canada N6A 5C2, garku@uwo.ca

Daniel Bagah Faculty of Integrated Studies, Wa Campus, University of Development Studies, Wa, UWR, Ghana, banliebo2@yahoo.ca

Rachel Benzer-Kerr Department of Geography, The University of Western Ontario, London, ON, Canada N6A 5C2, rbeznerkerr@uwo.ca

Sebastian Chakeredza ICRAF Agroforestry Programme, P.O. Box 30798, Lilongwe 03, Malawi, schakeredza@africa-online.net

Hans Chapman Florida A&M University, Tallahassee, FL, USA, hanschap@eng.fsu.edu

Abel Chikanda Department of Geography, Social Science Centre, The University of Western Ontario, London, ON, Canada N6A 5C2, achikand@gmail.com

Tarsha N. Eason (Dargan) Florida A&M University, Tallahassee, FL, USA, eason@eng.fsu.edu

Sylvester Galaa Faculty of Integrated Studies, Wa Campus, University of Development Studies, Wa, UWR, Ghana, sgalaa@yahoo.com

Nicole Laliberte Department of Geography, Pennsylvania State University, 336 Walker Building, University Park, PA 16802-5011, USA, njl148@psu.edu

Isaac Luginaah Department of Geography, The University of Western Ontario, London, ON, Canada N6A 5C2, iluginaa@uwo.ca

Charles Mbohwa Fulbright Scholar, The Supply Chain and Logistics Institute, Atlanta, GA 30332-0205, USA, Charles.mbohwa@isye.gatech.edu

Paul Mkandawire Department of Geography, Social Science Centre, The University of Western Ontario, London, ON, Canada N6A 5C2, pmkandaw@uwo.ca

Simon Mng'omba ICRAF Agroforestry Programme, P.O. Box 30798, Lilongwe 03, Malawi, SMngomba@cgiarmw.org

Mathew K. Nkrumah Faculty of Integrated Studies, Wa Campus, University of Development Studies, Wa, UWR, Ghana, mk1950_2000@yahoo.com

Yaw A. Owusu Florida A&M University, Tallahassee, FL, USA, owusu@eng.fsu.edu

Peter Rwakatiwana Department of Mechanical Engineering, University of Zimbabwe, P. O. Box MP. 167, Mt. Pleasant, Harare, Zimbabwe

Gudeta Sileshi ICRAF Agroforestry Programme, P.O. Box 30798, Lilongwe 03, Malawi, sileshi@africa-online.net.

Raymond S. Suglo University of Mines and Technology, P. O. Box 237, Tarkwa, Ghana, rsuglo@yahoo.ca

Petra Tschakert Department of Geography/Alliance for Earth Sciences, Engineering, and Development in Africa (AESEDA), Pennsylvania State University, 315 Walker Building, University Park, PA 16802-5011, USA, petra@psu.edu

Tony Weis Department of Geography, The University of Western Ontario, London, ON, Canada N6A 5C2, aweis@uwo.ca

Introduction

Isaac N. Luginaah and Ernest K. Yanful

Although global environmental concerns are often categorized under broad themes such as climate change and desertification, environmental problems of concern to many of the world's vulnerable groups living in marginal areas tend to have immediate consequences that affect the quality of life, livelihood and in many cases survival. Global climate change and variability affecting developing countries have resulted in increasing human and economic activities that tend to impact negatively on the environment and food security. Such impacts have created huge environmental challenges for governments in these developing countries and require mitigating solutions. Recent world summits have highlighted the need to develop environmental technologies and policies to protect fragile ecosystems. The purpose of the First International Conference on Environmental Research, Technology and Policy, ERTEP 2007, was to discuss grassroot environmental issues, assess efforts by government machinery and identify what communities and corporate entities can do as a social responsibility to mainstream and maintain environmental protection and integrity for sustainable development. The 3-day conference attracted some 250 people delegates from 18 countries. Invited plenary lectures on policy were presented by high-ranking officials from the Ghana Government, including the sector Ministers for Local Government, Rural Development and Environment, Lands, Forestry and Mines, and Women and Children's Affairs. Osagyefuo Amoatia Ofori Panin, the Okyenhene (Ghana) opened the conference. Other plenary and keynote speakers included Dr. Ulf Jaeckel, Federal Ministry for the Environment, Berlin, Germany; Ms. Joyce Aryee, Ghana Chamber of Mines; Mr. Charles Darku, Volta River Authority, Ghana; Mr. Lars-Ake Lindahl of the Swedish Mining Association; Dr. Wanda Günther Risso, University of Sao Paulo, Brazil; Mr. Peter Steblin, City Engineer, City of London; Professor George Nakhla, Universty of Western Ontario, Canada; and Dr. Clement Dorm-Adzobu and Mr. Philip Acquah, Ghana. The plenary lectures were followed each day by technical breakout sessions during which more

I.N. Luginaah (✉)
Department of Geography, University of Western Ontario, London, ON, Canada, N6A 5C2
e-mail: issac.luginaah@uwo.ca

than 100 papers were presented under the seven themes of the conference: Environment, Health and Safety; Oil and Gas Extraction and Environment, Forestry and Environment; Mining and Environment; State-of-the-Art Technologies for Environmental Performance and Protection; Integration of Gender in Environmental Management; Environmental Monitoring Institutions and Policy Development; and Sustainability, Corporate Investment and Social Responsibility.

Nearly all technical papers presented at ERTEP 2007 were reviewed by a theme of international referees selected on the basis of their expertise in the subject area. Each paper was reviewed by at least two referees and written comments were sent to authors for the preparation of revised papers. Following the conference, the Editors of the current volume Professor Isaac Luginaah and Professor Ernest Yanful (ERTEP 2007 Conference Chair), and three editorial assistants, Robyn Gaebel, Cindy Quintus and Alex Dolson selected a number of papers dealing with environmental health and management challenges in the developing world.

Part I
Environment Health and Management Issues

Characteristics and Determinants of Food Insecurity in Sub-Saharan Africa

Paul Mkandawire and Nathaniel D. Aguda

Abstract This chapter discusses the persistence of food insecurity in sub-Saharan Africa. Although pervasive poverty and low agricultural productivity are important factors in understanding food insecurity in the region, broader global processes are examined. It is argued therefore that, while poverty undermines individual and household access to sufficient food through market purchase, land inequalities, corruption, structural adjustment programs, civil conflict, HIV/AIDS and the role of the World Trade Organization Agreement on Agriculture are decisive. The chapter reveals that control over key policy decisions in the agriculture sector is increasingly taken from national states. Achieving food security in sub-Saharan Africa requires policies and actions that are integrated with efforts to reduce poverty, enhance livelihoods and incomes, and increase agricultural output while also paying attention to underlying structural factors that bear on agriculture in the region.

Keywords Food security · Sub-Saharan Africa · Livelihoods

Introduction

World food security is not only a relatively easy agreed-upon political goal, but is also a top-notch global priority. The global consensus on the need for universal access to food is manifest through the Millennium Goal # 1; the goal aims at halving, between 1990 and 2015, the proportion of people who suffer from poverty and hunger. Yet, food insecurity is increasingly becoming a major crisis facing countries of the developing world, with sub-Saharan Africa being the most vulnerable region. The United Nations Report (2008) indicates that overall, higher food prices are expected to push many more people into absolute poverty, with estimates

P. Mkandawire (✉)
Department of Geography, The University of Western Ontario, Social Science Centre, London, ON, Canada N6A 5C2
e-mail: pmkandaw@uwo.ca

I.N. Luginaah, E.K. Yanful (eds.), *Environment and Health in Sub-Saharan Africa: Managing an Emerging Crisis*, DOI 10.1007/978-1-4020-9382-1_1,

suggesting that the increase will be as many as 100 million, most of them in sub-Saharan Africa. The Food and Agricultural Organization (FAO) estimates that some 820 million people in the developing world still lack access to sufficient food, despite progress made in worldwide food production and global commitments to eradicating hunger (FAO, 2006). The greatest challenge to reducing hunger and undernourishment facing sub-Saharan Africa is manifest in the number of undernourished people which has increased from 169 million in 1990–1992 to 206 million in 2001–2003.[1] This region has the highest prevalence of undernourishment, with one in three people lacking access to sufficient food (FAO, 2006). The FAO's projections further estimate that by 2015, the region will contain about 30% of the undernourished people in the developing world, compared to 20% in 1990–1992.

However, when these disturbing figures are set against the fact that already one-and-a-half times more food is currently being produced than the amount required to feed the entire world, it does not only begin to reveal the social and geographical unevenness of global food production and consumption pattern, but it also calls into question whether further undifferentiated increase in the global food production will in any case resolve the problem of food insecurity. Furthermore, the strategy to addressing food insecurity through further increase in food supply is rendered even more questionable given the enormous burden that agriculture is already exerting on the environment (Weis, 2007). When the food security in the sub-Saharan Africa is examined in the context of these imbalances, it provides more scope for understanding the nature of factors that militate against both the efforts towards equal access to sufficient food and the actions aimed at reversing the declining food situation in the region. In seeking to explore key determinants and characteristics of the food insecurity problem in Africa, we begin from the question of why Africa, a net exporter of food at the time of decolonization in 1960s, now imports 25% of its food; with virtually every country as a net food importer (Bello, 2008). In this chapter we begin to unpack the food insecurity problem in the sub-Saharan region by arguing that poverty and declining agriculture productivity are responsible for the growing food insecurity in the region. While depravation and poor agriculture productivity are important, it is further asserted in this chapter that growing political instability, unaccountable political regimes, enduring legacy of colonial land inequality, structural adjustment programs promoted by the World Bank (WB) and the International Monetary Fund (IMF), and the World Trade Organization Agreement on Agriculture have a decisive influence on African agriculture and food security.

This chapter proceeds by examining how persistent poverty contributes to entitlement failure, and how the collapse of entitlements undermines the capacity of families in the region to achieve household food self-sufficiency. To demonstrate these causal links, we draw largely on related approaches of livelihoods and vulnerability. We then interpret the declining food security trend within the context of

[1] It is important to note, however, that the prevalence of undernourishment (proportion of undernourished people in the region) declined from 35 to 32% during this period. This decline is attributed to the region′s population rising more quickly than the number of undernourished people.