

LAND, ENVIRONMENT AND CLIMATE CHANGE

CHALLENGES, RESPONSES AND TOOLS



Land, Environment and Climate Change:
Challenges, Responses and Tools

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ABBREVIATIONS

AUC	African Union Commission
AfDB	African Development Bank
CCCI	Cities in Climate Change Initiative
CCRO	Certificates of Customary Right of Occupancy
DFPSIR	Driving Force-Pressure-State-Human Impact-Response framework
DPIR	Driving Force-Pressure-Impact-Response framework
EPLAUA	Environmental Protection, Land Administration and Utilization Association
GEF	Global Environmental Facility
GHG	Greenhouse gas
GLASOD	Global Assessment of Human Induced Land Degradation
GLTN	Global Land Tools Network
GPS	Global Positioning System
IPCC	Intergovernmental Panel on Climate Change
LAC	land administration committee
LULUCF	Land Use, Land Use Change and Forestry
MDG	Millennium Development Goals
MEA	Millennium Ecosystems Assessment
MTSIP	Medium Term Strategic and Institutional Plan
PES	Payment for environmental services
REDD	Reducing Emissions from Deforestation and forest Degradation
SUDNet	Sustainable Urban Development Network
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNECA	United Nations Economic Commission for Africa
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VLC	Village Land Certificates

FOREWORD



This publication examines the relationship between land tenure, land management approaches and the environment in a world that is rapidly urbanizing at the same time as climate change challenges are growing.

Using 20 case studies, it focuses on the linkages between land and the environment and how to move from a scientific framework to a country level implementation framework.

The studies include important tools for enhancement of land rights for the poor, low-cost land registration and certification, as well as low-cost land use planning and mapping.

There are also case studies on the introduction of laws that facilitate better functioning land rental markets and the sustainable management of rented land.

This work further carries a global overview of key environmental issues related to land use, land management and land tenure – including the question of climate change.

We hope that this publication is a timely and useful resource and tool for land professionals, environmental practitioners, and urban planners.

A handwritten signature in black ink, reading "Anna Kajumulo Tibaijuka".

Dr. Anna Kajumulo Tibaijuka
Executive Director, UN-HABITAT

EXECUTIVE SUMMARY

The lion's share of land resources is located in rural areas but, as of 2008, more than 50% of the world's population inhabit urban areas. Population growth and economic development cause drastic changes in land use in many parts of the world and institutional arrangements need serious reforming to ensure sustainable use of the increasingly scarce land resources. The effects of globalization are felt stronger with the threats of global warming, energy and food shortages, and most recently the financial crisis and global recession.

The main objective of this report is to provide a scoping overview of the relationship between land tenure, land management approaches and the environment. The focus is on the linkages between land and the environment moving from a scientific framework to a country level implementation framework. The implications this has in urban and rural areas are also presented.

The report contains a global overview of key environmental issues related to land use, land management and land tenure, including the issues surrounding climate change. The report identifies the implications of climate change with regard to policy development and implementation by governments and other stakeholders.

Furthermore, it identifies key opportunities, gaps and priorities where the Global Land Tool Network (GLTN) and its partners could add value and take responsibility, including new research, tool development, advocacy, resource mobilisation, and coordination.

This report uses the Driving Force-Pressure-State-Human Impact-Response (DFPSIR) framework, based on the Pressure-State-Response framework, as a basic element of the conceptual framework. It is important to understand the causes behind environmental degradation in order to identify suitable responses.

However, it may not always be possible to attack the root causes of the problems. In certain cases, diverse responses are needed both to tackle the root causes and go for adaptation and mitigation strategies.

The DFPSIR framework can serve as a simple interdisciplinary starting point. It should then evolve into a broader conceptual framework that captures essential elements of the functioning of socio-environmental systems where market and non-market institutions play important roles guiding resource utilization and protecting and enhancing human welfare.

Property rights are core determinants for how land resources are utilized and their welfare effects are distributed through market and non-market mechanisms. Similarly, the degree of market development for natural resources as inputs in production and as essential elements of livelihoods and safety nets for current and future generations determine the need for complementary non-market institutions and regulations where markets do not work properly.

“*Diverse responses are needed both to tackle the root causes and go for adaptation and mitigation strategies*”

This report builds on existing UN-HABITAT work and various research undertaken in the areas of land, environmental and climate change. From this work, a background document was developed and submitted for comments and further enrichment to an e-discussion.

The e-discussion ran on the GLTN website from April to May, 2009. The e-discussion aimed at further enriching the background paper that provided an overview of the relationship between land tenure, land management approaches and the environment (including climate change related issues). Contributors from the e-discussion identified and prioritised key issues and solutions, based on suggested questions and responses from the background document. Priority land tools were also identified.

Therefore, the following main challenges, research gaps and questions as well as the promising land tools to address these tools are the results of thorough research work and valuable contributions from the e-discussion.

The main environmental challenges are identified in chapter 3 and include:

- geographical poverty-environment traps
- tenure insecurity undermining investment incentives and leading to environmental mismanagement in urban as well as rural areas
- sharp increases in demands for land for food and bio-fuel production in areas with weak legal systems for protection of land rights
- increasing pressures on customary tenure systems that are in need of revisions
- encroachment in particularly vulnerable and valuable habitats

- increasing threats in coastal areas due to sea water rise and severe weather risk.
- increasing land fragmentation in densely populated areas
- increased activity in land rental markets and short-term management strategies on rented land
- deforestation and forest degradation leading to carbon emissions and loss of biodiversity
- poor land utilization due to unequal distribution of land.
- elite capture undermining land reforms

Chapter 4 identifies important research gaps and key research questions related to land, environment and climate change. The research questions are linked to the main environmental challenges presented in chapter 3.

Chapter 5 identifies key priorities and promising land tools and covers the following areas:

- land rights records and registration
- land use planning
- regulation of land markets to enhance sustainable land use
- land management, administration and information
- slum rehabilitation and resettlement
- land law, regulation and enforcement
- payment for environmental services
- participatory public works programmes as safety nets and as means to invest in environmental conservation
- collective action for enhancement of environmental services

- provision of tenure security in urban slums
- rescue plans for areas threatened by sea level rise and storm floods

Important tools for enhancement of land rights of the poor include: low-cost land registration and certification, low-cost land use planning and mapping, introduction of laws that facilitate better functioning land rental markets and sustainable management of rented land.

Design of Payment for Environmental Service (PES) schemes as a way to create markets for resources that are threatened by degradation and, consequently, also for their maintenance and improvement, can become important policy tools in the future. However, this requires innovative designs and careful pilot testing before they are scaled up. The poverty of land users and the poverty reduction effects of PES schemes will be important design considerations.

Productive safety nets are useful tools to conserve natural resources and enhance their productivity while at the same time providing employment opportunities for poor and vulnerable people. The potential of such productive safety nets for urban slum rehabilitation should be further explored.

A progressive land and resource dividend system, if introduced, may mobilize idle land from large land and resource owners for more efficient use in countries with unequal land and resource distribution. However, to succeed it is crucial to frame such a dividend system in a palatable way to build sufficient public support for its introduction. GLTN can take a leading role in piloting and promoting the use and scaling up of such land tools.

Rural development and urban development are closely linked through migration, flow of resources, economic empowerment, commodities and services. The problem of expanding slums cannot therefore be seen as exclusively an urban problem as they are largely filled by immigrants from rural areas. Slums may be compared to a leaking boat: new migrants flow in as earlier slum dwellers are rehabilitated or moved elsewhere. The problem can only be tackled at a broader scale requiring both rural and urban development.

Sea level rise will be one of the most difficult challenges to handle in certain coastal areas and island states. The industrialized countries have largely caused the problem and should thus share the responsibility for helping the poor countries that are severely threatened by climate change effects. The outcome of future international negotiations on climate change will set standards and determine the amount of resources that can be mobilized at the global scale.

Pro-poor land reforms in many countries face serious constraints from elite capture of reforms, resistance against and prevention of reforms that threaten the interests of the wealthy landowners, and rent-seeking behavior leading to over-exploitation of resources.

International efforts are important to enhance the transparency and accountability in situations where the poor lose out. Recent large-scale land deals in Africa and Asia in response to rising bio-fuel demand and resulting food price increases is an area where international organizations can help poor countries and local people in the negotiations to develop contracts that protect their interests.

“*Productive safety nets are useful tools to conserve natural resources and enhance their productivity*”



Productive land use is essential to meet competing needs and demands. Cultivation on steep slopes in Wollaita, southern Ethiopia. © S. Holden

Establishing better standards for transparency and accountability and increased international pressures and support to implement such standards will be important to reduce levels of corruption and elite capture.

To meet the Millennium Development Goal (MDG) goal 7, target 11 to have achieved a significant improvement in the lives of at least 100 million slum dwellers by 2020, is a central concern of UN-HABITAT.

This target must be seen in connection with the factors causing rapid inflow of new migrants as well as the fact that some of these areas are in coastal zones that are threatened by sea water rise and weather risk. Rural development and land reforms in rural areas can contribute to reduce the inflow of people and therefore be an important part of the solution.

Similarly, rural development can be seen as one of the means of alleviating poverty and increasing incomes for both rural and urban people. At the same time it must be an international responsibility, particularly for the countries that have contributed most to carbon emissions to provide funds for adequate compensation and alternative livelihoods for the people that are threatened by sea water rise, drought or flooding due to climate change. UN agencies can continue to take a leading role in the planning of strategies to tackle this problem.

1. INTRODUCTION

The lions' share of land resources is located in rural areas. Cities occupy only 2.8% of the earth's land area, but as of 2008 more than 50% of the world's population inhabit urban lands. Population growth and economic development cause drastic changes in land use in many parts of the world and institutional arrangements need careful revisions to ensure sustainable management of the increasingly scarce land resources. The effects of globalization are felt stronger with the threats of global warming, energy and food shortages, and most recently the financial crisis and global recession.

The underlying driving forces (including economic growth, technological changes, increasing population pressure, and institutional structures) create pressures on the environment. Such pressures are particularly severe in densely populated areas.

However, low population areas are also threatened by extensive land use practices and contain vital natural resources in form of biodiversity and carbon stocks. Destruction of these can have severe irreversible impacts on human welfare. Land resources are fundamental for food production to meet human needs. The production capacity of these land resources is threatened by various forms of land degradation, conversion to non-agricultural uses and sea level rise due to global warming.

This again threatens the food security of millions or billions of people, particularly those that are poor and vulnerable. Their land entitlements for food production and shelter are highly insecure and consequently so are their livelihoods.

There are urgent needs for action at the global, national and local levels to protect the increasingly scarce land resources and particularly the livelihoods of the poor and vulnerable. Such actions have to include both mitigation and adaptation responses to the environmental threats against human well-being. They also need to deal with the underlying driving forces as well as the more direct pressures on the natural resources. The design of institutional mechanisms for action is thus of central importance and where the UN and UN-HABITAT have important roles to play.

The main objective of this publication is to provide an overview of the relationship between land tenure, land management approaches and the environment. The focus is on the linkages between land and the environment moving from a scientific framework to a country level implementation framework. It contains a global overview of key environmental issues related to land use, land management and land tenure, including the issues surrounding climate change. More specifically the study:

“*Land resources are fundamental for food production to meet human needs.*”



Productive land use is essential to meet competing needs and demands. © UN-HABITAT /Remy Sietchiping

- a) Reviews existing work in the area.
- b) Identifies the main challenges in land management and land tenure approaches and the environmental implications including climate change.
- c) Takes into account policy developments and implementation by governments and other stakeholders.
- d) Identifies key opportunities, gaps and priorities where GLTN and its partners could add value including new research, tool development and advocacy.
- e) Has global coverage drawing from experience in all regions.

The study uses a conceptual framework that integrates the Driving Force-Pressure-State-Human Impact-Response (shown in figure 1) framework. It builds on the Millennium Development Goals and global overviews of land-related environmental problems, identifies the most important of these problems, assesses the nature of each of these with illustrative examples, and identifies the extent to which land tenure reforms can

play an important role to address each of these issues.

Furthermore, it identifies the key areas where UN-HABITAT and GLTN can fill important gaps based on an e-discussion with key stakeholders. Here the work builds on the UN-HABITAT Agenda, the GLTN Agenda, the GLTN publication Secure Land Rights For All and the draft UN-HABITAT strategy on cities in climate change.

1.1 OVERVIEW OF GLOBAL AND REGIONAL EFFORTS ON LAND AND ENVIRONMENT

Concerns about the limited capacity of the global environment gained global attention with the “Limits to Growth” study in the early 1970s and this boosted the environmental movements around the world. The Commission on Environment and Development (UNCED, 1987) had a profound impact on global thinking on environmental issues and tied these issues to poverty in less developed countries.

The seventh Millennium Development Goal aims to ensure environmental sustainability. Its targets are:

- to integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources,
- to reduce biodiversity loss, achieving by 2010 a significant reduction in the rate of loss,
- to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation,
- to have achieved a significant improvement in the lives of at least 100 million slum dwellers by 2020.

The Millennium Ecosystems Assessment (MEA) was launched in 2001 to be completed in four years with a focus on how changes in ecosystem services have affected human well-being, how ecosystem changes will affect people in future decades, and what types of responses can be adopted at local, national, or global scales to improve ecosystem management and thereby contribute to human well-being and poverty alleviation (WRI, 2003).

United Nations Environment Programme (UNEP) and UN-HABITAT have been given special roles by the Secretary-General in the fields of environment and human settlements. These include monitoring and assessment of global and regional environmental and human settlement trends and early warning information on environmental threats and coordination of international cooperation and action related to these (UN, 1999).

The Secretary-General also established a Task Force on Environment and Human Settlements to be chaired by UNEP (UN, 1998). The Task Force recommended coordinated efforts by UNEP and UN-HABITAT in the area of environment and human settlements. The Secretary-General took the initiative to establish an Environmental Management Group (EMG) to enhance inter-agency coordination in the field of environment and human settlements.

While UN-HABITAT had a central role when this initiative was taken, it appears to have a more marginal role in the 2008 stock taking of collaboration and coordination of environmental activities in the UN system (UNEMG, 2008).

In Annex 1 of this report UN-HABITAT is indicated in the particular areas of environment to assist local authorities with basic urban services such as waste management, water, sanitation, sustainable urban mobility and transportation, and the urban poverty and environment nexus through capacity building, providing technical advice, guidelines, and tools. The EMG identifies “Land” as an inter-agency matter in its Technical Meeting in February 2009 (UNEMG, 2009).

The EMG is considering a joint publication that will highlight the benefits of drylands for release in 2010. The publication will guide United Nations-wide contributions to the global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas, in order to support poverty reduction, climate change mitigation and adaptation, and environmental sustainability.

The report will provide a guide for public and private investments - supported by UN agencies - to coherently respond to opportunities within the mandate of the 10-year strategic plan of the UN Convention to Combat Desertification (UNCCD).

The major global initiatives, governing institutions and their associated roles are:

- the UN Convention to Combat Desertification (UNCCD) is the broadest and addresses land degradation in drylands areas.
- the Food and Agriculture Organization (FAO) and
- the International Fund for Agricultural Development (IFAD) both address problems of soil fertility and food production.
- the Secretariat of the Convention on Biological Diversity also addresses land issues.
- UNEP has a coordination role and is involved in monitoring and assessing land degradation.
- UNDP is involved in promoting National Action Programmes.
- UN-HABITAT is involved in land management issues related to urbanization.

The World Bank is a major international player in the field of land and environment policies with its influence on national and international policies and with its lending programs supporting land reforms, many development programs with large environmental impacts, and environmental conservation programs like the Global Environmental Facility (GEF). The Bank launched a new land policy document in 2003 (Deininger, 2003) signaling a broader approach to land policies and land reforms with stronger emphasis on poverty reduction.

The World Development Report 2008 of the World Bank focused on Agriculture for Development and had separate sections on land and environment issues.

The Intergovernmental Panel on Climate Change (IPCC) is a scientific intergovernmental body set up by the World Meteorological Organization (WMO) and by the United Nations Environment Programme (UNEP) in 1988 to provide decision-makers with an objective source of information about climate change.

The first report of IPCC was the basis for negotiating the United Nations Framework Convention on Climate Change (UNFCCC) treaty. "The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. Reviews by experts and governments are an essential part of the IPCC process. The Panel does not conduct new research, monitor climate-related data or recommend policies" (IPCC, 2004).

The Kyoto Protocol was established under the UNFCCC treaty at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit held in Rio de Janeiro in June 1992. The protocol was adopted in December 1997 in Kyoto, Japan, and entered into force in February 2005. Kyoto includes defined "flexible mechanisms" such as Emissions Trading, the Clean Development Mechanism and Joint Implementation as mechanisms for GHG reductions.

The Kyoto Protocol requested an IPCC Special Report examining the scientific and technical implications of carbon sequestration strategies related to land use, land-use change, and forestry activities and relevant Articles of the Protocol. This provided a basis for treatment of land use, land use change and forestry (LULUCF) activities and adopted definitions, modalities, rules and guidelines relating to LULUCF activities under Articles 3, 6 and 12 of the Kyoto Protocol.

Reducing emissions from deforestation and forest degradation (REDD) has emerged as a recent initiative that aims to reduce greenhouse gas (GHG) emissions by providing incentives to individuals, communities, projects and countries (Angelsen, 2008). UNFCCC laid the foundations for including REDD in developing countries in the post-2012 climate protection regime.

The African Union Commission (AUC), the United Nations Economic Commission for Africa (UNECA), and the African Development Bank (AfDB) have developed a framework and guidelines for land policy and land reform in Africa in order to enhance land rights, land productivity and the security of livelihoods.

The following section explains in more detail what UN-HABITAT is involved in doing related to land, environment and climate change.

1.2 CITIES, LAND, AND ENVIRONMENT IN CLIMATE CHANGE

The least developed countries, small-island developing States and countries in Africa face the most difficult challenges and urgently need the assistance of the international community in order to successfully safeguard the lives and livelihoods of their peoples, while attaining their development goals.

The UN-HABITAT strategy on cities in climate change identifies the key climate change adaptation challenges from an urban perspective and highlights UN-HABITAT's role and ongoing activities in this area.

Three-quarters of all large cities are located on the coast. Most of the world's urban population resides in vulnerable areas which are ill-equipped for adaptation. One billion people are living in slums, and are likely to become environmental refugees (UN-HABITAT 2008). Climate shocks, like storms, floods and droughts, are also causing poverty and larger inequity and require stronger global safety nets, adaptation and mitigation strategies.

UN-HABITAT supports national and local authorities in their efforts to cope with the impacts of climate change. UN-HABITAT's work on localized climate change adaptation builds on 15 years of experience and activities is responding to global trends in urbanization and poverty reduction.

Building on the long collaboration through the Sustainable Cities Programme, UN-HABITAT and UNEP are committed to provide a better and wider range of services to local and national governments in the field of urban environment through a Strategic Partnership Framework (2008-2013). UNEP and UN-HABITAT will provide a menu of services on agreed focus areas and actions including climate change, urban air quality and transport (UN-HABITAT, 2008a). UN-HABITAT will focus on better integration of local and national planning in adaptation and mitigation strategies related to climate change with emphasis on participatory planning processes and the needs of poor slum dwellers who are particularly vulnerable and have very limited resources to protect themselves.



Urban slum on the waterfront, Haiti. Most of Port-au-Prince's residents live in vulnerable areas. © Åsa Forsman

Furthermore, monitoring of climate change in selected cities and capacity building and knowledge sharing will be central activities.

New initiatives of relevance include the Cities in Climate Change Initiative (CCCI) and Sustainable Urban Development Network (SUDNet). Other documents that will be defining priorities for this study are the planned human settlement report for 2011 and the Agency Medium Term Strategic and Institutional Plan (MTSIP 2008-2011) (UN-HABITAT, 2007). MTSIP 2008-2011 gives priority to urban poverty and environment with reference to the Millennium Development Goals. It also refers to the 2004 evaluation of UN-HABITAT which called for a sharpening of its programmatic focus and the broadening of its funding base.

UN-HABITAT should therefore identify a few critical areas of its broad mandates in order to have the greatest impact. Based on this, six mutually reinforcing focus areas with recognized comparative advantage, were identified. Two of these are of particular relevance here: focus area 3, promotion of pro-poor land and housing and focus area 4, environmentally sound basic urban infrastructure and services. While focus area 3 covers both rural and urban areas, focus area 4 is only for urban areas.

Focus on the environment in urban areas will particularly be related to climate change as an entry point. UN-HABITAT has been given a special responsibility for following up the Millennium Development Goal target to improve the lives of at least 100 million slum dwellers by 2020 (UN-HABITAT, 2008a).

The report is organized as follows. Chapter 2 provides a conceptual framework and the main land-related environmental challenges are presented in chapter 3. Research gaps and key research questions are presented in chapter 4, followed by the identification of key priorities and promising land tools in chapter 5. Conclusions are presented in chapter 6 and the references in chapter 7.

The methods applied in producing this document included:

- review of a large amount of international scientific and public literature to identify the key environmental problems.
- identification and development of a conceptual framework that can serve as an inter-disciplinary tool for linking the complex land, environment, and climate change issues to their underlying causes, their consequences for human well-being, and the relevant actions to tackle the problems.
- provide case study examples of the key land-related environmental issues that need to be addressed.
- identify key priority tools to be used to address the identified issues.
- expose the preliminary findings to e-forum discussions to improve on a first version of the report.
- incorporate contributions from e-discussions and other contributors.

Based on this assessment the report used a framework to identify key land related environmental problems.

2. ENVIRONMENTAL PROBLEMS AND CONCEPTUAL FRAMEWORK

This section provides an overview of key global environmental problems (rural and urban) related to land as well as pressures on the environment, their underlying causes, their links to human welfare (impacts), and responses. This is based on a review of a large amount of scientific literature (see more detailed citations below).

A modified version of the Driving Force-Pressure-State-Human Impact-Response (DFPSIR) framework is used as a part of the conceptual framework. It is complemented with concepts from environmental and institutional economics to strengthen the basis for discussion of relevant institutional responses.

The advantage of this framework is its flexibility such that it can easily be adapted to a wide range of issues, scales and time periods. It does not require a large set of definitions and has a multi-disciplinary character. The main weakness is that lack of rigor limits its analytical power. This is compensated by a set of definitions of concepts used in environment and development economics to analyze land and environment-related policy issues.

2.1 KEY ENVIRONMENTAL PROBLEMS

Rural and urban areas are very diverse in terms of environmental as well as socio-economic characteristics. Therefore the type and severity of environmental problems also differ considerably. Land degradation

is a broad concept capturing both degradation of vegetation and soils. In arid and semi-arid areas it may be synonymous to desertification. The most important types of land degradation are as follows;

- **Deforestation.** This is a problem primarily in developing countries but has also become a problem in eastern parts of Russia due to high demand in China and the inability to control illegal deforestation there. Deforestation is also a major contributor to global carbon emissions. Much of the tropical deforestation takes place in rainforest areas in Latin-America and Asia.
- **Loss of biodiversity.** This problem is associated with deforestation as well as changes within existing farming systems (loss of agro-biodiversity) due to changes in the types of crops, crop varieties and livestock breeds kept. Climate change and increasing pressures in various habitats are also contributing further to these losses.
- **Soil erosion.** Soil erosion is particularly severe in tropical agriculture where the natural vegetation has been removed, on sloping lands, where rainfall is intense, and soils are erodible. It is associated with declining land productivity over time and can also cause permanent loss of arable land. Erosion also contributes to siltation of dams and rivers.

Do You Know?

The United Nations Framework Convention on Climate Change (UNFCCC), in its Article 1, defines climate change as: “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.” The UNFCCC thus makes a distinction between “climate change” attributable to human activities altering the atmospheric composition, and “climate variability” attributable to natural causes.

Desertification is defined by the UN Convention to Combat Desertification as “land degradation in arid, semiarid and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Land degradation is defined as the reduction or loss of the biological or economic productivity of drylands. Drylands include dry sub-humid, semiarid, arid, or hyper-arid areas.

“Rural and urban areas are very diverse in terms of environmental as well as socio-economic characteristics.”

- **Nutrient depletion.** This is a common problem in intensive low-input agriculture and can also lead to lower land productivity and exhaustion of soils because nutrients lost with crops and soils are not replaced.
- **Soil acidification.** This is particularly a problem on soils that are initially acidic and where crop cultivation and fertilizer use lead to further acidification and where liming is not used to bring up the pH-level. It can also lead to declining crop productivity and make it impossible to grow some crops.
- **Salinization.** This is a potential problem on irrigated lands where evaporation of water leads to a higher concentration of salts in the soil surface to a level that becomes toxic to crops.
- **Overgrazing.** Too intensive grazing can also exhaust grazing lands and cause loss of soil productivity and this is usually due to overstocking of animals.
- **Soil and water pollution,** due to excessive pesticide use and other pollutants, can be a problem in intensive agriculture and densely populated areas such as slums. Particularly in countries where such emissions are not regulated carefully, like in some densely populated developing countries, regions, cities and peri-urban areas.
- **Habitat destruction.** This involves environmental damage that reduces the different types of ecosystem services.
- **Desertification** occurs when land degradation affects large areas in drylands.

Urban areas also have several of the same types of land-related environmental problems with soil, water and air pollution as the most severe urban problems in many developing countries.

The severity of these land-related environmental problems varies greatly across locations and so does the vulnerability of the people living in the different locations to the effects of these environmental problems. The severity of the effects can also be delayed till certain threshold levels of degradation or accumulation have been passed and may therefore be ignored or underestimated by current populations while future generations will be badly affected. This is particularly the case for global warming where those who have caused the problem are more able to protect themselves than those who are most severely affected by climate shocks and sea level rise due to climate change.

There have been three global assessments of land degradation, the first being the Global Assessment of Human Induced Land Degradation (GLASOD) in 1990 (*Oldeman et al., 1990*), the second being the study by Dregne and Chou (1992) and the third by Lepers *et al.* (2005). These provide rough estimates of the extent of land degradation which is estimated to be between 10 and 20% or between 6 and 12 million square kilometers of the drylands.

GLASOD was based on expert opinion only, with variability in quality and extent of quantification. Dregne and Chou's assessment was based on secondary sources of varying quality. Lepers *et al.* did not have complete spatial coverage and was limited to 62% of drylands.

As stated by WRI (2005, p.19); “The shortcomings of these available assessments point to the need for a systematic global monitoring program, leading to development of a scientifically credible, consistent baseline of the state of desertification.”

The lack of such a system and baseline data makes it impossible to distinguish and quantify the human induced land degradation except in

a few case study areas where such data exist. Lepers *et al.* find that the Amazon basin, Southeast Asia and Siberia are the areas with most rapid deforestation. Drylands degradation is most rapid in Asia. It is not clear how important the human factor has been in the Sahel as the past droughts cannot be claimed to be human-induced. Many of the most populated and rapidly changing cities are located in the tropics (Lepers *et al.*, 2005).

2.2 CONCEPTUAL FRAMEWORK

The Driving Force-Pressure-State-Human Impact-Response (DFPSIR) framework, based on the Pressure-State-Response framework (OECD, 1993), is used as a basic element of the conceptual framework (see Box 2.2.1). A simplified version of it is presented in Figure 1. More detailed content for each of the boxes follows in the numbered boxes on the following pages.

It expands from the Driving Force-Pressure-Impact-Response (DPIR) framework used by the European Environmental Agency, and UNEP. It gives explicit attention to the environmental as well as human impacts of pressures caused by the more fundamental driving forces. The essence is that this is a flexible framework that can be adapted to a wide range of issues, scales and time periods.

For the purpose of this report, it is flexible in scale and time frame, and is targeted towards the impacts on poor and vulnerable rural and urban populations. It is dynamic and focuses on responses at different levels (local, national, regional and global), and of different types (technological, institutional).

The DFPSIR framework may tackle the underlying driving forces, the more proximate pressure factors, the environment (natural resource base), or the human populations more directly. This makes it more people- and poverty-oriented than the initial DPIR framework, emphasizing the interdependence between environmental and human health and welfare (well-being).

Variants of it have been used to identify key indicator variables for the state of the environment. The modified framework is used for that purpose also in analyzing land and environment relations that focus on poor and vulnerable populations. This is relevant for monitoring and impact assessment in relation to effects of the driving forces as well as responses, like use of various land tools. Such indicator variables could also be linked directly to the Millennium Development Goals.

Some of the limitations of these kind of broad frameworks are that they do not build on strong theoretical foundations or apply very rigorous methods e.g. to test hypotheses or establish causality between different factors. They rather depend on basic system thinking in the biological and social sciences through some form of consensus-building on what are the key elements to include. To compensate for some of these limitations we have added an environmental and development economics perspective.

The components of the DFPSIR framework are as follows:

Driving Forces are the underlying factors in form of population growth, technological characteristics and changes, institutional (including political, market, cultural, social) structures and changes.

“

Many of the most populated and rapidly changing cities are located in the tropics.

”

Box 2.2.1: Driving Forces:

Economic growth

- Increased consumption

Population pressure

- High population growth
- Immigration

Externalities/Market failures

- Missing markets
- Imperfect markets

Transaction costs/Imperfect information

- Lack of awareness of consequences
- Lack of awareness of opportunities
- Lack of collective action

Opportunistic behavior (Moral hazard, corruption)

- Policy failures
- Inadequate laws and regulations
- Lack of law enforcement
- Inappropriate public expenditure priorities
- Inappropriate taxes and subsidies

Land laws and land markets are typical institutional factors that affect land resources through how they impact on land management. There are typically nested interactions among these driving forces.

Pressures are the activities that follow from the driving forces and that have direct impacts on the environment. Such pressures could be forest clearing to convert land for agricultural production, conversion of agricultural land to other uses for the expansion of cities, or pollution of land, water and air from industrial and other human activities. Pressures emerge from the incentive structures created by the driving forces.

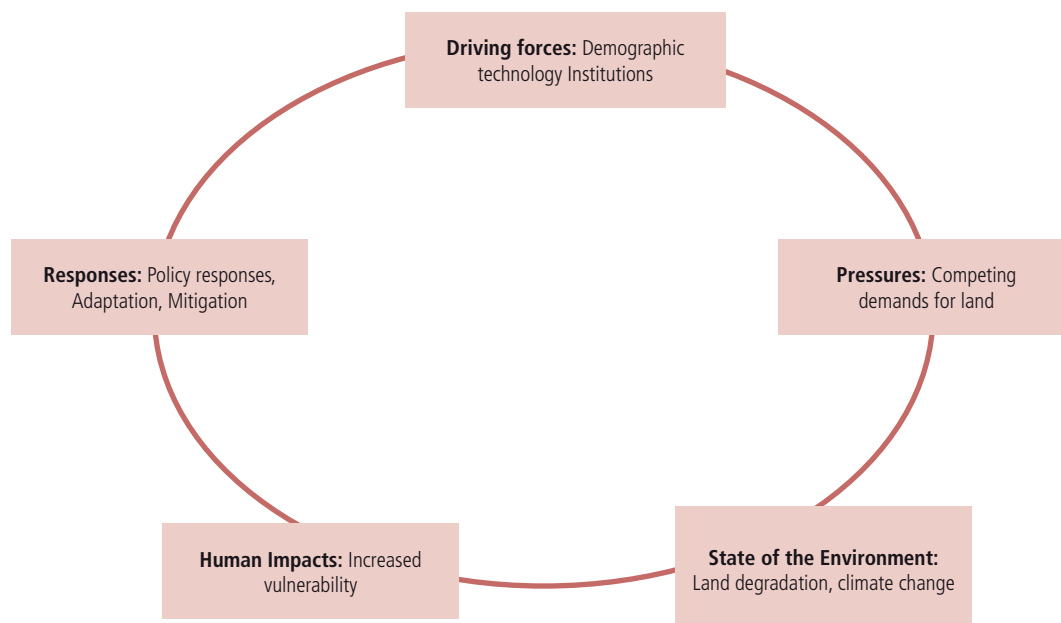
State of the Environment can be captured by assessing the stock of natural resources, the changes in these stocks or various indicators of environmental quality like, erosion levels, nutrient stocks or flows, soil acidity or salinity, pollution levels, changes in areas or quantities of carbon, loss of species, or loss of

habitats. Global warming due to GHG emissions causes changes in air and water temperatures, sea level rise and severity of storms, floods, and droughts.

Human Impacts of the changes in the environment are measured through a range of indicators, like poverty status, food security or other measures of vulnerability, access to land and other resources, tenure security, market access, access to shelter and other basic human needs, access to safety nets, and the degree of empowerment or political influence. At aggregate level these are related to the Millennium Development Goals.

Responses include responses at local, national and international levels. They can address the Driving Forces, the Pressures, the Environment or Human Well-being. The time perspective may also vary and can be short-term or very long-term. Categories of responses are classified in different ways (see figure 1).

FIGURE 1. The driving force-pressure-state of the Environment-Human Impacts-Response Framework



source s. Holden

Different typologies of responses have been used (see WRI, 2005 for an overview). It is useful to classify five main types of ecosystem management: development, prevention, mitigation, adaptation, and rehabilitation. Responses may also be divided in legal, technological, economic, social and behavioral, and cognitive responses although many of these categories are clearly overlapping.

For example, command and control legal responses through enforcement with punishment like fines and imprisonment also create economic incentives. Market or incentive-based economic responses also need a legal foundation before they can be implemented. Institutions represent the rules of the game (North, 1979) and have both legal and traditional (customary) foundations. New or increasing environmental problems require institutional innovation at multiple levels and dimensions.

It is important to understand the causes behind environmental degradation in order to identify suitable responses. However, it may not always be possible to attack the root causes of the problems. In certain cases diverse responses are needed both to attack the root causes and go for adaptation and mitigation strategies. The DFPSIR framework can serve as a simple interdisciplinary starting point but needs to be combined with a broader conceptual framework.

Property rights are core determinants for how land resources are utilized and their welfare effects are distributed through market and non-market mechanisms. Similarly, the degree of market development for natural resources as inputs in production and as essential elements of livelihoods and safety nets for current and future generations determine the need for complementary non-market institutions and regulations where markets do not work properly.

An environmental and institutional economics conceptual basis

An understanding of basic institutional structures and the factors explaining these structures and how easy it is to change them is important before choice of appropriate interventions can be made. This applies in particular to the Driving Forces in the DFPSIR-framework (see box 2.2).

These basic conditions are important determinants of human behavior, the existence or non-existence of specific types of markets, like land markets and markets for various types of environmental services, and negative environmental externalities (such as air or water pollution). For a basic understanding of the economics of rural organization. Useful references include Binswanger and Rosenzweig (1986), Hoff, Braverman and Stiglitz (1993). For an understanding of the choice between alternative environmental and natural resource policies, see Sterner (2003).

Annex 1 provides definitions of basic concepts used in evaluating alternative policy interventions and their costs and benefits.

Environmental problems related to land and the role of market interventions

Market failures as a cause of environmental problems are particularly severe in relation to land degradation in developing countries and for inter-temporal problems like climate change. This is what Nicholas Stern (2007) framed as “a problem of inter-temporal international collective action with major uncertainty and linked market failures.”

“*The existence of market failures implies a need for policy interventions.*”

Box 2.2.2: Pressures:

Increased food demand and demand for land for agricultural production:

- Forest clearing for extensive agriculture
- Burning and removal of biomass
- Inadequate fallow periods
- Use of erosive crops and cultivation systems
- Inadequate investment in soil and water conservation
- Overgrazing
- Monocropping
- Overuse of fertilizer and pesticides
- Depletion of open access resources

Urban land use:

- Congestion and expansion of slums
- Uncontrolled settlement

Global warming:

- Rising sea level



Soil erosion due to poor conservation, North Shewa, Amhara Region, Ethiopia
© S. Holden

Box 2.2.3: State of the environment:

Land:

- Erosion
- Nutrient depletion
- Compaction
- Acidification
- Pollution
- Salinization
- Loss of agricultural land
- Loss of residential land

Vegetation:

- Loss of biomass (carbon emissions)
- Loss of biodiversity
- Habitat fragmentation and destruction

Water:

- Low water use efficiency
- Pollution
- Siltation of irrigation systems
- Sea level rise

The existence of market failures implies a need for policy interventions to internalize the externalities caused by these market failures. Existence of high transaction costs and asymmetric information are important reasons for imperfections in markets, including non-existence of markets.

Interventions that can reduce these transaction costs and information asymmetries are therefore important policy instruments to make markets work better and also to reduce environmental problems caused by these. However, high transaction costs may also protect environmental resources like remote hilly forest areas where no roads are built and where it is therefore too costly to extract the forest resources.

Establishment of market-like mechanisms may also be used to better protect the environment where severe externalities exist. Establishment of payment for environmental services (PES) and distribution of tradable quotas such as for carbon emissions are examples of market-like mechanisms where no markets previously existed and where this had negative external effects. Such mechanisms create private incentives for better environmental management.

Another example is use of the polluter pays principle where there is no market for the damage that pollution creates and polluters ignore the effects of their activity. By charging the polluter the marginal cost of pollution, an optimal level of pollution may be established as an alternative or complementary mechanism to direct regulation of pollution and technology and resource use leading to pollution.

In cases when market mechanisms do not work or are less efficient, non-market interventions may be preferable. Such interventions could be in form of direct regulation through prohibition of certain activities, setting of standards for technology choice or management, or putting restrictions on harvesting or pollution levels. Less restrictive approaches could be to provide recommendations for best practices and information about negative consequences of not following such standards. Cost-benefit analyses may be used to compare the different approaches, however, when interventions have large effects it may be necessary to develop models to estimate the relative performance of the alternative approaches.

Property rights and environmental degradation

Non-existence of or unclear or incomplete specification of tenure rights are important reasons for the existence of environmental externalities. Coordination failures in relation to common property regimes are another reason for environmental damages. This is more likely to be the case in relation to global commons (e.g. climate change) than local commons (e.g. management of a communal forest).

Where no property rights exist (*res nullius*) or where such rights are not respected or enforced (leading to *de facto* open access), excessive resource extraction may take place. Such problems are more likely in relatively low population density areas where common property is still the dominant regime and are important reasons for rapid deforestation and loss of biodiversity (in Asia, Africa and Latin-America).

Establishment of private property rights for such forest areas does not always lead to a well functioning market for forest land because of the relative abundance of such land and forests. Alternative mechanisms may be needed to control such rapid deforestation. Since deforestation is an important contributor to carbon emissions (about one-fifth of all emissions), reducing emissions from deforestation and forest degradation (REDD) in developing countries is likely to be included in the next global climate treaty. REDD is not included in the Kyoto Protocol under the United Nations Framework Convention on Climate Change (UNFCCC). It is a core idea of REDD to reward those who reduce emissions but there are multiple challenges related to the implementation, monitoring and enforcement of such mechanisms.

Lack of clearly specified and secure property rights may represent an important constraint to more sustainable and intensive management of agricultural lands. Tenure insecurity can undermine incentives to conserve and invest on land to enhance its productivity. Land titling has been seen as the way to obtain private and secure property rights, however, land titling programmes have more often than not failed to achieve this in developing countries.

High costs, limited administrative capacity and corruption have caused land titling programs to favor the wealthy at the expense of the poor (Benjaminsen et al., 2009, Cotula et al., 2004). UN-HABITAT has therefore emphasized identification of alternative low-cost and pro-poor land tools that can overcome the problems of traditional land titling, building on a continuum of land rights perspective. Customary tenure systems may provide tenure security in many places but may also be associated with tenure insecurity if they are not recognized by the formal system and if land pressures contribute to tougher competition over scarce land resources.

Local power structures (political economy) influence how the land resources are distributed and the degree of tenure security of land users. Government interventions through past and recent land reforms and policies have had ambiguous effects on tenure security. These interventions also have consequences for land management, land conservation and investments where tenure insecurity may lead to short-sighted behavior and more rapid land degradation.

Land sales and land rental markets affect land management, conservation incentives, other investments and productivity.

“

Tenure insecurity can undermine incentives to conserve and invest on land to enhance its productivity.

”

Box 2.2.4: Human impacts: Indicators for vulnerable groups - rural populations in

poor countries:

- Poverty status
- Food security
- Nutritional status
- Access to health services
- Access to and distribution of
- land and other resources
- Tenure security
- Access to clean water
- Access to markets
- Access to education
- Access to safety nets
- Control over local resources
- Exposure to climate change and risk

Urban populations:

- Poverty status
- Access to basic services
- Health status
- Access to shelter with tenure security
- Access to employment
- Access to safety nets
- Influence/empowerment

“ *Short-term rental contracts are more likely to be associated with poor land management.* ”



Tenure insecurity can undermine land markets and the productive use of land.
© UN-HABITAT/ Remy Sietchiping

Box 2.2.5: **Responses:**

Local responses:

- Local collective action
- New technology adoption and adaptation

State responses:

- Improvement of laws and regulations
- Decentralization of power
- Allocation of government resources for action
- Development of plans and strategies
- Removal of policy failures
- Correction of market failures
- Provision of safety nets for poor and vulnerable groups
- Investment in research and education
- Dissemination of information and coordination

International responses:

- Coordinate global action
- Mobilize funds for action where needed
- Technical support

For instance, the prohibition of land sales in many countries is related to the fear of increasing landlessness due to distress land sales and accumulation of land in the hands of a few followed by excessive rural-urban migration. At the same time land sales may provide capital for starting a business somewhere else as a way out of poverty.

Short-term rental contracts are more likely to be associated with poor land management and this may lead to environmental degradation. There is a need to assess how incentives can be created for more sustainable management of rented land since rental markets for land have many other advantages like making land available for poor people at an affordable cost.

Poverty affects ability to invest in land and policies have to be designed to make the poor more able to conserve their land. The environmental implications of other forms of land transfer (inheritance, expropriation, redistribution) should also be considered and are likely to be context-specific. More research is needed to investigate such effects.

Development of appropriate institutions at national and local levels will be crucial for implementation of national policies and local actions in response to the various environmental problems. The neoclassical arguments for land reform have been to reduce tenure

insecurity, stimulate investment in land, enhance tradability of land resources (allowing transfer of land to more efficient producers) and to allow land to be used as collateral.

With the MDGs, land reforms have increasingly focused on poverty reduction and empowerment of poor and vulnerable groups. This has also led to a focus on more affordable and scalable approaches to land reform. Some good examples of success stories have recently emerged. Such approaches are, however, still in their infancy when it comes to enhancing more sustainable land use.

Capacity-building will be crucial in order to strengthen organizational structures for implementation of institutional innovations. Devolution of power and responsibilities to local institutions will also need to be accompanied with sufficient funding for implementation. Equally important will be the development of mechanisms to mobilize funds for such action in particularly poor and vulnerable countries.

International and global actions will be particularly important in relation to the global external effects from global warming. UN organizations must take the lead to orchestrate global collective action with support from other international organizations and national governments.

3. ENVIRONMENTAL CHALLENGES AND POSSIBLE SOLUTIONS

While key land-related environmental challenges were identified in the beginning of chapter 2, this chapter goes into the more context-specific conditions under which these environmental challenges occur and affect human livelihoods.

For each of the challenges a short introduction and overview is provided. This is followed by one or two case study examples to illustrate the issue and indicate actions required.

3.1 NEO-MALTHUSIAN POVERTY-ENVIRONMENT TRAPS

Densely settled farming areas with food-insecure households and severe land degradation are further stressed as pressure on the land and its resources increases due to population growth. Such areas are found in many countries in Asia, Africa and Latin-America.

Distressed lands with high population densities and/or very skewed land distribution limits land access of large populations that still depend heavily on land resources for their livelihood. Continued population growth, technological stagnation and limited intensification options, and limited off-farm and outmigration options create poverty traps that lead to further environmental degradation. Land fragmentation, expansion of crop production into steep slopes, pastoral areas and rangelands exaggerates land degradation and land disputes.

This also leads to increasing landlessness and undermining of land as a safety net for the poor. Severe poverty and shocks due to droughts and other risks reinforce survival strategies and underinvestment in environmental conservation. High birth rates predominantly occur where health and education is low. This in turn results from a negligent revenue raising system.

Extreme land scarcity leads to disputes over land resources. These areas can also be sensitive to political manipulation that can easily erupt into conflict. Skewed land distributions and ethnic differences fuel such conflicts, as in Kenya, Zimbabwe and Rwanda. Many case studies and global overviews exist from such locations.

There is a growing literature trying to identify the causal mechanisms between resource access, resource degradation, population growth and population pressure, ethnic diversity, property rights and land productivity, market access and policies. The pressures on the natural resources in these areas are increasing, and can cause permanent loss of productive capacities as rehabilitation can be very costly or impossible in many cases (WRI, 2005). The availability of technological options and institutional capacity determine the relevant responses to these severe environmental challenges.

“High birth rates predominantly occur where health and education is low.”

Box 3.1: Wollaita in Southern Ethiopia

Wollaita is a very densely populated area in Southern Ethiopia depending primarily on rain-fed agricultural production with poor market access. The agricultural production consists of annual (maize, sweet potato) and perennial (enset, coffee) crops and livestock with crop-livestock synergies (Tessema and Holden, 2008).

Nutrient mining and soil erosion are the main environmental problems. Continued high population growth (4% per year) and lack of alternative sources of income lead to fragmentation into very small farms (0.25 ha or less), chronic food insecurity and increasing dependence on food aid. The land distribution has been egalitarian since the 1975 land reform and following land redistributions, but these also created tenure insecurity as one possible explanation for low levels of investment.

Holden and Yohannes (2002) found that resource poverty appeared to be a more severe constraint for investment than tenure insecurity in the area. The implementation of low-cost land registration and certification from 2004, including joint certification of women and men, appears to have strengthened tenure security of men and women. The traditional patrilineal inheritance system and patrilocal residence system favors men but it appears that the joint certification and new land laws have in particular strengthened the land rights of women. It also appears to have reduced the frequency of land border disputes (Holden and Tefera, 2008).

However, the introduction of a minimum farm size of 0.25 ha and the rule that land should be shared upon divorce can be conflicting. It appears that this land reform does not represent a solution to of the extreme land shortage and land degradation via in terms of soil nutrient depletion mining. Solutions in form of improved technology, off-farm employment, migration and population control/family planning are required.

A case study from southern Ethiopia is presented in Box 3.1., where population densities are very high and there is strong correlation between household size/number of children and the level of poverty. High population growth, limited access to off-farm employment or migration opportunities, poverty and limited investment ability means that most people in this area are in a poverty-environment trap (Holden and Tefera, 2008).

These areas are also very diverse such that both the causes of environmental degradation and the status of land tenure systems are very different. This implies that the most relevant responses in terms of land tenure reforms will depend on these location-specific characteristics if land tenure reforms are a solution to the problems.

For example, if land degradation is severe but not due to tenure insecurity of land users but rather poverty, tenure reform may neither be a necessary nor a sufficient policy instrument. It may be necessary to provide alternative sources of income and limit population growth in the area to bring population into balance with land productivity.

3.2 TENURE INSECURITY IN RELATION TO URBAN EXPANSION.

Urban expansion is especially rapid in many large cities in the Tropics. Such urban expansion necessitates conversion of agricultural land to land for housing, infrastructure and other public needs. All countries have laws and regulations which allow expropriation of land for such purposes. However, there is large variation in the strength of the rights for those who lose their lands in such expropriations. This includes the right to compensation, and the principles defining the size and form of compensation.

De facto rights are much weaker than the *de jure* rights of those who lose their land. Such tenure insecurity may cause illegal sales of land before it is taken, or losses with limited or no compensation. Loss of land without compensation also means loss of a livelihood.

Typically, urban expansion also means conversion of land from agricultural to non-agricultural purposes. The environmental implications of such conversion will depend on the type of agricultural production before the conversion and the new type of land use after conversion. Such land is also typically intensively utilized due to its favorable location in relation to markets.

Land values for non-agricultural purposes are often many times higher than values for agricultural purposes. Weak land rights mean that the initial user/owner receives only a small fraction of this land value and expropriation often means a wealth redistribution that increases inequity and poverty.

The type and amount of compensation affects the choices available to those who are evicted from their land, whether they join the urban sector or search for an alternative livelihood in a rural area. Such choices will also affect the environmental side-effects.

In China urban expansion has been very rapid in relation to the strong economic growth over the last 30 years. Box 3.2. describes a case from China where the land rights are weak and compensation for loss of land has been small.

Box 3.2: Urban expansion in China

According to China's constitution, all urban land in cities is owned by the state. Land in the rural and suburban areas is owned by collectives except for those portions that belong to the state. With the expansion of the urban boundary, the land ownership is transferred from the collective to the state. The state may thus expropriate the land from the commune and consequently also compensate the commune. Compensation is determined by the Land Administration Law and includes a compensation fee for the cultivated land, and a subsidy for resettlement as well as compensation fee for ground investments and young crops. Land compensation fees for the cultivated land requisitioned should be 6-10 times of the average annual output value in the three years prior to requisition. The rate of subsidy for resettlement per person should be 4-6 times the average annual output value in the three years prior to requisition

of the cultivated land. The total of land compensation fees and subsidy for resettlement shall not exceed 30 times of the average annual output value in the three years prior to requisition of the land. However, illegal land-takings are the most important reason for land disputes in China.

The amount of compensation, which may be a small share fraction of the market value of land is paid to the local community and the amount received by the farmers who have lost their land is typically only a small share (10-20%) of the compensated amount (Keliang and Prosterman, 2007).

Much of the expropriated land is of high agricultural potential and cannot be replaced by other land of the same quality. The conversion typically leads to permanent loss of such high potential agricultural land. This has implications for China's ability to be self-sufficient in food production.

China's population constitutes 22% of the world's population, while the country has only 9% of the world's arable land. This is not trivial for a country that lost 15-30 million people due to starvation less than 50 years ago.

Loss of cultural heritage is another effect of the rapid urbanization in China, although the strong economic growth has also created an opportunity to save more of this heritage. The rapid urban expansion creates many interconnected environmental problems related to pollution of air, water and land. Careful long-term urban planning is necessary to deal with these problems and to provide sustainable livelihoods for the rapidly increasing urban population. Such modern urban planning is new in China and needs further improvement (Dayong, 2004).

Valuation principles vary across countries in relation to land expropriation. The most common principle used in relation to compensation for expropriated land is "fair market value" compensation. This requires that there is a market for land where such a "fair" value may be determined. Alternative principles used are the replacement value and the income capitalization approaches.

In countries where land sales are prohibited or where land markets are small or non-existent, it is difficult to identify a fair market value. Restrictions on land sales typically lead to suppressed land values. For productive land one can alternatively capitalize the net production value by getting the net present value of an expected future income stream. This also requires identification of an appropriate discount rate.

International standards for compensation have increasingly stipulated that the affected people should be compensated up to a point that they are no worse off after the expropriation than before. Other rights of the affected party include the right to receive advanced notice and a fair hearing before the land can be taken. The standards in many developing countries fall far short of these principles.

3.3 TENURE INSECURITY OF POOR SLUM DWELLERS IN DEVELOPING COUNTRIES

One of the motivations for promoting land titling in urban slum areas is to make credit available to slum dwellers. In using their land and houses as collateral, the idea is that they can upgrade their houses. However, credit requires a secure income to repay the loan.

“*Loss of land without compensation also means loss of a livelihood.*”

“*Land titling programs can enhance tenure insecurity and undermine traditional land rights.*”

Box 3.3: Forced eviction of slum dwellers in Zimbabwe

The Zimbabwean government launched the Operation Murambatsvina (Restore Order) in 2005 and evicted 700,000 people and destroyed about 92,500 housing structures. It also had an Operation Garikai (Live Well) that aimed to build 20,000 new housing units in 40 days. One year later only 3,300 houses had been built (BBC News, 2007). The purpose of these operations was to clean up the cities, remove slum areas and illegal construction.

However, a large number of people lost their homes and were not provided adequate alternatives. They received very short notice, or none at all and lost much of their property.

The operations violated Zimbabwe's and international laws. The chaotic approach had very high humanitarian, economic, and political costs that worsened the crisis in Zimbabwe. The mass evictions involved relocating many of the victims to farms and camps with inadequate water and sanitation facilities. Other victims went to rural areas or other urban areas to search for alternative housing, driving up rental prices for housing. The outcome was that people were living under even worse and more insecure conditions than before. (<http://www.issafrica.org>).

Some recent studies of urban land titling efforts in such areas have not provided convincing evidence that this strategy works for poor slum dwellers (Payne *et al.*, 2008).

The recent financial crisis also demonstrates that this link between financial and housing markets can be the Achilles heel of market economies when a combination of rapid fall in housing prices, increase in interest rates and increasing unemployment can create a domino effect of huge dimensions. The risk of losing one's property makes poor people very reluctant to borrow money and leads to self-imposed credit restrictions (Boucher *et al.*, 2008).

Eviction of slum dwellers has been one of the approaches used to reduce or eliminate the expansion of slums. Box 3.3. provides an example of such a program that had drastic consequences for the people affected.

3.4 TENURE INSECURITY AND INVESTMENT IMPACTS

Economic theory emphasizes that tenure security enhances investment. However, there are few studies that have controlled the endogeneity of tenure security. A positive correlation between tenure security and investment could also be explained by reverse causality; people invest more in order to increase their tenure security (Sjaastad and Bromley, 1997; Besley, 1995; Braselle *et al.*, 2002).

There have been few studies that have effectively controlled the endogeneity of tenure security when assessing the impacts of tenure security on investment in land. Exceptions include Besley (1995) in Ghana, Braselle *et al.* (2002) in Burkina Faso and Holden *et al.* (in press) in Ethiopia.

Direct measurement of tenure security is also difficult along the continuum of rights. There exists no global overview of the degree of tenure security and without a baseline it is also impossible to monitor changes at a broad scale. The limited anecdotal evidence that exists makes targeting of programs to enhance tenure security difficult at best.

There is a need for standardization and scaling up efforts to make broader assessments of the extent of tenure security and thus also identify the potential need for interventions. It is too often assumed that traditional or customary tenure rights are insecure. Closer inspection has provided evidence of the opposite (Jakoby and Minten, 2007). There can also be large variation in tenure insecurity across communities within a country (Holden and Yohannes, 2002).

Land tenure reforms do not necessarily enhance tenure security. Land titling programs have actually been found to have had the opposite effect in many cases, especially for the poor (Benjaminsen *et al.*, 2009, Cotula *et al.*, 2004). Land titling programs can enhance tenure insecurity and undermine traditional land rights, especially in the hands of corrupt governments and bureaucrats (Bromley, 2009).

In Cameroon households were not willing to pay the full price of land titles, but they demanded the first step of land border demarcation. This appeared to provide them with sufficient tenure security as these were respected at village level (Firmin-Sellers and Sellers, 1999).

3.5 THREATS AGAINST FLEXIBLE TENURE SYSTEMS IN PASTORAL AND AGRO-PASTORAL AREAS

Seasonality and droughts cause availability of fodder to vary substantially both temporally and spatially in semi-arid and arid pastoral areas. Mobility of pastoralists and their livestock is an essential element of their adaptation to reduce risks, maximize productivity of their animals and to avoid or reduce overgrazing and desertification. Flexibility of tenure systems is essential to allow such mobility of livestock which need to move through areas of agriculturalists and agro-pastoralists.

Expanding agricultural production into such areas threatens the livestock mobility and pastoralist livelihoods and creates conflicts between pastoralists and farmers. Attempts to settle pastoralists and their animals can also lead to overgrazing and desertification in and around the areas of settlement due to the more intensive land use which goes beyond the carrying capacity of the system.

Pastoralists' land rights have weak legal protection in many countries. Establishment of exclusive private property rights to land, as is done in conventional titling programs, will also typically threaten the rights of pastoralists. There are therefore good reasons to warn against land titling in such areas. Alternative ways of formalizing land rights helps to strengthen pastoralists' land rights if flexible and overlapping rights are recognized, registered and recorded, including the rights to keep and use pathways that allow livestock mobility.

Box 3.5a provides an example of a land reform that has reduced the flexibility of movement of livestock by changing plot borders and removing important corridors. Box 3.5b describes another example where land reforms and increasing land pressures have marginalized pastoralists and reduced flexibility in movement of animals.

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Formalizing land rights may help to strengthen pastoralists' land rights if flexible and overlapping rights are recognized.

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Box 3.4: Low-cost land certification in Tigray, Ethiopia

The land redistribution policy that was implemented in Ethiopia from 1975 in order to sustain an equitable land distribution and prevent landlessness also created tenure insecurity. While this policy was officially scaled down by the new government that took over in 1991, several cases of redistributions have also occurred after this. A survey of households in Tigray region in 1998 revealed that about 50% of the households expected to lose land due to land redistributions within the next ten years. Also a large share of the remaining households expected to get more land through such redistributions. Just after this survey land registration and certification was implemented in this region.

Follow-up surveys of the same households in 2001, 2003 and 2006 revealed that more than 80% of the households had received land certificates. Farm plot level data analyses revealed that maintenance of soil conservation structures was better and tree planting was more common on plots with land certificates. Furthermore, average land productivity was found to be 45% higher on plots with land certificates after controlling for land quality and other relevant variables. These results were found after controlling for endogeneity of land certification (*Holden et al.*, in press). Female-headed households that received land certificates had become more willing to rent out their land through sharecropping contracts, apparently because they have become more tenure secure.

Box 3.5a: Namaqualand, South Africa

Namaqualand is located in the arid northwestern corner of Northern Cape Province close to the Namibian border. Annual rainfall is in the range of 100- 350 mm. Dryland crops may be grown in some years while sheep and goats are the main types of livestock. Communal grazing lands without fences hosted multiple herds with kraaling (gathering animals during night time). A land reform was introduced after Namibia's independence in 1994. This included a reform in communal areas.

Based on local referenda, communal property association ownership was chosen in most areas. Rights to do dryland cropping were more individualized and the reform therefore proceeded by demarcation of these dryland cropping plots. It turned out that this exercise changed the plot borders that tended to be irregular and with pathways in between. The exercise created straight borders, often eliminating the pathways between. It also appeared to stimulate fencing of plots. These changes also reduced the mobility of grazing animals in eliminating corridors where animals could pass. While strengthening tenure security of individual plot owners, the reform reduced the tenure security of the livestock herders that use the commons (Benjaminsen T. A., 2008).

“*The food and financial crises have turned agricultural land into a new strategic asset.*”

Box 3.5b: **Maasai land, Kenya**

The Maasai pastoralists have a long tradition of migrating with their herds to optimize the use of scarce rangeland resources. The Kenyan land reform affected large areas of several semi-arid Districts in the 1960s and 1970s when group ranches were established aiming to reduce rangeland degradation and commercialize Maasai cattle keeping. However, the effect was to reduce the reciprocal access arrangements while each of the ranches was too small to hold all the variability demanded from a flexible and viable unit.

In the 1980s a wave of subdivision of these group ranches followed, partly stimulated by the government policy and partly due to internal tenure insecurity. However, the subdivision has further restricted mobility and access to resources for secondary rights holders. Access to land has become more unequal. Women and young men have been the most marginalized. The youth have lost the birthright of access to common land and depend on inheritance from their father for both land and livestock.

Land reform via group ranching schemes has contributed to increased vulnerability and less flexibility in use of the dryland resources. It may also have increased the risk of environmental degradation (Meinzen-Dick and Mwangi, 2008).

Box 3.6a: **Land allocation to Daewoo Ltd. in Madagascar**

The South Korean company Daewoo announced in November 2008 that they made a deal with the government in Madagascar to lease 1.3 million hectares for production of maize and palm oil. South Korea is the third largest maize importer in the world. This is about one-third to one-half of all arable land in Madagascar. Daewoo did not pay anything for the 99-year lease, but would provide employment and invest in infrastructure in the country. Daewoo also considered importing labor from South Africa for the plantations.

Strong national and international reactions caused the plans to be cancelled. Accusations of neo-colonialism and protests against Madagascar becoming a South Korean colony came out very strong and caused the government to cancel the plans.

3.6 LAND FOR THE POOR VS. LAND FOR BIO-FUEL AND FOOD PRODUCTION

The high energy prices that emerged between 2005 and 2008 triggered a race for alternative sources of energy, including bio-fuels. This led to the expansion of energy crops which also impacted on food production and food prices. The use of maize for ethanol production in the US caused an increase in food prices as well.

The growing concern about a global food deficit due to the rapid increase in demands for food also contributed to the land race for fuel and food crops that suddenly hit several African countries in 2006-2008. Both international and national investors saw great opportunities for profits in energy and food production and acquired large chunks of land through long-term lease contracts.

Such contracts were typically established without the local populations being fully informed and in countries where the legal land rights are unclear due to a gap between national laws and customary rights to land. Box 3.6a provides one example of this from Madagascar. Such gaps may be used by investors as well as bureaucrats who see this as an opportunity to make large profits.

The poor who have been the traditional users of this land risk alienation without compensation. Land that is under fallow may be perceived as being idle and not owned or controlled by anybody. Fallowing is, however, a necessary element of the rotation in many tropical land use systems.

The fallows are required for regeneration of soil fertility and elimination of pests and weeds. Fallow lands are therefore a part of customary lands and land rights on this land is typically clearly specified according to local customs.

Mapping of such customary rights did typically not take place in relation to the allocation of land for biofuel expansion.

Soaring food prices lead many countries with food deficit problems to look for opportunities abroad to strengthen their food security. More countries prefer to be in charge of their own food production rather than relying on their liquid assets to buy food.

The food and financial crises have turned agricultural land into a new strategic asset. Well known examples are South Korea, China, Libya, Qatar, Saudi Arabia, Malaysia and Kuwait. China is farming land in Australia, the Philippines, Laos, Kazakhstan, Myanmar, Cameroon and Uganda and exploring options for rice production in Mozambique. Saudi Arabia has looked for land in Sudan, Ethiopia, Egypt and Ukraine. Another example is Qatar's negotiations with the Kenya government to lease 40,000 hectares of fertile uncultivated government land on Kenya's coast near the Tana River Delta for food production. In return, Qatar would fund the building of a new port in Lamu (IFPRI Policy Brief 13, April 2009).

Some of the land that has been identified for such large-scale intensified food production is ecologically fragile. There are considerable technical and economic difficulties related to making intensive production sustainable due to the topography, soil characteristics, erosive rains and high investment needs. Such conditions have in the past caused environmental disaster and waste of resources. Many of the recent land deals been hastily made and were not based on careful planning and proper assessment of the related human and environmental risks.

The conversion of these high potential areas into commercial

production requires big private investors and land tenure reforms that give them sufficient tenure security to be willing to expand their activities in these areas.

Ukraine has carried out land tenure reforms in recent years with support from USAID. Russia, Ukraine (see Box 3.6b) and Kazakhstan have about 23 million hectares of arable land that have been unused for food production since the collapse of the USSR.

This land can easily be brought back into food production and without any environmental damage and is among the most fertile soil in the world. What is needed is investment in basic infrastructure, machinery, human skills, market structures and inputs to release this production potential.

3.7 THE NEED FOR TENURE REFORM IN AREAS WITH CUSTOMARY TENURE

Customary land rights still play an important role in many countries, especially in Africa. Customary land rights are location-specific and often flexible, overlapping, and include individual as well as group rights to use local land resources. They typically include dispute resolution mechanisms, e.g. they are handled by local chiefs, and access to land is typically restricted by kinship or ethnicity excluding outsiders and restricting land sales. Individuals belonging to the group may be allocated land for individual (family) use but if they leave the land unused it may go back to the community (Ostrom, 2001; Platteau, 1992).

Customary land rights have not been acknowledged in the constitution and land laws in many countries. Recently there has been a trend towards recognizing and formalizing customary land rights by integrating them into national laws.

Box 3.6b: Land reform in Ukraine

Ukraine got its independence from the Soviet Union in 1991. With about 50 million people it was one of the largest of the former Soviet Republics. The country has about 42 million hectares of agricultural land mostly belonging to the black earth belt of high fertility.

Agricultural production took place through large scale collective farms during the Soviet regime and the transition from a centrally planned to a market economy has also triggered a shift towards private property rights in land. The Ownership Law of 1991 recognized private ownership in addition to the traditional state and collective ownership and included Ukrainian residents as well as foreign individuals and legal entities among those entitled to own property in Ukraine. Land was transferred from state land to collectives, enterprises and private ownership and land registration started.

International support from Sweden, Canada, USA and The World Bank was received for establishing cadastre and for land titling. While technical skills and capacity have improved there are many institutional weaknesses and a long way to go before the agricultural land resources in the country can be efficiently utilized. While environmental risks are low for the agricultural land, deforestation has caused the country to become dependent on importing wood (Bondar and Lilje, 2002).

Libya has proposed an agreement with Ukraine to lease 247,000 hectares of the black soil belt for wheat production. In return Ukraine would get access to Libyan oil to reduce its dependence on Russia for its energy needs. If such arrangements are implemented this is another challenge for ongoing land reform in Ukraine.

“Recently there has been a trend towards recognizing and formalizing customary land rights.”

Box 3.7: Land tenure reform in Malawi

Malawi has attempted to integrate the customary land tenure system into formal law. This started with the New Land Policy in 2002.

The new policy recommended that customary land holdings should be registered as private customary estates for entire communities, families and individuals. This was a response to growing land pressures and the evolution of customary land ownership towards stronger individualized rights. Registered and titled land of this type was to have full legal status as private property that can be leased or used as security for a mortgage loan.

One of the challenges in Malawi was that the matrilineal system of inheritance dominated in the south while the patrilineal inheritance system dominated in the north of the country. The new policy called for a change in inheritance laws to allow the remaining spouse, children and especially orphans to inherit their parents property. This was clearly against the customary rules.

The new policy also aimed to build up local Customary Land Committees as a way to integrate the government and traditional systems of tenure. The proposal was to make the chiefs the chairpersons of these committees. The committees would have a land clerk who would keep the records. Another important part of the new land policy was to establish a more democratic and transparent conflict resolution mechanism in form of district level and traditional authority level Land Tribunals, with Village Land Tribunals as the lowest level. This was previously the responsibility of the chiefs and they were now to become the chairmen of these tribunals.

Box 3.8: Honduras, Central America highlands

Much of Central America is mountainous with forested hillsides that are very susceptible to erosion and landslides. In Honduras 75% of the land has slope greater than 25%. Unequal land distribution forces small farmers to occupy steep hillsides and small valleys. The hillsides have been deforested where they cultivate to meet their subsistence needs. Over the last 50 years expansive shifting cultivation systems have been replaced by more intensive production systems.

Agricultural land was typically registered as communal property in cadastral maps while all remaining forested land was nationalized in 1974. Official permission is required to cut down trees but this is circumvented by selective cutting (avoiding clear-cutting) and by burning the forest. Cutting dead trees to establish pastures is allowed. From 1992 it was again possible to privatize forest land and forest management plans were introduced (Kammerbauer and Ardon, 1999).

Much customary land was alienated during colonial times as well as later. An example is the establishment of many tobacco estates in Malawi.

The demand for land is increasing in most countries where customary tenure predominates due to population growth, globalization and policy changes (see section 3.6). These forces also put the customary land rights system under pressure and views differ as to whether the system is adequate to handle these changes.

Land degradation in various forms is also an increasing problem on land under customary tenure. However, it is not clear what the most appropriate actions are to ensure more sustainable land management on customary land. Devolution of power and establishment of local land administrations are broadly applied as potential remedies for the problem.

Land grabbing and exclusion of poor and vulnerable groups is still a problem on land under customary tenure, and is an increasing problem in many places (Peters, 2002). Protection of the land rights of the poor is neither granted by land reforms nor by customary tenure systems when both types of systems are controlled by the political elite. Box 3.7 provides an example of attempted land reform in Malawi that was stopped by the local chiefs.

Traditionally the chiefs had strong authority over the land resources within their boundaries and were also in charge of all conflict resolution but they did not have to keep any records or provide any reason for their decisions. The chiefs would have lost power under this new system and that was the main reason why the Malawian Parliament stopped the proposed reform (Holden *et al.*, 2006).

3.8 PROTECTING STEEP SLOPES FROM NON-SUSTAINABLE AGRICULTURAL PRACTICES

Encroachment onto steep slopes is common in countries with mountainous and hilly terrain, high population pressure and/or skewed land distribution in Asia, Africa, and Latin-America. Much of this encroachment is associated with non-sustainable land use practices and deforestation and leads to rapid land degradation.

The need to meet immediate basic needs, lack of investment capacity and unavailability of technologies that both can satisfy immediate basic needs and the sustainability requirement are explanations for this type of rapid land degradation. Regulations are in place to prevent conversion of forest land to agricultural land but such regulations are often not efficient or sufficient to stop deforestation and land degradation. Box 3.8 provides an example of encroachment on steep slopes where severe environmental degradation resulted and where interventions are necessary to reduce the problem.

3.9 PROTECTION OF COASTAL ZONES AND WETLAND AREAS

Expanded human activity, like development of cities, expansion of shrimp farming, fishing, tourism, leisure and recreational activity, extraction of resources, agricultural production, use of pesticides, inadequate disposal of and control of dumping polluting substances into coastal waters represent a considerable threat to coastal ecosystems and habitats.

Mangrove forests and coral reefs are among the most threatened ecosystems that require action to be protected. Rising sea temperatures and some forms of pollution

contribute to bleaching of coral reefs that are habitats for rare fish species. Box 3.9 describes the complexity of designing property rights in coastal zones to enhance environmental protection and facilitate efficient use.

Coastal zones are also in very high demand for recreational and housing purposes and land values for properties located by the sea are extremely high many places. There are also conflicts of interest between the public and private owners about the access and use of beaches for recreational purposes. Property regimes vary substantially and are often a combination of private and public property that may be overlapping. These increasing pressures and the expected rise in sea level represent severe threats to the coastal zone resources, ecosystems and habitats, private and public property.

Careful reforms of property rights regimes, laws and regulations will be crucial to tackle these new and stronger pressures to minimize irreversible damage and protect the interests of different groups.

3.10 CONSOLIDATION OF FRAGMENTED LAND HOLDINGS

Land fragmentation is an increasing problem in countries with high population density, high dependence on agriculture and limited off-farm opportunities. Accessing land through inheritance and distributing the land among (male) children is the most common system in such areas (Platteau and Balland, 2001).

With high population growth such fragmentation can be rapid. An initial farm may consist of several plots of different land quality and it is common then that each plot is split to allocate the different land qualities to the children.

Box 3.9: Coastal property rights in England

The coastal property rights are based on dividing the coastal area into four zones: terra firma, foreshore, sea bed and internal waters. The foreshore, under common law, lies between high-water mark and low-water mark, with terra firma (dry land) above it and sea bed below. Internal waters fall on the landward side of the territorial sea baseline. The high- and low-water marks are the medium high and low tides through the year.

The property regimes and rights differ across the four zones in complex ways. They are governed by a combination of common law, modern law, statutory laws, local by-laws, and easements. Rights in the terra firma zone above the foreshore property regimes are primarily guided by modern law. These are essentially freehold and various forms of occupational rights e.g. through leases of varying length, and conservation regimes in specified areas of particular value, such as national parks, and environmentally sensitive areas.

Easements improve public access (use of footpaths and carriageways), but may also impose behavioral restrictions. Most of the foreshore is vested in the Crown and public access rights are stronger for navigation and non-commercial fishing. These public access rights also have to be recognized by private foreshore owners.

The sea bed is the property of the Crown where public access is granted but special laws apply in harbor areas and Marine Conservation Areas. Sea water rise will obviously affect the borders between these zones and a question is how that should affect the property regimes, particularly the terra firma that is converted to foreshore area.

“ *The combination of poverty and limited off-farm opportunities often leads to more intensive soil depletion on very small holdings.* ”

Box 3.10: Land fragmentation and food production in China

The commune system for agricultural production in China was founded on the idea that there are economies of scale in agriculture. This system collapsed and was replaced by the household responsibility system from the late 1970s.

Land was at that time allocated to households based on household size (consumption need) and on labor endowment. Each household received a share of different land quality classes in the village to ensure equity within villages. Typically each holding was fragmented into a number of plots, with regional variations in the degree of fragmentation. The number of plots per household varies from one to 20 or even more. An argument for such a holding structure is to reduce risk but the degree to which this is the case has not been studied. Unclear property rights and restrictions on land markets also limited the possibility of consolidation through such markets.

Not surprisingly, land fragmentation is found to have an adverse effect on yields for various crops in China. This loss varies from 2 to 10% among crops for adding an additional plot. Complete consolidation of plots increased output by 17, 14 and 12% for wheat, rice and tuber crops. Overall, this is estimated to lead to a 15% increase in China's annual food grain output or 71 million tons of cereal output. There may be more to gain from land consolidation than from increasing landholding size. The recent provision of land certificates may allow consolidation through land rental markets but further studies are needed to assess the effect of land rental markets on land fragmentation and consolidation (Wan and Cheng, 2001).

This reduces risk in subsistence production systems. However, it is at a cost of having to operate many dispersed and very small plots.

Land fragmentation that leads to less sustainable land management is also a concern (Blaikie and Sadeque, 2000; Niroula and Thapa, 2005). The combination of poverty and limited off-farm opportunities often leads to more intensive soil depletion on very small holdings. This increases short-term returns but at the expense of future returns. Such cultivation leads to lower (marginal) return to non-land resources, like labor.

Households become more reluctant to invest on small distant plots and more of the land is occupied by paths when plots are small. Plot border disputes and spatial externalities are also more likely to occur with such small plot sizes due to the mere length of plot borders. Poor management affects neighboring plots, e.g. where improper soil and water conservation and weeding practices occur.

Although many believe in constant returns to scale in smallholder tropical agriculture, there can be a minimum size below which there are economies of scale. This is particularly true if each household has a number of dispersed plots. It is also more likely to be true if plowing is done with bullocks rather than with hand hoes. Increasing land pressure has also led to allocation of common property land to individual households as a first step toward fragmentation.

The frequently observed inverse farm size-productivity relationship shows that small farms are more productive than large farms. This has been explained by higher cost and lower marginal return to hired labor on large farms as compared to that of family labor on small farms. However, extreme land fragmentation implies comparison of relatively small and large

smallholdings all farmed primarily using family labor.

South Asia is one of the regions experiencing severe land fragmentation. The number of landholdings increased from 71 million in 1971 to 89 million in 1981 and to 107 million recently (Niroula and Thapa, 2005). In Pakistan the number of holdings increased from 4.1 million to 5.1 million from 1980 to 1990. Average holding and plot size had decreased by 17% and 8% in Nepal with an average of 4 plots per holding. The average distance from the house to the plots was 1.5 km in some mountain regions. Box 3.10 provides details based on studies of land fragmentation and the food crop yield implications in China.

Policy responses to land fragmentation include consolidation of holdings, opening land markets to create efficient operational holdings, restrictions on minimum size of holdings and promotion of cooperative farming.

3.11 THE NEED TO ENSURE SUSTAINABLE MANAGEMENT OF RENTED LAND

Land areas under rental contracts have expanded rapidly in various parts of the world. In Europe and the US large farms typically rent in land from small farms due to economies of scale in mechanized agriculture. A large share of agricultural land is rented in Europe, 63% in France, 45% in Sweden, 40% in Norway, 35% in UK, and about 30% in many other countries (Ravenscroft *et al.*, 1999).

There is a large literature documenting the efficiency implications of alternative land rental contracts, including fixed rent, sharecropping and cost-sharing contracts. From some of these studies it is possible to assess the implications for the sustainability of land use, but for



Woodlots on small farms in North Shewa, Amhara Region- Ethiopia. © S. Holden

most of them this is not so clear. If intensity of production is lower on rented land then this may have ambiguous effects on long-term land productivity.

The effects of land renting on sustainability of land use depends on how such contracts affect investments on rented land as well as more short-term land management practices. Legal restrictions on rental arrangements can include restrictions on the duration of contracts (maximum or minimum constraints), the type of contracts (e.g. prohibitions of certain types of contracts), area restrictions (e.g. the share of the farm that can be rented out), specification of who has the responsibility for conserving the land, or land-to-the-tiller regulations.

Relatively little is known about the environmental implications (i.e. sustainability of land use) of such regulations. Theoretically, tenants would be more willing to conserve and invest on rented land if they have longer-term contracts, but there are ways to enhance sustainability of land use in short-term, renewable contracts. It is also possible that landlord households have sufficient incentives to conserve the land they rent out.

Sharecropping has been associated with lower output and input use because tenants do not get the full benefit of their input use. However, the empirical evidence on this is mixed (Otsuka, 1988, 2007, Holden *et al.*, 2008). A study in the Philippines found that sharecropping contracts were preferred in locations where land was very fragile, while fixed rent contracts were preferred where soil fertility was not a concern. Sharecropping could lead to less intensive and less degrading land use (Dubois, 2002).

Kassie and Holden (2007; 2008) found in a study in Ethiopia that sharecropping was associated with more use of fertilizer and higher land productivity and attributed this to threat of eviction which more than counteracted the disincentive effect of sharecropping because good performance increased the probability of contract renewal.

Box 3.11 provides more information on an assessment of the sustainability of land use on rented land in Uganda. With the increasing importance of tenancy in many parts of the world it is important to identify more clearly the land use sustainability implications of this.

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Land areas under rental contracts have expanded rapidly in various parts of the world.
 ”

Box 3.11: Management of rented land in Uganda

One of the objectives of the Land Act of 1998 in Uganda is to promote sustainable land management by formalizing the land market. A study using farm plot level data to assess the long-term land investments (soil and water conservation, trees, irrigation), intermediate term practices (fallowing, use of manure, incorporation of crop residues, crop rotation), and short-term practices (fertilizer use, use of slash and burn) on land under different tenure, revealed some interesting insights. Most of the rented land in the study was under short-term contracts (75% of the plots were on contracts with less than 3 years duration).

Long-term investments were found to be more common on purchased or inherited plots, while more short-term substitutes to long-term soil conservation structures (drainage channels vs. terraces) were more common on rented land. Mulch, animal manure, compost, and household refuse was more commonly applied on purchased plots than on rented plots. Fertilizer use was more common on rented plots. Slash and burn was more common on rented and borrowed plots.

When examining major soil nutrients, purchased plots had the largest nutrient stocks while borrowed plots had the lowest, and rented plots were in an intermediate position. This could, however, indicate that borrowed and rented plots tend to already be of poorer land quality, rather than renting leading to lower land quality (Nkonya *et al.*, 2008).

“*Sharecropping has been associated with lower output and input use.*”

Box 3.12: Tree planting in the Ethiopian highlands

Deforestation is severe throughout the Ethiopian highlands. There are almost no natural forests left and they are under severe pressure. They are being used illegally for charcoal making, cut for firewood and other purposes. Animal manure is increasingly used for cooking while nutrient depletion and erosion cause agricultural yields to decline. Fertilizer use is low and far from sufficient to replace the lost nutrients. Restrictions on tree planting on arable land and tenure insecurity due to past land redistribution policies have undermined incentives to plant trees. Eucalyptus and several other fast growing tree species are highly productive and profitable to grow.

However, there is a widespread fear that eucalyptus species especially competes for water and is not considered suitable as an agroforestry tree because of its suppression of plant growth in the understory. Nevertheless, eucalyptus is the most popular tree to plant and has become a very important source of income, building materials and fuel. If planted in small woodlots on sloping and marginal land such land could become much more productive and this could replace erosive cropping. Removal of law restrictions and provision of more secure property rights as well as other measures to stimulate tree planting could therefore create win-win benefits (Holden et al., 2004).

3.12 TREE PLANTING HAS MANY BENEFITS

Deforestation and forest degradation is severe in the tropics as well as in Russia due to increased demands for energy and land for agricultural production. This deforestation also threatens biodiversity and contributes a large share of global GHG emissions. In energy scarce and densely populated rural areas animal manure and crop residues are increasingly used as a source of energy. This also threatens the productivity and sustainability of agricultural production.

Stimulation of tree planting can be an important instrument to reduce deforestation of natural forests, thus protecting biodiversity and enhancing the sustainability of farming systems, especially if trees are planted on steep slopes where erosive cropping takes place. Tree planting and forest preservation are essential for renewing water tables and sources.

Unclear property rights, incomplete or restricted property rights, cooperation failures under common property regimes, market imperfections and poverty are all explanations for insufficient incentives to plant trees. The institutional failures in property rights regimes lead to tenure insecurity which undermines investment incentives.

Provision of more secure property rights is a necessary (but not always a sufficient) condition to stimulate tree planting. Box 3.12 provides an example from Ethiopia where restrictions on tree planting on arable land suppressed tree planting and therefore enhanced pressures on natural forests.

3.13 UNEQUAL LAND DISTRIBUTION, LAND DEGRADATION AND INEFFICIENT LAND USE

Unequal land distribution is particularly severe in Latin-American countries where the land Gini-coefficients are above 0.8. However, some African countries, like South Africa and Zimbabwe, also have very skewed land distributions. At the same time it is argued that the inverse farm size-land productivity relationship creates the possibility of efficiency as well as equity gains from land redistributions (Deininger, 2001). There have been many land reform programs that focused on land redistribution, an agenda that also has been pushed by the World Bank. Many of these programs have not been successful, however. Some of the reasons include:

- Unclear, incomplete or collective property rights only provided to those receiving land
- Favoring large farms with subsidized credits for modernization thus eliminating the inverse farm size-productivity relationship
- Neglect of the need for complementary resources (including skills) and markets (for credit, inputs and outputs) to use land efficiently
- Political tensions and power structures that worked against such reforms reducing their effects and increasing their costs

The belief that land ownership through private property rights to land would lead to the development of credit markets because land can be used as collateral) has been dominant but in most cases has not been true.



Land degradation caused by overgrazing and lack of soil conservation, Amhara Region, Ethiopia © S. Holden

Negotiated land reforms have been attempted that rely on voluntary land transfers based on negotiations between buyers and sellers and governments providing grants for the buyers, to reduce the political tensions (Deininger, 2001). Box 3.13 describes the experience with negotiated land reform in Columbia.

What should be the appropriate counter-factual when evaluating the impacts of such reforms? From an efficiency perspective it could be the land use efficiency before and after redistribution on the redistributed land and on other land that was indirectly affected by the redistribution. When it comes to the welfare effects, these should include the welfare effects for the beneficiaries receiving land as compared to their situation before or without the reform.

There could, however, also be positive beneficial effects on others in the area of origin of the beneficiaries if land pressure was reduced there. This effect is important if the high land scarcity and poverty lead to non-sustainable land use practices. There could,

however, also be negative spill-over effects (externalities) in the neighborhood of the redistributed land in form of tension between the newcomers and those traditionally living there, including the old owners of the land.

The integration into these societies, the availability of public services given the increased demand for these (e.g. access to water, schools, health, transport, conflict resolution and shops) can have important bearing on the overall success of such programs.

3.14 PROTECTING HUMAN SETTLEMENTS IN THREATENED COASTAL AREAS AND ISLANDS

This issue is also closely linked to section 3.9. According to a Special Report on Emission Scenarios of the Intergovernmental Panel on Climate Change (IPCC) (Nicholls, 2004) sea levels have been estimated to rise by 22 to 34 cm between 1990 and 2080. However, the rise could be much larger if parts of the Greenland and Antarctic ice sheets melt.

Box 3.13: Negotiated land reform in Columbia

The land reform in Columbia has aimed at correcting the extremely unequal land distribution, increase the productivity and enhance the environmental sustainability of land use, and reduce rural violence. However, even though land reforms started in the early 1960s they did not change the land distribution much.

A new law was passed in 1994 trying to push for more rapid redistribution through a more decentralized and demand-driven process. The law provided for a 70% purchase grant, however, it did not solve the problem of providing capital for investments on the land to enhance productivity. It also turned out that much of the land offered for redistribution was of marginal quality and hardly suitable for land reform while some of the best land continued to be idle or underutilized. The programme also affected land prices and appeared to benefit the old landowners more than the new owners.

The capital shortage and credit constraints faced by the beneficiaries lead to a typical situation where they have planted perennials and vegetables on a small share of their farms. Meanwhile the remaining farmlands were mostly managed as pasture which gave insufficient returns to pay for the debt (30%) that they had on the farm. One option would have been to go for smaller farm sizes of 2-5 ha rather than the standard 15-16 ha. This would have given a more optimal balance between family labor and land (Deininger, 2001).



Those with the least resources have the least capacity to adapt and are the most vulnerable.



Box 3.14a: Flood threats in Bangladesh

Bangladesh appears to be the most vulnerable among the countries with largest populations in the risky zone as 40% of its area is in the zone and 46% of its population lives there. This is also due to the severe poverty in this country and the large population. The population that lives in the zone increased from 51 million in 1990 to 63 million in 2000 while the urban part of this population increased from 12 million to 15 million in this period, with higher population growth rates than other parts of the country (McGranahan *et al.*, 2007).

Box 3.14b: Extreme flooding in Mozambique's coastal cities

In February and March 2000 Mozambique experienced its worst flooding in 50 years. The cities of Maputo and Matola were particularly affected. More than one million people were directly affected. The water and sanitation systems were disrupted and this caused outbreaks of dysentery and cholera (Douglas *et al.*, 2008). Residents in Maputo perceived there to be less overall rainfall but rare storms seemed to have become more intense. The resulting damage was worse due to inadequate drainage infrastructure, no organization to maintain drainage channels, manage sewage, or evacuation and provide assistance to flood victims when floods occur. National and local governments appeared unable to implement necessary action and communities themselves also appeared unable to organize self-help.

While it is not (yet) possible to link such flooding directly to climate change, climate change is increasing the probability of more extreme floods occurring.

Box 3.15: Southern African drought in 2007

"Hot, dry weather from January through March 2007 wilted crops in southern Africa. The severe drought produced near-record temperatures that, combined with a lack of rainfall, caused extensive crop damage, particularly in western crop areas. In South Africa, the anticipated yield from the corn crop dropped from ten million tons in December to six million tons in April because farmers couldn't plant in the dry conditions and many of the crops that were planted wilted in the dry heat. The last South African drought of this magnitude occurred in 1992."

(<http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=18226>)

At the same time there is a trend towards population concentration in coastal areas and particularly in coastal urban areas. This trend is also driven by globalization with increasing trade flows where the bulk of the trade is shipped on boats. Nowhere is this trend stronger than in China where the population in the low elevation coastal zone has increased from 119 million in 1990 to 144 million in 2000. The urban share of this population increased from 56 million in 1990 to 78 million in 2000.

It is concerning that continued urbanization will draw larger populations into the low elevation coastal zones. At the same time the population concentration in coastal areas threatens coastal ecosystems. The Millennium Ecosystem Assessment concluded that the coastal ecosystems are among the most productive in the world but also among the most threatened by human settlements (Agardy *et al.*, 2005). Large areas of mangrove forest and coral reefs have already been destroyed.

IPCC Working group 2 has found that successful adaptation to climate change depends upon technological advances, institutional arrangements, availability of financing and information exchange (IPCC, 2004). The need for more research and analysis of economic and social issues related to climate change were also highlighted with emphasis on a portfolio of actions aimed at mitigation, adaptation and improvement of knowledge. Those with the least resources have the least capacity to adapt and are the most vulnerable. On the other hand adaptation, sustainable development, and enhancement of equity can be mutually reinforcing.

Areas below 10 meters above sea level cover 2% of the world's total land area but host 10% of the population and 13% of the urban population.

Small island states have 13% of their population and 16% of their land in this zone. The countries with the largest population in this zone are China (144 million), India (63 million), Bangladesh (63 million), Vietnam (43 million), Indonesia (41 million), Japan (30 million), Egypt (26 million), USA (23 million), Thailand (16 million), and the Philippines (13 million) in year 2000 (McGranahan *et al.*, 2007).

This shows that Asian countries are facing the largest challenges. They have 75% of their population in the risk zone. Some small island states have more than 90% of their areas below 10 meters above sea level, including Maldives, Marshall Islands, Tuvalu, Cayman Islands, Turk and Caicos Island (*ibid.*). Box 3.14a provides some additional information on the population at risk in Bangladesh. Box 3.14b provides information about the effects of a recent flood in Mozambique.

3.15 INCREASED PROBABILITY OF DROUGHTS AND ERRATIC RAINFALL DUE TO CLIMATE CHANGE

GHG emissions are likely to affect rainfall patterns as well as mean temperatures with severe consequences for agricultural production in various parts of the world. Some recent climate modeling assessments indicate that the Sahel droughts that occurred were not due to human-induced GHG emissions. Rather they appear to have been caused by a natural variation with warming in the Southern Atlantic relative to the Northern Atlantic.

According to this study, GHG emissions are not likely to lead to drying in the Sahel in the period 2000-2050 but are likely to lead to a drying trend in southern Africa together with a projected warming

of the Indian Ocean (Hoerling *et al.*, 2006). These models predict a greening of the Sahel in the 2000-2050 period.

Some other models, however, taking into account other factors, like the increase in aerosols in the atmosphere, predict a drying in the Sahel also in the 21st century (Held *et al.*, 2005). However, none of the existing models contain all the factors that play a role. The different models give very different outcomes and are inconclusive about how global warming will affect rainfall patterns. Box 3.15 describes the recent drought in Southern Africa, an area where the climate models predict a dryer climate in the future.

3.16 AVOIDING ENVIRONMENTAL DAMAGE IN 'FRONTIER' AREAS FOR NEW ENERGY SOURCES

Natural gas is a potential substitute for oil, coal and other sources of energy and reduces the amount of GHG emissions substantially if new, more efficient technology is used. The potential natural gas resources in the world are far from fully explored and require heavy investments but the dependency on gas is increasing rapidly. For example, China's heavy dependence on coal could be substantially reduced if the country invested in its natural gas resources that are found mostly in the western parts of the country and offshore.

High energy prices and increasing demands for fossil fuels have triggered exploration for hidden resources in many new parts of the world including deeper ocean regions, arctic areas, remote terrestrial areas and deeper soil layers. Higher prices and new technologies have created opportunities for economic extraction of new resources including oil from oil sands and natural gas from shale.

“Higher prices and new technologies have created opportunities for economic extraction of new resources.”

Box 3.16a: Marcellus shale, Appalachian basin, USA

The black Marcellus shale from the Devonian period covers large areas of New York State, Pennsylvania, Virginia and Ohio. The shale is about 1-2 miles below the surface and varies in thickness. Until 2003 geologists assumed that the shale contained only small amounts of natural gas. However, using new methods of horizontal drilling and fracturing, substantial amounts of gas could be extracted. New estimates of the amount of gas in the shale were 250 times higher than earlier estimates.

Environmental concerns over the extraction from these shale deposits focus on the large amounts of water needed and their management, also on the additives in the water used for fracturing the shale. The components added to the water include a friction reducer, a biocide to prevent growth of bacteria, a gel to carry the proppant (material for 'propping' open the fractured zone) into the fractures and other substances to ensure that the proppant stays there and substances to prevent corrosion of the pipes in the well.

The New York Department of Environmental Conservation is currently assessing how to impose the necessary safety measures to minimize the risk of pollution. A new law was also introduced to control well spacing. Environmental regulation otherwise includes a rigorous permit process that takes into account the location characteristics, the technology design, inspection of implementation, and enforcement of restoration when drilling has been completed.



It is important to focus on the national laws that are necessary to minimize the potential environmental damage.



Box 3.16b: Gas and oil exploration areas in Papua New Guinea

Oil and gas exploration and mining for export started in Papua New Guinea in the early 1990s. The oil and gas reserves and the pipelines that are needed for transportation of the oil and gas are located on land that is mostly under customary tenure. As much as 97% of the land in the country is under customary tenure under the control of customary groups (clans).

Those affected by the mining industry are paid royalties and equity dividends derived from taxes on the oil and gas sales. Payments are made to the land groups, called Incorporated Land Groups, on a regular basis. Two percent of the 22.5% tax that the government takes from oil and gas projects is distributed to the local government and land owners as compensation and as a benefit share.

Problems arise as payments are made to the land groups while it is not always clear what the appropriate groups should be. New groups form in order to obtain a share of the royalties and dividends. The group leaders take a large share of the benefits while the distribution of benefits among members is unequal and unfair. The situation is characterized by lack of representation and involvement of group members, lack of accountability and transparency, and inability of the groups to resolve their own problems. Leaders get away with their behavior and form alliances with government officials for joint benefit (Koyama, 2003).

Shale is the world's most common sedimentary rock. Although shale often contains gas, it is so impermeable that until recently it was not possible to extract the gas in an economic way. New technology includes horizontal drilling in shale layers deep below the ground and hydraulic fracturing methods that help to release the gas from the shale.

These technologies, which were developed in North America, have led to a gas rush when energy prices increased in areas with potentially high shale gas reserves. These areas include New York State, Pennsylvania, Texas, Arkansas and many other states in the US as well as Alberta, Quebec and British Columbia in Canada. The financial crises and the following fall in oil and gas prices may again make some of these reserves uneconomical.

There are environmental concerns related to possible pollution of groundwater, handling of large amounts of water needed for the fracturing, and the traffic and infrastructure needed on the surface. Oil sand utilization creates a lot more damage on the surface and therefore has more environmental hazards. Box 3.16a provides more information on the exploration of shale gas in the US and the environmental hazards involved.

There are several tenure-related issues that have come up also with gas exploration and production. The basic question is who has the mineral rights for such resources deep under ground. This varies across countries but also within countries. In the US the mineral rights typically accompany the surface rights but not always.

Owners of the property can sell the mineral rights or the rights to explore for minerals while they also take a royalty on any eventual production. Since exploration companies typically want access

to a larger area than the individual farms and since the below ground horizontal drilling can cut across properties, property owners have merged in groups to negotiate contracts with the companies. This helps them to strike better deals with the companies. There is large variation in the contracts they receive both in terms of rate paid per acre for the right to explore for gas and the percentage royalty on the production afterwards (www.geology.com/). Box 3.16b is about oil and gas exploration and contracts in Papua New Guinea.

This type of natural gas exploration is now spreading quickly to other parts of the world where land and mineral rights are less clearly specified than in the US and Canada and where also environmental protection is of lower quality. People with surface rights (like farmers) are likely to be affected by such programs even though they do not have mineral rights. Therefore, it is important to focus on the national laws that are necessary to minimize the potential environmental damage that these mineral exploration operations cause.

Another frontier is offshore, including Arctic areas and deep seas. New technologies and high oil and gas prices make such resource extraction profitable. Nation states typically control the offshore mineral rights. The midline principle has often been used to draw borders between nations' offshore property rights and agreements about these borders have been reached for many offshore areas but there are still some gray zones, contested and unresolved areas, for instance in the Arctic.

Summer melting of the Arctic ice sheet has caused Russia and several other countries to position themselves for resource exploration and extraction in this harsh and vulnerable region where environmental risks are particularly high.

These areas are very rich in fish resources and many environmental organizations advocate prohibition of all mineral exploration in such vulnerable areas. Several areas have been declared as conservation areas up to certain dates.

The combination of improvements in extraction technology, rising prices for oil and gas and exhaustion of wells further south, generates pressure to open new areas in more extreme locations. High energy demands and high prices are prompting most countries to explore for oil and gas reserves. Many of these countries lack the technical expertise and know-how to ensure environmentally sound policies and practices for fossil fuel exploration and extraction.

The risks of severe damages are therefore high and international support is important to help these countries to establish better standards to minimize this risk. Accidents in relation to extraction of these deep sea oil and gas resources easily lead to large oil spills that threaten the oceanic ecosystems.

3.17 SOCIAL AND ENVIRONMENTAL COSTS OF ELITE CAPTURE OF LAND REFORMS

Elite capture of land reforms has occurred in many countries and is one of the important reasons why many land titling programs fail to benefit the poor. There is a high risk that adjudication/registration processes can be manipulated by the elite, excluding poor groups that depend on these land resources for their livelihood (Platteau, 1992).

The environmental impacts of such reforms will depend on the alternative options for those excluded from their land and also on what those who take over the land do with it. Environmental

consequences need to be taken seriously where those excluded are forced into marginal lands and use non-sustainable land use practices. If they move to urban slums they may also add to the problems there. However, they could find alternative employment opportunities and livelihoods that do not compromise environmental quality.

Elite capture includes controlling or influencing the government with legal and illegal means, making laws or preventing new laws from being introduced or implemented. It may take place centrally as well as locally and is a sign of weak and/or dysfunctional institutions. It may involve appropriation of resources like land or minerals because of their high value such that taking over or getting the property rights is the name of the game. It may also involve the appropriation a large share of resource rents at the expense of poor and marginal beneficiaries. Box 3.17 details the consequences of elite capture on a land titling program in Mali.

This ends the review of important land and environmental issues. Many of them require further attention and action through concerted efforts at global, regional, national and local levels. The next section looks at identification of important research gaps and key research questions that will guide future research on these issues.

Box 3.17: Land titling in Mali: for the wealthy and powerful only

Increasing population pressure and commercialization in the cotton zone in southeastern Mali has triggered a process of conversion from inalienable customary tenure to various forms of alienable and exclusive land holdings.

Informal land transactions have become common and land values have increased rapidly. Land titling is possible and titles can be obtained but are extremely expensive and may cost up to 3000 US\$. This high cost makes obtaining a title impossible for ordinary farmers. The process is bureaucratic and substantial bribes are demanded by officials in the regional government. Land titles provide higher tenure security, however, because it is much more difficult to expropriate titled land.

On the other hand, untitled land is very insecure and can easily be expropriated from the users as the state is considered the owner of such land and very little compensation is paid. Such compensation is also paid only for an area up to 3.5 ha. This leads landholders who face a high risk of expropriation to sell the land at a low price before it is taken and they tend to be left worse off than before.

The largest share of the land rent is siphoned off by the civil servants, urban authorities and the central state, while middlemen get a smaller share. With this system formalization of land rights takes place at the time of expropriation and the main beneficiaries of this system are the wealthy, powerful, well-informed and well-connected (Benjaminsen et al., 2009).

4. RESEARCH GAPS AND KEY RESEARCH QUESTIONS

This chapter identifies important research gaps related to land tenure and environment. The review of important environmental challenges in the previous chapter reveals many of these research gaps. The global overviews of the extent and severity of various environmental problems related to land tend to be very broad, and are based on generalizations from case studies and satellite images with limited ground-truthing.

Advanced technologies, like use of radar and laser technologies in satellites, will continue to strengthen the global land survey data bases. However, these databases must also be linked to socio-economic and other data to better analyze the relationships mechanisms between environmental health, human well-being and behavior, and land policies at a global scale. Unfortunately, action cannot wait for all of this to be in place.

Considerable evidence has accumulated showing that standardized approaches, like land titling, have often failed to achieve the intended effects (Deininger, 2003). Likewise, many land redistribution programs have not been as efficient as expected in creating a more egalitarian land distribution. Attempts at regulating land rental markets and land-to-the-tiller policies have enhanced tenure insecurity and the transaction costs in the land rental markets, and have therefore undermined land use efficiency (Otsuka, 2007).

These failed attempts were due to errors in design as well as errors in implementation. More can be done to integrate the lessons from the different experiences.

There is a need for greater humility in seeking solutions to important environmental problems and about what are the most appropriate land policies. As stated by de Janvry *et al.* (2001), they saw their book “Access to land, rural poverty and public action” as “an exercise in humility in identifying huge knowledge gaps in efficiently designing land policy reforms.”

Most of the debate about various types of land reforms has been either for or against reform, and with an emphasis on the search for cases that could be used to defend one view over the other. Ideology has also played an important role in the politicized research agenda. However, a more pragmatic and cautious approach also appears to have gained ground in recent years. This is reflected in the changes in the World Bank’s land policies.

Some of the basic lessons are:

- The impacts of a specific policy measure are highly context-specific, what works one place may not work in another place because of the large differences in local characteristics. Careful assessment of the links between environmental and socioeconomic characteristics, and identification of key bottlenecks for more sustainable land use is therefore key to successful policy design.

“Standardized approaches, like land titling, have often failed to achieve the intended effects.”

”

- The cause of an environmental problem or the solution may be unrelated to land tenure, or the solution requires much more than a tenure reform to succeed.
- Many cases are such that it is not possible to be very confident about what works and what will not work. Such cases will require cautious testing of alternative approaches before it is advisable to scale up the successful approaches. It is therefore relevant to develop and test a menu of options.
- Several promising land tools have been, and are still being developed. These give new hope and they deserve to be carefully tested under varying conditions. Doing this in a systematic way will help develop better recommendations about what works where and what will not work under certain conditions.

The world is full of “besser-wissers” who make a living out of selling ideas that have not been subject to careful scientific scrutiny. Again and again development agencies are cheated to put their money into big projects that have a very weak scientific basis. Still many want to believe in the silver bullet that works against everything.

The arguments are that we need action, not more research, but the lack of systematic assessment of all the mistakes made, and the unwillingness to set aside a small share of the budget to collect baseline data that can be used for more robust impact assessments, undermines the possibility of incremental learning and raising the quality of projects or policies over time.

4.1 KEY RESEARCH QUESTIONS RELATED TO LAND AND ENVIRONMENT

A list of important research questions follows, based on the review in part 3 of this report. They are formulated to be solution and action-oriented in relation to important knowledge gaps. They were used to stimulate an E-discussion by asking participants to react to each question and short tentative answer that was provided. An extract on the E-discussion comments are included following each of the research questions.

1. Can land tenure reforms eliminate the neo-Malthusian poverty-environment trap?

No, but tenure reforms are part of a larger solution to break such traps. No consensus appeared from the contributions here as the basic cause was questioned, except that there most often exist technological and institutional solutions to such traps.

Research literature is emerging that tests for the existence of poverty traps in relation to income poverty and asset poverty. Market development and improved technologies are good approaches to increase land productivity and reduce poverty in densely populated agriculture-based economies where land degradation due to soil erosion and nutrient depletion cause low and falling land productivity. Input subsidies have again become popular to stimulate this kind of development.

“*Market development and improved technologies may be the best approaches to increase land productivity and reduce poverty.*”



Tenure security for people in slums is an important step towards improving living conditions. © Åsa Forsman

2. Can the property rights of poor land users in peri-urban areas be better protected and compensated in cases of eviction?

This should be possible but requires priority by national and local governments in law making and the way such laws are implemented and provide legal backup to victims of violations of such rights.

There was agreement that evictions should not take place unless it was clear that this was in the public interest. Laws should be developed to define such public interests. The poor are particularly at risk of being evicted without proper compensation. The level of compensation should be large enough to prevent those evicted from being worse off after eviction than before. It should not only be for the land but also all investments that have been made. Preferably they should be provided with alternative land and livelihood opportunities. Adequate information and compensation should be provided prior to eviction.

3. Can tenure security be provided to slum dwellers to improve their access to basic services and create incentives for them to improve their property?

Yes, but this will require large investments and may be in conflict with other urban priorities for resource allocation. The rapid increase in the number of slum dwellers and high environmental risks in slums threatened by storm floods and sea level rise makes this an issue of high global significance requiring coordinated international, national and local action.

There is a need to define more clearly what is meant by tenure security. For example, whether it is related to protection against eviction or provision of legal rights to houses and what rights should be provided to new entrants because there tends to be a steady inflow of people. Basic services should be provided to all irrespective of whether they were tenure secure or not.

“There is a need to define more clearly what is meant by tenure security.”

It is clear that the slum problem is a big problem that needs to be prioritized. To what extent can the issue be made global rather than only a national issue? One suggestion is to develop a blueprint approach that can provide a guideline for the way forward.

Another perspective would be to understand the dynamics of countries unable to provide adequate housing for all. Another suggestion is to focus on the lack of political will which causes too little funding for basic services and secure livelihoods. It might also be worth looking carefully into how to organize slum improvements and prevention and facilitate the linkages between local, national and international organizations. Above all, none of these suggestions can stand alone. A multi-track approach is needed to tackle slum conditions at scale.

4. Can land tenure reform enhance tenure security where it causes poor land management and non-sustainable land use?

Perhaps, but careful assessment is needed as many tenure reform programs have not had the intended effects on tenure security. There is a growing consensus that land tenure reforms require bottom-up involvement in order to have the desired effects. There is a risk that reforms from above have the opposite effect of enhancing tenure insecurity. More research is needed to identify the extent of tenure insecurity and to design tenure reforms that can enhance tenure security where it is low.

5. Is it possible to formulate flexible tenure systems for pastoral and agro-pastoral areas such that pastoral systems are sustained and conflicts reduced?

Alternatives are needed to the conventional titling approach, allowing flexible and overlapping land rights. Some promising approaches are being tested but more research is needed to assess how scalable and effective such approaches can be.

6. Can national laws and international agreements be developed to protect the land rights of people living on land identified for large-scale food or bio-fuel production schemes?

Global standards are needed for environmental and human rights protection in relation to such large schemes. The countries with land resources that are in high demand for such purposes need expertise in negotiating such large-scale contracts to protect the rights of people living in the selected areas, to have proper environmental assessments, and to establish fair long-term contracts for mutual benefit.

7. Is there a need for tenure reforms in areas with customary tenure?

This will depend on the local circumstances and requires careful study in each case as customary tenure systems are very diverse, such as the difference between matrilineal and patrilineal inheritance systems. The customary tenure rights have in some places been undermined and may be in need of strengthening, revision or even replacement if they can no longer handle the challenges faced.

“*Land tenure reforms require bottom-up involvement in order to have the desired effects.*”

Women's land rights are often weak under customary tenure. This has also been the case in land titling programs that have attempted to replace customary tenure systems. A cautious pilot-testing approach is recommended when assessing alternative solutions.

There is a need for certain types of reforms in customary tenure, especially of enhancing gender equity, making such systems more democratic, providing tenure security to all (including women and children), and linking them more closely with the MDGs. There are many valuable aspects of customary tenure that are important to keep.

8. Can land laws be imposed to protect steep slopes and other fragile ecosystems?

Yes, this should be possible but enforcing such laws may not be easy. Laws and international agreements were seen as important but not sufficient. Even more important is the agreement among the people themselves and local authorities and organizations that have to support restrictions on land use. Such resources may be depleted out of necessity and then laws do not help. What is needed is guidance and alternatives for the poor. Stimulation of collective action and local leadership to conserve such valuable resources may be the most important. Payment for environmental services and carbon sequestration are new tools that can create incentives for protection of steep slopes. This requires further research and pilot testing.

“*There are many valuable aspects of customary tenure that should be kept.*”

9. What are the appropriate property regimes for environmental protection in coastal zones and for enhancing private and public environmental services?

Environmental conservation areas must be set aside and protected. There is a need to balance private and public interests. Sea water rise will require adjustments of the property rights regimes. This will require further studies to investigate how best to protect the interests of the stakeholders involved and affected.

10. Should land consolidation be implemented in areas with very fragmented land holdings?

Consolidation should not be implemented without careful studies of the costs and benefits involved. Consolidation should preferably be sorted out on a voluntary basis, and could also be promoted by facilitation of land rental and land sales markets.

11. Is management of rented land less sustainable than management of owned land and are interventions required and feasible to achieve more sustainable management of such land?

This question needs further research. There have been few studies on this and hardly any studies on the efficiency of alternative instruments to enhance more sustainable management of rented land where that is needed.



People living along the coast are at risk of sea level rise. © Åsa Forsman

There is a risk that those managing rented land invest less in conserving such land than if they owned the land. As land renting expands there is a growing need for legislation that protects rented land by signaling clear responsibilities of owners and tenants. Longer-term contracts may reduce this problem and very long-term contracts, i.e. 99-year leases are treated almost like sales. Enforcement of longer-term contracts may be an option but that may also reduce the flexibility advantage of short-term contracts. Imposing sustainable management requirements as a part of the contract may be an alternative approach that should be tested in diverse environments.

12. Can tenure reforms be introduced to stimulate tree planting and thus reduce deforestation?

Such reforms may work where tenure insecurity has discouraged tree planting. However, this requires careful assessment in each case. This should be seen in relation to the need for more systematic research to identify the extent of tenure insecurity at a broader scale and whether it represents the key to explain deforestation and lack of tree planting incentives.

13. Can land redistribution projects create win-win benefits by reducing environmental degradation and enhancing equity?

Needs assessments and environmental assessments in target areas are required to establish the counter-factual conditions. Most redistribution projects have failed to do so. Many redistribution programs have been very difficult to implement successfully, so more research and pilot-testing are clearly needed. Solutions must always match local conditions.

14. Can the property rights of people living in areas threatened by sea level rise be protected or be compensated if lost?

This will require global collective action to establish an international insurance or compensation mechanism. This is mainly needed for the most vulnerable poor people that are unable to protect themselves. There is a need to develop national and local rescue plans and alternative locations for resettlement where protection is too costly or impossible.

“*The need for flexible tenure regimes may become even more important if global warming increases.*”

15. Can better safety net programs be developed to protect against climate risks due to droughts, floods and heat waves?

This requires coordinated action at global, national and local levels. It may be possible to build on the World Food Program and alternative safety net programs that provide employment, food and other basic needs in emergency cases through food-for-work, cash for work, food aid and rehabilitation programs. Environmental rehabilitation could be an important component of such productive safety net programs. The need for flexible tenure regimes may become even more important if global warming increases such environmental risks. However, flexibility can also be a source of tenure insecurity.

16. How can land tenure reforms protect the environment in frontier areas for resource extraction to meet global resource needs?

Improvement of national laws and regulations is crucial to protect the environment against excessive damage as well as to ensure the protection of national and local interests and particularly those of the poor. The risk of resource curse is evident in many places and strong institutions are required to avoid or reduce such problems that can have large negative social and environmental implications. However, establishing strong institutions that protect the rights of the poor and vulnerable is easier said than done.

17. How can elite capture of land reforms be prevented so that land reforms become more pro-poor and environmentally friendly?

How easy or difficult it is to achieve this depends on the local and national power structure. International pressure and programs with donor support may help, if well-designed baseline, monitoring, and impact assessment are implemented. Continued funding must also depend on positive environmental and pro-poor designs and impacts.

Some donors have very weak systems for monitoring, evaluation and impact assessment and hide behind the convenient recipient responsibility. When the real recipients are corrupt bureaucrats and the elite, rather than the poor and their environments that were to be targeted, such an approach does not work. There are no easy solutions and a very cautious step-wise approach with pilot-testing is recommendable before eventual scaling up.

The two possible solutions were the introduction of a land ceiling, and land taxation or dividend that is progressive. Land value dividends may be most appropriate in countries with well developed land markets and systems for land valuation. Land dividends have also been used in countries primarily with poor farmers using a fairly flat rate. The basic constraint to the introduction of progressive land dividends is that land owners and the elite do not want them. This may also be the case for the policy decision-makers who are land owners.

This concludes the key research questions and provides a basis for prioritizing and identifying the most relevant policy tools in the next section, including priorities for action.

5. KEY PRIORITIES AND PROMISING LAND TOOLS

This chapter identifies key priority areas where land stakeholders could add value as well as develop land tools that could be used to enhance sustainable land management and human well-being. For instance, the Global Land Tool Network (GLTN) has identified six areas for land tool development:

- i Land rights records and registration
- ii Land use planning
- iii Land management, administration and information
- iv Land law and enforcement
- v Land tax and valuation
- vi Cross cutting issues (GLTN, 2006). This division will be used when reviewing relevant land tools

5.1 LAND TENURE REFORMS

Land reform requires thorough analysis of each country's specific situation and must be widely agreed upon by various interest groups in the land sector.

Taxing of land values was identified as a crucial instrument to mobilize idle land and make it available to more efficient and needy users. However, even though introducing such a tax system seems an optimal solution, there can be strong political constraints as it is likely to be opposed by landowners and the elite. The best strategy would be to look at the range of land relation taxation solutions.

In a broader urban perspective on policies and tools there are many examples of innovative, pragmatic and cost effective policies to improve access, land tenure security and property rights for the urban poor. Information on these is already in the public domain through the bi-annual World Urban Forum, the bi-annual World Bank Urban Research Symposia, the annual Habitat Awards, Dubai Best Practices, academic publications, bi-lateral and multi-lateral agencies and Google.

There may therefore be a need to focus more on why so few of these are applied or scaled up at a broader scale. The reason may be that too many of those in power benefit more from the status quo than from introducing such reforms. GLTN therefore needs to give priority attention to the political economy within which land management operates in order to identify key constraints that need to be addressed to move forward in specific locations at a given time.

Finally, although there are many tools that have been proposed for application in the urban setting, many of these have not been systematically tested across a range of heterogeneous urban localities. These promising tools need more systematic piloting. Successful pilots build a stronger basis for scaling up. This may also be an area where GLTN can play a key role.

A diagnostic typology approach may be used to identify whether there is a need for certain types of land reform. This will be used to identify the key characteristics that imply both certain problems and certain solutions.

Examples of such characteristics are:

1. Degree of overall land scarcity
2. Skewed land distribution
3. Level of tenure security for different land holders
4. Degree of dependence on the land for livelihood (extent of exit options)
5. Whether pro-poor reforms are in the interest of the local and central elite and policy-makers
6. The extent of environmental degradation and its short-term and long-term consequences
7. Characteristics of land laws and possibility of law enforcement
8. The degree of transparency and accountability in administrative systems locally and centrally

If countries then are grouped based on having similar characteristics, one may look for the best solutions there.

Transparency is the basis for law enforcement. Thus, transparency in land administration goes a long way in sorting out issues provided that proper laws have been put in place. Transparency can also help to ensure that government officials do their job efficiently and reduce illegal activity. This is a very important area where effort should be concentrated to make a real difference.

UN-HABITAT, in partnership with GLTN, and other training institutions successfully developed a training programme on transparency in land administration. The programme was implemented

in Africa in 2008 and is scheduled to be expanded in Asia and Latin America and beyond.

It is recommended that modules on transparency should be built into all training programmes on land administration. Guidelines and best practices should be established for enforcement of transparency. Related to this is also transparency in land-related dispute resolution systems, like local courts or land tribunals having well documented records of the treatment of court cases and how court decisions build on the law.

5.2 LAND RIGHTS RECORDS AND REGISTRATION

Low-cost land registration and certification

This is an approach that may be relevant in poor countries with high population density, tenure insecurity and land disputes contributing to environmental degradation.

Land registration and certification may be implemented in many different ways and at varying costs. With the low-cost approach described above and the conventional land titling approach as two extremes it is possible to find multiple intermediate combinations with intermediate cost levels. New technologies, like GPS, new software and computers, high resolution satellite pictures, have opened up new approaches that are cheaper to implement than conventional registration and titling.

If registration of individual farms and parcels is too demanding, it is also possible to only register village borders and borders of communal land vs. private land and prepare certificates of customary land to groups of users.

The approach is relevant in poor countries with high population density, tenure insecurity and land disputes contributing to environmental degradation. It may require technical capacity building as well as institutional strengthening but to a lesser extent than the conventional land titling approach and is therefore scalable with a much lower budget if there is local support for it.

The low-cost approaches have become more diversified due to new technologies lately but it is crucial to balance the technology level with the costs and affordability, technical skills and scalability. There has been a strong tendency to prefer a higher level of technology that is too costly and this has been at the expense

of affordability by the poor and scalability due to limited capacity and budgets.

Before a country decides on whether to apply the conventional land surveying and titling approach or low-cost land surveying and titling/certification approach, or even to title land at all, the country should be clear on the objectives of titling/certification. Is the objective to enhance tenure security; to reduce the frequency of land border disputes; to stimulate investments in the land; to create incentives for sustainable use of land and better land management; to enhance land productivity; to activate the land market; to unlock 'dead capital' in informal urban settlements/slums or a combination of any of these.

Box 5.2: Low-cost land certification in Ethiopia

Ethiopia has successfully implemented land registration at a large scale with very limited funding. The reform was implemented at regional level in four largest regions in the country. It began with Tigray region in 1998 and the other three regions from 2003. The objectives were to improve tenure security, to promote better land management and larger investments, and to reduce conflicts over land boundaries. The approach focused only on cultivated land but involved registration of all cultivated land in one sweeping operation and consisted of the following steps:

- The basis of the reform was the introduction of a new federal land proclamation (in 1997) and new regional land proclamations.
- Four types of forms were used; Form 1 for collection of parcel data in the field, Form 2 was the registration book kept at community (tabia) level, Form 3 was the land certificate given to the owner, and Form 4 was for registering transactions such as inheritance, redistribution and reallocation.
- In each region young persons were recruited and trained as technical staff for the implementation
- Land registration typically involved the technical staff, the development agent, community representatives, and the land holders walking the fields as a group, and recording the data on forms. Information collected included name of owner (head of household), address, family size, time of last land distribution, number of parcels, name of location of parcels, fertility status of parcel, parcel size (local traditional way of measuring), names of owners of neighboring plots of the parcel, and signatures of the people recording the information.
- Land borders were better demarcated in some cases where that was needed, using local materials.
- The same information was recorded in the registry book in the community.
- Land certificates in form of a single page including the same information were then issued to households containing information about all the parcels of the household.

Advantages of the approach used in Ethiopia include the low cost because no expensive technology was needed, only people with very limited training were used, strong local participation was ensured and all parcels were observed in the field with neighbors present as witnesses on ownership, the location of parcels and their borders. Eventual disputes were resolved there and then. Cases where on-the-spot resolution was impossible required more follow-up work.

The costs of this approach are extremely low when compared to standard land titling approaches. In standard titling methods the poor are often unable to obtain land titles unless the programmes are heavily subsidized, which goes beyond what poor countries can afford. Disadvantages of the low-cost approach include lack of a computerized land registry system, lack of maps, more cumbersome ways to update and maintain the system, difficulties of extracting summarized information, low levels of accuracy of plot measurement, and lack of geo-reference for parcels.

It is not obvious, however, that these limitations necessarily add tenure security and therefore would lead to more sustainable land management and investment and less disputes. On the contrary, research has documented that the approach has; enhanced tenure security, stimulated investments and maintenance of soil conservation structures and land productivity, and has reduced the frequency of land border disputes (*Holden et al., 2008, 2009a*).

The approach has also been poverty neutral (Holden and Tefera, 2008). This has not been the case for more expensive land titling programs. The experience shows that low-cost does not have to mean low quality and low impact, whereas high cost does not guarantee high quality.

The next step is to take a decision on the level of surveying accuracy which is desired to achieve the objective; this will in turn determine the land surveying and titling/certification approach. Cost implications are critical as affordability and sustainability heavily depends on the cost of the titling/certification.

Developing countries should adopt a low-cost approach using the available low-cost technology. The case study of Ethiopia is a very good example. Rwanda is implementing a certification exercise; Uganda is piloting systematic demarcation on a small scale. Most important, these approaches are scalable, effective and deliver the objectives. Unfortunately many such projects in Africa 'die' at the pilot level.

5.3 LAND USE PLANNING

There is a need for an interactive land use planning process between central and local authorities to consolidate national and local priorities. Top-down land use planning may lead to very poor implementation at the local level. Local commitment cannot be taken for granted and broad participation and local elite capture can be difficult to avoid. This leads to the exclusion of poor and vulnerable groups who have no power and low status in society. Ways of empowering the poor and vulnerable, including women, should therefore continue to be a key priority area for GLTN.

UN-HABITAT (2008) notes that 'poor land use planning associated with insecurity of tenure and incompletely specified land rights also leads to problems of air and water-borne pollution from agricultural and industrial land use. As a result, in densely populated areas, the poor are more exposed to pollution hazards.'

Land use planning may be implemented at different levels. At a local level it can potentially be an important tool in areas with overlapping land rights and where flexible tenure systems are needed, such as in agro-pastoral and pastoral areas. Such areas are susceptible to land use conflicts and organized land use planning may be a way to get different stakeholders together to sort out conflicts of interest and agree on how to share the utilization of resources.

Preparation of land use maps and documentation of traditional use rights may be useful to clarify and strengthen the rights and obligations of the different parties. If environmental degradation and overexploitation is a problem on part of the land, land use planning may help to coordinate efforts to reduce the pressure and conserve the resources for mutual benefit.

This could lead to collective action agreements, establishment of monitoring systems, rules for utilization, and punishments/fines for violations. Such local land use planning should be strengthened with support from above but the responsibility should remain at the local level.

Support may be needed on the technical side with maps and some other equipment. Laws and regulations and an organizational model for implementation with principles and standards of conduct are helpful. Such principles and standards include transparency, representation of all relevant stakeholders, and respect for agreed rules. Still there are many challenges related to implementing a local level approach. These are traditional power structures, conflicts, lack of trust and respect, free-riding, and crossing self-interests. Social capital is needed to get such an approach started. Initial success makes it possible to build more social capital.

Some initial support certainly helps this. It is also important to set clear objectives within a realistic plan, use a stepwise approach with milestones that are achievable with the resources and time available.

There is a need for an interactive land use planning process between central and local authorities to consolidate national and local priorities. Top-down land use planning leads to very poor implementation. Local commitment cannot be taken for granted. Broad participation and local elite capture are hard to avoid and likewise the exclusion of poor and vulnerable groups having low social status.

Box 5.3 describes a case in Tanzania of successful local land-use planning. The pilot study was implemented by a government land reform program, Mkurabita. Some other actors were involved in the Handeni pilot. These included the Legal and Human Rights Centre and the Tanzanian Pastoralists, Hunters and Gatherers Organization.

Some of their conclusions on the experience are summarized by Mkulila (2006) and Sundet (2008). They perceived that the attempt to “fast track” the process caused more problems and contributed to land grabbing, partly due to misinterpretation of the term customary right of occupancy, causing some to claim ownership of land where their forefathers were buried whilst some other people have been on the land for over 30 years. A group of Maasai women were also left out of the process. Sundet (2008) also refers to a report which states that two local businessmen managed to gain access to 2000 ha of land in the process, causing others to have become landless.

BOX 5.3: Village land use planning in Tanzania

Tanzania has achieved widespread demarcation of village borders. However, the next step of creating village Land Use Plans is a slow process. Local knowledge about land laws is very limited with a few exceptions where projects and pilot studies have disseminated information and implemented land use planning.

The approach applied a comprehensive participatory process, establishing permanent local land use planning teams with representatives from the major stakeholder groups. It holds promise to reduce the number of land disputes and may also help to protect the interests of weaker groups, including pastoralists and women. However, there is no guarantee that this will be the case. Clearer principles and guidelines will ensure more successful local land use planning and management and may be implemented as local by-laws.

A pilot study in Handeni tested a few innovations on land use planning and registration in order to come up with a more efficient methodology for implementation of the Village Land Act of 1999. A second purpose was to gain field experience on implementation of the Act that would produce

proposals for the envisaged reforms in rural land management systems. Handeni District had already prepared the District Land Use Framework Plan. It had also constructed a District Land Registry and had obtained the necessary computer and GPS equipment.

The project went through the following steps:

1. Educating the village councils about the VLA and training of the technical team
2. Boundary adjudication and surveys
3. Preparation of Village Land Certificates (VLCs)
4. Construction of Village Land Registries
5. Preparation of Village Land Use Plans and its by-laws
6. Issuance of Certificates of Customary Right of Occupancy (CCROs)
7. Registration of CCROs
8. Lessons learnt:
9. It is important to mobilize the village properly to fully participate

in the process. It is important not to rush the process too much

10. Temporary staff, e.g. Form 4 leavers, may be trained quickly so that they can implement this type of survey work as technical support staff
11. Establishment of village borders may be challenging and may involve disputes with neighboring villages
12. Issuing of village land certificates (VLCs) should be decentralized from the Commissioner of Lands and to District Land Offices
13. Villages should themselves take the responsibility to establish village land registries
14. Establishment of Village Land Use Plans requires participation by all relevant stakeholder groups and preferably the relevant professional staff from Ward level

The land use plans need to be accompanied by bylaws and it is important that the villagers are involved in approving these to ensure that they do not violate them

(Source: Claussen et al., 2008).

Still, Mkulila (2006) thinks that the Handeni experience with participatory land use planning is something to build on through further modifications and testing. Participatory land use planning, if properly implemented, not only as a quick PRA activity but by establishing more permanent local teams with representatives from all key stakeholder groups, helps to sort out or reduce land use disputes.

First priority should be to scale up comprehensive participatory land use planning with the aim to minimize land use conflicts and protect the rights of all groups that depend on the land as a livelihood. More systematic piloting is needed to improve upon the participatory land use planning approach. Proper professional research should be

carried out to maximize learning from the pilot studies and more pilots should be implemented to test different approaches.

5.4 REGULATION OF LAND MARKETS TO ACHIEVE SUSTAINABLE LAND USE

Land market regulations have been and are still common in many countries. These regulations serve to protect the interests of those in political power, and in other cases they are introduced to protect the poor against exploitation, or they are introduced based on anti-market ideologies.



Capacity building, innovation and joint effort are important ingredients of success.
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Concerns about environmental consequences may call for regulation of land rental markets, particularly if the rental contracts are of short duration. Short-duration contracts can suppress investment incentives, leading to non-sustainable land management practices. Some evidence of that has been found in Uganda by Nkonya *et al.* (2008), however, the cause may not always be clear i.e. whether landowners prefer to rent out their poorly managed land, or whether poor management is a consequence of the land being rented out. This requires further investigation under diverse conditions since land renting has become so common and is on the increase in many parts of the world.

Land market regulations could require longer duration contracts, require them to be formalized and clearly show who is responsible for ensuring sustainable management. Well-intended regulations do not always have the intended effects. It is therefore not useful to introduce them unless there is a need and

if there is a need careful impact assessment should be carried out to test the effects of such regulations.

Land rental markets have high potential in Africa where most land is under customary tenure and is not surveyed. Unfortunately few African countries have strategies to promote land rental markets. Regulation of rural land rental markets should provide investment incentives with a view to promoting sustainable land use and management practices.

A well-regulated land rental market creates incentives, mainly conservation incentives for more sustainable land management. Short-term rental contracts are more likely to be associated with poor land management and this may lead to environmental degradation.

The regulation strategies should create incentives by:

- requiring contracts to be formalized and to be of longer duration to enhance tenure security

Box 5.6: Resettlement in Mumbai

Mumbai has a population of more than 10 million, half of which live in slums. More than 20,000 poor households were living risky lives along the railway tracks in Mumbai in illegally built shelters. These shacks were within 1-25 meters of the railway tracks, without access to water and sanitation. The attraction of low cost and short distance to sources of income outweighed the disadvantages of tenure insecurity, small space, risk of accidents, and poor basic services. The congestion of people along the railway tracks forces the trains to slow down, reducing the transportation capacity of the railway system. Accidents are frequent and the lack of sanitation forces the household residents to defecate on the tracks.

The World Bank partly funded a project to improve the railway system and to resettle railway slum dwellers. The World Bank resettlement guidelines help to protect the rights of the slum dwellers and require civil society participation in the formulation of the resettlement and rehabilitation plan. The National Slum Dwellers Federation was also represented and contributed to strong local participation in the resettlement process.

The sub-organization, the Railway Slum Dwellers Federation, started savings schemes, organized themselves into housing cooperatives, and negotiated access to land and infrastructure. They built their own houses using a mixture of their own savings and loans. Affordable low-cost standard houses were developed. The resettlement was combined with baseline surveys and movement of people in groups of 50 households. In one year about 60,000 households were resettled into better accommodation with piped water, sanitation and electricity and without any police involvement. This also improved the efficiency of the railway system.

- specifying who is responsible for ensuring sustainable management
- providing a local structure for registering these rental contacts

It may not be wise to uniformly enforce registration of all land rental contracts. It may be better to offer registration as an opportunity. This would then be done in cases when there is limited trust among the parties, for example when the tenant is an outsider.

5.5 LAND MANAGEMENT, ADMINISTRATION AND INFORMATION

National plans and regulations are critically important to protect large and valuable land resources that are threatened by environmental degradation or are in high demand. This is also the case where the livelihoods of large populations are at risk due to extreme weather events or sea water rise. Development of rescue plans, adaptation and mitigation strategies, monitoring and early warning systems are crucial ingredients to minimize the risks and costs.

For instance, GLTN and its partners can play a coordinating role to develop tools and contribute to capacity-building through arranging short courses, and mobilize political support.

Challenges are particularly large in certain countries with very large populations living in the coastal areas in some Asian countries. First priority should be given to providing assistance to the most vulnerable and poorest countries with the largest population under threat. Bangladesh can be singled out as the first priority country that will need assistance.

5.6 SLUM REHABILITATION AND RESETTLEMENT

The case study from Zimbabwe (Box 3.3) is a striking contrast to the example from Mumbai (Box 5.6). The latter may be considered a better practice. One related challenge is that slum areas that have been evacuated or cleared quickly can be filled with new slum dwellers, leaving no improvement in these areas.

Forced displacement of slum dwellers without adequate alternatives, resettlement options or compensations is the recipe for further social, economic and environment losses. Displaced urban dwellers tend to resettle on more marginal and vulnerable sites. Their source of and access to livelihoods are often severely undermined. Upgrading and reconstructing degraded urban environments such as slums is crucial in combination with providing good alternative resettlement areas.

Development of low-cost and incremental approaches is key due to the budgetary restrictions and the large and growing number of slum dwellers. More importantly, preventing and containing slum growth, especially on vulnerable landscapes would provide long-term gains.

5.7 LAND LAW, REGULATION AND ENFORCEMENT

Land laws are crucial tools for enhancing more sustainable land use. However, land laws can also be 'toothless' unless enforced. Development of improved land laws needs parallel dissemination of information about the content of the laws in the land administration system as well as other parts of national and local administrations that have an influence on land use (e.g. Ministries and Departments of energy, forestry, agriculture, transportation, and planning).

Furthermore, the public and land users themselves need to be informed. Universities and relevant education programs, research institutions, land user organizations, NGOs, and large private enterprises are all organizations that should help disseminate such information.

In developing countries with poor information access and low levels of literacy, it takes years before the contents of new land laws reach land users, if ever, before new laws are passed. The language of the laws is hard to understand for people with limited formal education. The new laws have to be translated into local languages before being disseminated. Popular formats conveying the essence of the law may be more suitable for dissemination than direct translations.

Knowledge may often not be a sufficient condition for behavior to be regulated according to the law. Many land users may have strong motivations to violate the law out of profit interests or even out of necessity. This is often the case for poor and vulnerable groups who must use scarce environmental resources as a safety net.

Well intended laws may in many cases have unintended effects while the intended effects were not realized.

Lawmakers often lack understanding of the local incentive structures which can be rather complex. Laws that were intended to protect some user groups could have the opposite effect. Public hearings of the content of new laws may reveal important problems. Pilot testing of the laws in some locations may also give insights about the likely effects. Follow-up monitoring and impact assessment can also reveal the extent to which the intended effects are achieved or whether unintended and unexpected effects occur.

New laws that are clearly contradicting traditions and current practice may require careful consideration, follow-up and enforcement mechanisms in order to succeed. Command and control vs. economic incentives are alternative or complementary mechanisms for enforcement.

It is not obvious what the most appropriate methods of enforcement are but pilot testing at a small scale gives valuable insights before scaling up. Local land administrations and land use planning committees at community level play important roles in the dissemination and enforcement of land laws and regulations. Box 5.7 provides an example of such interactive regulation of land management in Norway.

Box 5.7: Regulating autumn/winter plowing in Norway

Pollution of lakes, streams and rivers due to erosion and nutrient leaching from agricultural land has been a substantial environmental problem in Norway. Spreading of animal manure on the land during the winter was prohibited many years ago. Recently there has been a debate whether a general prohibition of plowing during autumn should be introduced for sloping areas close to streams, rivers and lakes. Such plowing has been a preferred land use practice by many farmers who plant winter wheat, the most profitable crop, or who want to renew old pasture fields. Prohibition of this practice would therefore have negative economic consequences for these farmers earnings. Farmers' organizations argue that there should be no prohibition and that it is sufficient to disseminate information and that would lead to a sufficient reduction of this kind of activity. They also argue that introduction of such a prohibition will only lead to more environmental bureaucracy. Some local political parties and environmental organizations argue for introduction of a prohibition and enforcement by reducing the agricultural support to those who violate the prohibition. They open the possibility of applying for exemption under certain conditions.

The final agreement made in one region between the local government and farmers' organizations was that farmers could cultivate up to 40% of their land area if this area was flat and not exposed to erosion. An additional requirement was to establish sufficient buffer zones near lakes, streams and rivers. The agreement also included compensating farmers who suffered economic losses due to the program.



Pikine, Dakar; houses of residents being destroyed © UN-HABITAT

Enhancement of sustainable land management through laws and enforcement in Ethiopia

The regional land proclamations in Ethiopia include articles that specify the duties of land users. An amendment came in 2002 to the 1997 rural land use proclamation for Tigray region that prohibits use of plants which affect the fertility of agricultural land but allows for planting of eucalyptus, cactus and other perennials on sloping land. This proclamation replaced an earlier one that prohibited planting of eucalyptus and cactus on arable land.

The amendment also included rules for punishment in cases of violation. Such punishments were relevant for households who do not conserve their land properly, who plant crops that affect the fertility of the land or other forbidden plants. The punishment was in form of cash fines in the range of US\$ 3–600.

A new rural land proclamation was introduced in 2006 and provided the basis for establishing land administration committees (LACs) in every community (tabia) and village (kushet). These committees are under district level Environmental Protection, Land Administration and Utilization Associations (EPLAUA).

While the previous proclamation did not specify how the law should be enforced, the new LACs are given this responsibility according to the most recent proclamation. The proclamation was followed up with a more detailed regulation in 2007. The regulation provides details on the composition of the LACs and their duties which include land administration, land use planning and conflict resolution related to land based on the law.

The LACs were established so recently that it is too early to assess their impacts in terms of implementation of the law. Surveys in 2006 and 2007 revealed that the knowledge of the law was very limited for many aspects of the law. The establishment of LACs demonstrates a focus on decentralized land administration that includes a legal backing for enforcing more sustainable land management. The region also has a strong tradition of implementing soil and water conservation through collective action in form of compulsory labor mobilization and food-for-work programs. Such programmes have included conservation of whole watersheds including private land.

The reasons for collective action on private land include the need for technical assistance in designing appropriate conservation technologies, the need to coordinate structures across farms, resolve disputes and mobilize labor. Each community has an agricultural development agent who is also involved in land administration and can help guide the work. Local conflicts are typically resolved with the help of local conflict mediators.

This can be seen as a good example where national laws have contributed to strengthened land tenure rights through land registration and certification which has stimulated more sustainable land management and investment (Holden *et al.*, 2009b). The recent changes in the law and establishment of local LACs have provided a stronger administrative system for law enforcement.

This may be characterized as a decentralized, transparent and participatory land administration approach for enhancement of sustainable land management. However, the approach needs further testing and possibly refinement to assess whether it can work.

Decentralization of land administration and management appears to be the answer but putting in place the decentralized institutions and equipping them to deliver can be a challenge. The other challenge is the customary tenure rules and practices over which statutory land laws are imposed. Enforcement in such an environment becomes a tall order.

5.8 PAYMENT FOR ENVIRONMENTAL SERVICES

Payment for environmental services (PES) can be seen as a way of creating markets where they do not exist and therefore cause environmental externalities that are so severe that they require action. Establishment of such mechanisms facilitates an internalization of the externality which may be seen as imposing a Pigouvian subsidy or tax which reflects the actual environmental costs or benefits involved.

The principles of PES include:

- (a) Those that provide the environmental service get paid for it
- (b) Those that benefit from the service pay for it
- (c) Payments are conditional
- (d) Participation is voluntary

PES may be particularly relevant to apply in relation to spatial externalities, e.g. where deforestation in the uplands by one group of landholders affects downstream land users negatively through erosion, siltation, and more irregular water flows. Here, the downstream landholders may be willing to pay upland landholders for conserving the forest to reduce deforestation and reduce the downstream damages.

Reducing emissions from deforestation and forest degradation (REDD) has emerged as a recent initiative that aims to reduce greenhouse gas emissions by providing incentives to individuals, communities, projects and countries. This will require development of similar mechanisms to create incentives for carbon sequestration by establishing market-like mechanisms to trade carbon.

Some of the challenges involved are:

- How easy is it to identify, measure and monitor the environmental services?
- How easy is it to mobilize the beneficiaries to pay?
- How easy is it to identify the service providers and ensure that they adjust their behavior and provide the service agreed upon?

The last question may also relate to the property rights arrangements. If the land rights are clear and exclusive for the areas that need to be conserved or planted with trees, it may also be easy to establish contracts that ensure enforcement. If ownership is group based, like for communal forests or possibly under a customary tenure system, payment could go to the group and the group could arrange the distribution of payments itself as well as utilize group arrangements for enforcement.

How effective this would be depends on the strength of the local institutions, the commitment and power of the local leaders, transparency and enforcement mechanisms. Here are potentially substantial transaction costs and information asymmetries that can lead to moral hazard, rent-seeking, free-riding, corruption and conflicts in environments with weak institutions.

There may still be confusion around the PES concept, including how it could be implemented. Questions that are difficult to answer include: who is going to pay? Who is to be paid? How to define the payment? Reservations about its applicability exist until these issues are resolved and pilot testing has revealed that it can work. Application of PES will require a careful analysis in each case to provide the answers to these questions as well as setting up an administrative mechanism to make such markets work.

Link between poverty and environment

There is a close link between poverty and environmental degradation. Environmental issues tend to be relegated to the most poor as people struggle to meet their daily livelihood. The environment is further compromised as people continue to depend upon trees to provide for their cooking fuel since other sources of fuel are beyond their reach. To meet the goal of improved environment needs the incorporation of strategies to combat poverty.

In addition, there has to be concerted effort to develop much cheaper sources of domestic fuel, alternative cheap building materials, poles and material for making furniture. Therefore, imposing an environmental tax on the poor household cutting down trees may not work and could make things even worse. The poverty and basic needs of people will have to be taken into account when designing smart PES schemes that can both reduce poverty and protect the natural resources.

Box 5.8a provides an example of a successful PES program in Costa Rica and Box 5.8b provides another example from China.

Box 5.8a: Payment for forestry environmental services in Costa Rica

Costa Rica's government serves as an intermediary, selling environmental services such as carbon sequestration and watershed protection to domestic and international buyers. The services are provided by private landholders under contract. Incentive payments are provided for forest protection and natural regeneration, sustainable forest management, and plantation establishment. Payments are made over a five-year period while the conservation commitment is for 15-20 years and includes establishment of a management plan. In addition a new Forestry Law prohibits conversion of forest lands and makes preparation of management plans compulsory.

The programme started in 1997 and was implemented on about 95,000 ha. Applicants to the program must provide legal proof of land ownership and provide a detailed management plan. These requirements impose transaction costs on landowners. These costs tend to be larger on small areas than on large areas due to an initial fixed cost.

The responsibility for monitoring and enforcement is with the local foresters but exact criteria for compliance assessment and penalties in case of violations were not specified. The largest potential demand for this type of service comes from the Kyoto Protocol through the Clean Development Mechanism. The CDM authorizes creation of certified emissions reductions through activities in developing countries that are bought by developed countries to meet national GHG emissions limits.

One of the many weaknesses of the Kyoto Protocol and CDM is that a dynamic baseline, which is a business-as-usual scenario, requires that the program create an improvement (called "additionality") as compared to the baseline. This improvement is not restricted to the actual area of conservation but should be an overall improvement such that so-called "leakages" should be taken into account. An example of "leakage" is increased deforestation in a neighboring area because wood cutting has been restricted in the conservation area. Leakages could also be due to effects on markets. For example, if the price of fuelwood goes up due to the project this could create incentives for more fuelwood extraction elsewhere (*Chomitz et al., 1999*).

5.9 PAYMENT OF RESOURCE DIVIDENDS

People who live in places needing land reform also tend to have an ethic of sharing. There is the custom of hospitality, even with strangers. There is the custom of lending aid to a relative who has had a misfortune. In some places, extended members of a family band together to buy a house.

To win acceptance of land taxes or land dues or land-use fees, it helps to not stress the tax aspect, but stress the sharing aspect. That is, it might make sense to couple land taxes or land dues with a land-rent dividend. That would help everyone understand that land value is a value generated by society and belonging to all society. Many places already pay a dividend: Alaska pays an oil dividend, and Aspen Colorado pays a housing dividend. Paying the dividend would be no harder than collecting the tax or dues.

In a place that has registered voters, wherever people go to vote, there each month they could pay their land dues and receive their “rent dividend”. Most people would get back more than they pay in, since poor people live on locations of low value, but every region has a city with areas of high value.

Poor nations have used land taxes before, including Taiwan, Jamaica, and Kenya. But they lost the tax because they did not pay a dividend. Nevertheless, if those places mentioned could solve the logistics of collection then so can other places today, and win popular support by tying the reform to the custom of sharing (www.geonomics.org).

5.10 PARTICIPATORY PUBLIC WORKS PROGRAMS AS SAFETY NETS

Food-for-work and cash-for-work programmes have been used both as a safety net for poor and food insecure households, to provide employment. They also supply labour for public projects like road building and maintenance, construction of buildings, soil and water conservation, irrigation dams, and tree planting. Recently the productivity-enhancing programmes have been renamed as productive safety net.

Public works programmes can target the poor and needy who are unemployed or underemployed, by providing them food and income in exchange for their labor. Such low levels of payment would then cause the non-poor not to compete for such employment.

However, such programmes require compulsory involvement if the primary objective is to finish an investment project. The degree of participation of local communities in the planning and organization of such public works programs also varies. Such investments are more likely to give lasting positive effects if they are demand-driven.

Food-for-work programmes have been applied at watershed level to enhance sustainable land management and can have several advantages such as:

- Mobilization of labor (collective action) for labor-intensive investments on common property land and possibly private land.
- Coordination of conservation of a biophysical unit like a watershed where there are advantages of a landscape approach

Box 5.8b: The Sloping Land Conversion Program in China

The Sloping Land Conversion Programme, also called the Grain for Green, was introduced in 1999 and is the largest land retirement program in the developing world. The environmental goals of the program are to reduce soil erosion and desertification and to increase China's forest cover by converting steep and marginal agricultural land. The goal is to convert 14.67 million ha of cropland to forests, of which 4.4 million ha was on slopes steeper than 25%. It covers more than 2000 counties in 25 provinces in the country and has a budget of 40 billion US\$. By 2003 it had retired 7.2 million ha. It is also the largest ‘payment for environmental services’ program in China.

The programme uses a public payment scheme but where individual landholders can volunteer to participate. Subsidies paid for conversion have been both in cash and in kind. The in-kind compensation has been in form of annual provision of grain subsidy of 1500-2250 kg/ha and free seedlings worth about 90 US\$/ha. The cash subsidy was about 36 US\$/ha. The subsidies last for 8 years for ecological forests, 5 years for economic forests, and 2 years for planting of grasses.

In this programme it is the government that pays the subsidies. No specific baseline has been established for the programme except the before conversion situation. The programme was implemented using a fairly top-down approach in terms of the choice of trees to plant, or what farm plots to include in the program. and participation was not always voluntary (*Bennett, 2008*).

- Provision of technical support to individual farm households and to groups of farm households that need to coordinate the conservation investments across farm borders

Good local institutions, commitment and support are important for such programs to work well. A source of funding of the incentives (food or cash) is also needed to ensure the safety net dimension of the programmes. Ideally, the investments could enhance the productivity of the local land resources and thus reduce the vulnerability and dependency on such safety nets in the future. Tenure security and clearly identified property rights are likely to be crucial to ensure lasting effects of such investment programmes (*Holden et al., 2006a*).

Such programmes have mostly been used in rural areas. Their potential for upgrading of urban slum areas is worth exploring, especially if they create employment for slum dwellers and upgrade public services.

International donors often provide funding for such programs that help in relief and emergencies. Disadvantaged and vulnerable groups can be sustainably rehabilitated through developing public lands with the donation from international communities through ensuring employment, income, education, enterprise, production and economic development.

Many food-for-work and cash-for-work programs in the past have only had short-term objectives and had no lasting environmental effects. Local participation in identification of priority investment and rehabilitation options is crucial to enhance the benefits from such programs.

The new productive safety net programmes should be more effective in this regard but careful impact assessments must be undertaken.

5.11 COLLECTIVE ACTION FOR ENHANCEMENT OF ENVIRONMENTAL SERVICES

Collective action may be relevant to protect and enhance environmental services. Such collective action is more likely to take place when there are large negative effects of inaction, while each individual's action reduces significantly the negative effect on him/her-self and on others. This is more likely to be the case for some environmental services and for certain groups and property rights. See Box 5.11 for a description of game theory.

There exist many successful collective action examples at micro level where communication and monitoring is easy and relationships are personal. This can also explain why common property regimes continue to exist in areas where population pressures are high and where there are more benefits than disadvantages related to collective management over individual management. This may be the case for common grazing lands and community woodlots.

Important group characteristics that enhance collective action are the level of trust among the members, the group size, their history and traditions for cooperation, the level of transparency, system for punishment in case of violations, system for conflict resolution and the degree of support from outside authorities (government).

Box 5.11: Game theory and collective action

Game theory has been used to analyze many kinds of collective action problems and has revealed that the problem is much more diverse than the one-period prisoners' dilemma game that was used by Hardin (1968) in his famous "Tragedy of the commons" paper. These variations include the pay-off structure in the game which may not always create incentives to defect. An example is the "chicken game" where defection by some parties creates incentives for others to take action. Another is the "assurance game" where cooperation by some creates incentives also for others to cooperate.

Examples of chicken games could be the organization of herd mobility in common grazing lands or the relationship between head-enders and tail-enders in an irrigation scheme when it comes to maintenance of irrigation canals. If the parties have the opportunity to interact and the game is repeated many times this also enhances the chances of collective action in cases when the pay-off structure is more like in an assurance game or prisoners' dilemma game.



Windhoek, Namibia: City Councils face many challenges in managing peri-urban growth. © UN-HABITAT/Remy Sietchiping

The heterogeneity of the group in some cases undermines cooperation while in other cases certain types of heterogeneity enhance collaboration. In cases where collective action fails to work it may be better to specify more individual property rights to enhance sustainable land management. It may also be difficult to implement big investment projects, like building irrigation dams, purely based on collective action. Such large investments require some additional funding and incentive payment (Baland and Platteau, 1996).

It is easier to promote collective action in small rural communities than large urban slum areas. Other forms of collective action may be promoted in neighborhoods when people feel tenure secure.

Law, regulations and law enforcement mechanisms are not enough in most countries. More important is consolidated and coordinated action for ensuring quality and standard of urban environmental services.

A strong urban environment monitoring agency is essential. An independent, powerful and capable urban environment protection force can be established.

5.12 INTEGRATED RURAL AND URBAN DEVELOPMENT

There are strong links between urban and rural areas through for instance migration as well as flow of resources, commodities and services. Rural and village development is considered crucial to reduce the inflow of migrants to urban slums.

Employment generation in both rural and urban areas is the key to further slum expansion. Land reforms can in some countries be the key to employment generation in rural areas. Organizing slum dwellers at village or group level and into cooperatives can be a good way to mobilize participatory collective action and training to improve urban livelihoods and environmental management and the same goes for rural livelihoods.

The fundamental problem is the lack of sufficient funding for investment in slum rehabilitation. A better tax system may in some countries (where sufficient surpluses are generated) be an additional solution. Decentralization of power and establishment of strong local administrations that use transparent and accountable processes to mobilize the local people are the way to go but there are many obstacles at the local and more central levels to such approaches. A focus on the political economy is, therefore, crucial.

There is a need to better understand why some rural development efforts have failed. For example, in Kano State in Northern Nigeria, there has been wrong prioritization of land resources development. The State has about 30 dams that are underutilized. The neglect to develop water resources for rural communities is responsible for the overcrowding in Kano City. Areas in Kano State whose land resources are developed for agricultural uses have the lowest rates of urban migration and even poverty.

Develop rural areas and you reduce migration and poverty in both urban and rural areas. Rural development alleviates poverty and increases incomes for both rural and urban folks rather than be viewed as a way to curb urban migration. Development of non-agricultural income earning opportunities in rural areas will be the key to poverty reduction.

One of the main factors contributing to the growth of slums includes lack of adequate incomes for urban dwellers to seek alternative housing solutions. The strategy towards improved or curtailed expansion of slums should include improved incomes for the poor.

5.13 PROVIDING TENURE SECURITY AND SLUM REHABILITATION

Increasing populations in urban areas makes it difficult to provide shelter and security of tenure for urban dwellers, especially for the poor and other vulnerable groups. Poorly managed rapid urban population growth in developing countries often leads to a rapid growth of slums and increasing environmental health problems.

Severe environmental degradation is one of the common features in developing country cities. Insecure tenure in informal (often illegal) settlements makes it also unattractive for poor households to invest in improving their temporary housing arrangements and adopt sustainable environmental practices. Conventional titling programs in such urban areas have often failed to solve many of the basic problems and may have forced poor slum dwellers to relocate in environmentally risk-prone and hazardous locations, further exposing them to natural disasters.

It appears that legal pluralism is preferable, combining ownership-based and rights-based approaches while taking into account the needs of the poor, their financial constraints and the limited capacity of urban land administrations. This also implies a continuum of land rights, including freehold tenure, leasing arrangements, public ownership, group tenure, and informal tenure arrangements (*Payne et al., 2008*).

Many alternative approaches to titling are being tested. Examples of these are:

- Provision of temporary occupational licenses, group ownership by community land trusts, and company or co-operative ownership and subdivision of land to members in Kenya
- Simple documentation of informal settlements in Egypt
- Cooperative housing in South Africa
- Provision of Certificate of Rights to use and develop state owned land in Botswana
- Temporary land rental in Thailand
- Recognition of illegal settlements in Indonesia
- Relocation of illegal settlers by providing land titles on nearby land in Cambodia
- Provision of registered leaseholds in squatter settlements in Brazil

Formal landlord-tenant property contracts in Bolivia (*Dey et al., 2006*)

There is a lot to learn by analyzing this large diversity of approaches and by piloting variants of them in other locations to assess the strengths and weaknesses of each. Little is known about how they will affect the urban environment and the costs of improving it.

The question of slums is closely related to housing/shelter rights or land rights. This is an area worthy exploring since its answer will greatly contribute towards achievement of one of the Millennium Development Goals. The other issue is the preferred strategies for housing provision for purposes of creating a stock of affordable houses for all. In the end legalizing and recognizing the continuum of rights is critical.

For urban slums, the group tenure might provide a more progressive approach. This consideration is based on the fact that it is quicker to create groups rights where the laws already exist. In addition financing, training and labor is easier to organize once a group of people are bound together.

Land sometimes becomes a liability for the poor owners who cannot afford the development cost. The reform policy can adopt supportive options for sustaining poor people such as low-cost housing on rental or small installment payment system, enterprise or credit financing, including a secured income and employment scheme. Public owned lands can be allocated for such projects and public-private partnerships can be used to implement such projects.

For the developing world, provision or enhancement of slum tenure security should not take the form of conventional titling.

The Namuwongo Slum Upgrading Project in Uganda is a classical example, like many other projects which failed to provide security of tenure through conventional formal titling. Most slum dwellers just sold the newly acquired leaseholds and invaded a wetland adjacent to the project area, creating a worse slum settlement in a fragile environment. Legal pluralism, implying a continuum of land rights and innovative approaches to tenure regularization, and provision of tenure security in slum/informal settlements are the best options for the developing world.

Uganda has contributed to the range of alternative, innovative and flexible approaches to security of tenure, by issuing certificates of customary ownership (equivalent to freeholds) but which do not require the strict and costly conventional surveying and titling procedures.

It is becoming clear that local and national governmental failure to provide adequate and serviced land for all social groups, particularly the poor, can only lead to more informal settlements in environmentally fragile areas.

Slum areas that have been evacuated quickly can be filled with new slum dwellers, leaving no improvement in these areas. Reconstruction in these areas may therefore also be crucial in combination with providing good alternative resettlement areas. Development of low-cost approaches is crucial due to the budgetary restrictions and the large and growing number of slum dwellers.

Slum dwellers centrally located in prime development land become the target for evictions. The trauma of evictions of urban poor people is mainly attributed to the social and economic disruption caused to those forced to move from their inner city homes, which would be cleared for land developers to make large profits by clearing the poor from inner city areas and holding the empty land for speculation.

In New Cairo City, provision was made for resettlement, but was too far from urban poor's places of work in greater Cairo's inner city areas. Whilst resettlement housing lacked sufficient infrastructure and services, other upgraded low-cost housing projects often ended up in the hands of middle-class groups.

Slums are inseparable parts of the urban areas. Slum dwellers serve the city residents but do not get entitlements. Their settlements are not recognized as a State obligation. The rehabilitation of slum dwellers must be a part of overall planned urban development. Provisions must be made for reserving a portion in the community for their rehabilitation on rental or low cost installment basis.

5.14 RESCUE PLANS FOR AREAS THREATENED BY SEA LEVEL RISE AND STORM FLOODS

Particularly vulnerable areas with large poor populations that are unable to protect themselves against sea level rise and storm floods need international and national support. Whether it is most appropriate to invest to protect their current livelihoods or to organize resettlement in safer locations depend on the relative costs of the alternative solutions. This will depend on the expected size of the necessary protective barriers that have to be built for protection, the distance to available alternative locations for resettlement, the size of the population, costs of building suitable resettlements, etc.

A long-term plan for gradual resettlement is preferable to an after-disaster resettlement. The latter will be more chaotic and will involve severe losses. In relation to such planned gradual resettlement, there are important property rights issues to be resolved. The property value of the properties lost may fall significantly but there is also a risk that evacuated areas and houses are likely to be occupied by opportunistic settlers.

In some cases it may be easy to identify suitable locations for resettlement not too far from the evacuation areas. In other cases this may be impossible, e.g. on some small island countries like the Maldives.

Further, it will be necessary to concentrate people on much smaller areas and provide alternative livelihoods there. Careful planning and specification of clear property rights will be essential to keep such resettlements under control.

The financial costs will be very high and clearly beyond what poor affected populations, communities, cities and countries can afford. Since the cause of the problem is also global, it is necessary to develop an international system for funding of such large-scale operations. This is an area where UN agencies could play an important role. Support will also be needed for building professional capacity to tackle such large resettlement schemes. Organizing a network of professional staff from threatened countries and cities is an important first step.

The national strategic planning mechanism of the developing world must emphasize the adequate rescue package for the vulnerable and displaced population. Protecting livelihoods through protecting land, water and natural resources remain more important for sustainability.

National governments can adopt larger scale development projects in collaboration with business communities, private sector and international stakeholders. In order to achieve better allocation of resources, cross-sector partnerships should be integrated in urban coastal planning policies for climate change mitigation initiatives which involve local people, land developers and urban planners.

The links between climate change, prioritizing land issues in the UN system and combating desertification, land degradation and drought must be prioritized in the political and policy space being created in the international debates on climate change.

Joint appropriate synergistic responses, in the broader, coherent UN System, that simultaneously address land degradation and climate change are essential. Priority should be given to soil health and enhancement of soil productivity, particularly in the drylands, with emphasis on water resources development, rangeland management and improved livestock production to handle the vulnerability associated with land degradation and unreliable weather.

6. CONCLUSIONS

This report has provided an overview of some of the most important land-related environmental problems that the world faces in the 21st century. The lion's share of the land under consideration is located in rural areas while at the same time (from 2008) more than 50% of the global human population lives in urban areas.

Globalization is causing countries, rural and urban areas, poor and rich people to be increasingly interdependent as demonstrated by the recent energy and food price hikes, the financial crisis, and the threats from climate change. International cooperation to develop global solutions to these challenges will be of utmost importance.

The UN system and international organizations must play a key role in helping build stronger institutions at global, national and local levels to support more efficient and sustainable land and resource management.

This report has identified the most important land-related environmental challenges that threaten the livelihoods of poor and vulnerable populations in the developing world. These challenges include land degradation due to soil erosion, nutrient depletion, and deforestation, rising sea level due to climate change, weak land rights causing tenure insecurity and marginalization of poor people due to increasing demands for land, for food and energy production, extreme weather events in the form of droughts, floods, and storms that

may become more frequent with global warming.

Many research and knowledge gaps exist. For instance, more research is needed to identify the prevalence of tenure insecurity that causes environmental degradation. Therefore the necessary solution to the problem may be land rights reforms that enhance tenure security. Land reforms have too often ignored this issue, taking for granted that their effect would be strengthened tenure security. Reforms should be more specific about whose tenure rights are to be secured.

Important tools for enhancement of land rights of the poor include; low-cost land recording, registration and certification, low-cost land use planning and mapping, introduction of laws that facilitate better functioning land rental markets and sustainable management of rented land. The relevance of these tools and their exact design has to be considered and adjusted to local conditions. Pilot-testing should be the rule before scaling up.

Political economy factors represent the most important constraint to successful reform programmes. Pro-poor land reforms in many countries face serious constraints from elite capture of reforms, resistance against and prevention of reforms that threaten the interests of the wealthy landowners, and rent-seeking behavior leading to over-exploitation of resources.

International efforts are important to enhance the transparency and accountability of the key stakeholders in situations where the poor easily lose out. The recent large-scale land deals in African and Asian countries in response to bio-fuel demand and resulting food price increases is an area where international organizations can help poor countries and local people in the negotiations to develop contracts that protect their interests.

Establishing better standards for transparency and accountability and increased international pressure and support to implement such standards will be important to reduce levels of corruption, elite capture, and “resource curse” outcomes.

Design of Payment for Environmental Service (PES) schemes as a way to create markets for resources that are threatened by degradation and consequently also for their maintenance and improvement, can become important policy tools in the future. However, this requires innovative designs and careful pilot testing before they are scaled up.

The poverty of land users and the poverty reduction effects of PES schemes will be important design considerations. The climate negotiations will also be instrumental for the design as well as funding of such schemes. It is obvious that the definition and enforcement of legal resource rights will play a key role in implementing schemes to achieve the desired impacts. Transparency and accountability will be crucial to control hazard and identify impacts.

Productive safety nets are useful tools to conserve natural resources and enhance productivity, while providing employment opportunities for poor and vulnerable people. The potential of such productive safety nets for

urban slum rehabilitation should be further explored. Strong local participation in setting priorities as well as management of the programmes is likely to be crucial for success.

A progressive land and resource dividend system, if introduced, may mobilize idle land from large land and resource owners for more efficient use in countries with unequal land and resource distribution. However, to succeed it is crucial to frame such a dividend system in a palatable way to build sufficient public support for its introduction. GLTN can take a leading role in piloting and promoting the use and scaling up of such land tools.

Rural development and urban development are closely linked through migration, flow of resources, commodities and services. The problem of expanding slums cannot therefore be seen as exclusively an urban problem as they are largely filled by immigrants from rural areas. Slums may be seen as a leaking boat: new migrants flow in as earlier slum dwellers are rehabilitated or moved elsewhere. The problem can therefore only be tackled at a broader scale requiring both rural and urban development.

Sea level rise will be one of the most difficult challenges to handle in certain coastal areas and island states. The industrialized countries have largely caused the problem and should thus share the responsibility for helping the poor countries that are severely threatened by climate change effects. The outcome of future international negotiations related to climate change will set standards and determine the amount of resources that can be mobilized at the global scale.

UN-HABITAT/GLTN has competence in the areas of land rights and land administration, land use planning, land law and regulation,



Extreme flood events will be more frequent as the planet heats up.

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and can contribute substantially towards more sustainable land management by giving stronger focus to this in its core areas of competence. Environmental issues can be integrated systematically in all areas as a cross-cutting issue.

GLTN can contribute by further developing low-cost approaches to land registration and administration that explicitly address the need to enhance sustainable land management and that are fitted to the capacity and needs in poor countries. Low-cost methods of enhancing transparency and accountability should be developed. This is an area which requires further research and pilot testing before scaling up.

At the same time, UN-HABITAT may take special responsibility for some of the most important new environmental challenges. This report suggests that UN-HABITAT should give first priority to finding solutions to the threat of sea level rise, where most cities and towns are located, due to climate change. This is a severe threat in some densely populated and poor countries – like Bangladesh - and small island states. It is clear that this is an area where the international community and especially the richest countries that generate the lion's share of carbon

emissions have a major responsibility in providing funds to compensate those who will lose their livelihoods due to climate risk.

UN-HABITAT may play an important role in the development of adaptation strategies for the poorest and most vulnerable countries, cities, and islands. The development of international agreements on compensation, identification of alternative locations for resettlement, mobilization of funding, building local competence and capacity to handle the problems in the countries facing the greatest threat are some of the areas where UN-HABITAT can make a significant difference, particularly in cases where resettlement is needed.

Alternative livelihoods will have to be identified but where these environmental refugees will go is a major question. Is alternative land available in the neighborhood or will they have to look to the rest of the world for help and apply for immigration somewhere? Should people be moved before catastrophic events occur in areas under greatest threat and where good protection is impossible or extremely costly? The report concludes that this should be the main future challenge of UN-HABITAT.

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ANNEX 1. CONCEPTS IN EVALUATING ALTERNATIVE POLICIES

Transaction costs:	Costs related to carrying out transactions. Includes costs related to search, formation of contracts (negotiation), monitoring, and enforcement. High transaction costs can make it very costly or impossible to establish markets for certain environmental services.
Asymmetric information:	Unequal access to information has important consequences for how an economy is organized. Obtaining information is costly and information asymmetries can be exploited. This leads to moral hazard and adverse selection and is particularly important for the functioning of credit, insurance and labor markets. Difficulties of collecting information which may be essential to monitor environmental management can be a basic constraint to better environmental management.
Moral hazard:	The risk that the presence of a contract will affect the behavior of one or more parties. An example is the risk to an insurance company resulting from uncertainty about the honesty of the insured. Another example is corruption where officials do not perform their duties but allow illegal actions in exchange for bribes. Misuse of power can take many forms and have very severe consequences that can have severe environmental as well as human impacts.
Adverse selection:	In a market where buyers cannot accurately gauge the quality of the product that they are buying, it is likely that the marketplace will contain generally poor quality products. The consequences of transaction costs and asymmetric information are that some markets do not exist, like missing insurance markets in some risky environments, rationing is occurring in other markets, like that for credit, and many prefer not to participate in markets because of entry barriers and price bands.
Market imperfections:	Deviations from perfectly competitive markets. Perfectly competitive markets imply that there are no transaction costs and information asymmetries. Market imperfections include missing markets, markets with price bands, partly missing markets (rationing, seasonality), thin markets (imperfect competition), and interlinked of markets (e.g. share tenancy, barter trade).
Market failure:	Market imperfections that cause inefficiency. In such cases it is possible to intervene (introduce a policy) such that efficiency can be enhanced in the economy implying that some can be made better off without making anybody worse off. Not all market imperfections can be eliminated due to pervasive transaction costs, asymmetric information, non-rivalry and non-exclusiveness of public goods or bads. In a second-best world with transaction costs there are Pareto-irrelevant externalities and pervasive market imperfections.
Externality:	Failure of markets to form can be caused by undefined property rights. A deviation between private and social marginal costs/benefits, e.g. unpaid factors of production (like synergies between apples and bees production), public goods and bads (e.g. pollution). Can also be caused by economies or diseconomies of scale (Pigou).
Environmental externality:	This is an externality that causes a sub-optimal production of environmental services. The different types of land degradation that were presented in the beginning of chapter 2 are examples of environmental externalities.
Spatial externality:	Activities in one part of the landscape affect agents in another part of the landscape without compensation, e.g. deforestation by some agents in the hills cause siltation and floods for other agents in the lowlands.
Inter-temporal externality:	Activities at one point in time have effects on others at a later point in time, e.g. GHG emissions leading to climate change or non-sustainable agricultural practices leading to future loss of land productivity.

Pecuniary externality:	This is an externality in form of a price distortion due to general equilibrium effects, e.g. population growth in or immigration to an area leads to increasing demand for land and increasing property values which make it harder to enter the property ladder.
Common property:	Property owned equally by all members of a group.
Public good:	A product (i.e., a good or service) of which anyone can consume as much as desired without reducing the amount available for others ("pure" public good).
Congestible good:	Non-rivalry in consumption at low levels of demand and rivalry at higher levels. An example is traffic congestion when there are too many vehicles relative to the capacity of the road system.
Rivalry:	Use/Consumption by one reduces what is available to others. Non-rival goods = pure public goods.
Exclusiveness:	Possibility of excluding others from use or consumption of a good/resource. Non-exclusiveness is due to prohibitive high costs of exclusion for some goods/resources. This has implications for the introduction and enforcement of property rights. The high cost of fencing/dividing communal grazing lands to individuals may be an important reason for retaining such non-exclusive property regimes. Fencing may also eliminate or reduce an important flexibility of a collective property regime that allows animal mobility.
Environmental services:	This refers to qualitative functions of natural non-produced assets of land, water and air, including productive services (inputs in production), consumption and consumer services (clean air, residence, recreational services), and disposal services (sink for waste, pollution).
Payment for environmental services:	This is a way to intervene where there was no market for environmental services, in other words, a way to internalize a positive environmental externality and enhance its provision or a way to reduce a negative environmental externality.

THE GLOBAL LAND TOOL NETWORK

The main objective of the Global Land Tool Network (GLTN) is to contribute to poverty alleviation and the Millennium Development Goals through land reform, improved land management and security of tenure.

The Network has developed a global land partnership. Its members include international civil society organizations, international finance institutions, international research and training institutions, donors and professional bodies. It aims to take a more holistic approach to land issues and improve global land coordination in various ways. These include the establishment of a continuum of land rights, rather than a narrow focus on individual land titling, the improvement and development of pro-poor land management, as well as land tenure tools. The new approach also entails unblocking existing initiatives, helping strengthen existing land networks, assisting in the development of affordable gendered land tools useful to poverty-stricken communities, and spreading knowledge on how to implement security of tenure.

The GLTN partners, in their quest to attain the goals of poverty alleviation, better land management and security of tenure through land reform, have identified and agreed on 18 key land tools to deal with poverty and land issues at the country level across all regions. The Network partners argue that the existing lack of these tools, as well as land governance problems, are the main cause of failed implementation at scale of land policies world wide.

The GLTN is a demand driven network where many individuals and groups have come together to address this global problem. For further information, and registration, visit the GLTN web site at www.glt.net.

ABOUT THIS PUBLICATION

This publication provides an overview of some of the most important land-related environmental and climate change problems that the world is facing. Land, Environment and Climate Change offers an overview of the relationship between land tenure, land management approaches and the environment. This document identifies clear linkages between land, environment and climate change, moving from a scientific framework to a country level implementation framework. The implications this has in urban and rural areas are presented, and illustrated with 20 brief cases.

This global overview of key environmental and climate change issues related to land use, land administration, land management and land tenure offers timely material and land tools for land professionals, environmental practitioners, and planners. The report identifies opportunities, gaps and priority research areas and critical land tools for action at local, sub-national, national, regional and global levels. Readers will find in this publication action-oriented suggestions for new research, land tool development, advocacy, resource mobilisation, and coordination.

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