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In partnership with the School of Environmental Sciences, University of KwaZulu-Natal, Durban, South Africa.

MAKE PEACE HAPPEN 2010

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ACCORD
THE AFRICAN CENTRE FOR THE CONSTRUCTIVE RESOLUTION OF DISPUTES

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UNIVERSITY OF KWAZULU-NATAL

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The *African Journal on Conflict Resolution* is a biannual peer-reviewed journal published by the African Centre for the Constructive Resolution of Disputes (ACCORD) for the multidisciplinary subject field of conflict resolution. It appears on the list of journals accredited by the South African Department of Education. ACCORD is a non-governmental, non-aligned conflict resolution organisation based in Durban, South Africa. ACCORD is constituted as an education trust.

The journal seeks to publish articles and book reviews on subjects relating to conflict, its management and resolution, as well as peacemaking, peacekeeping and peacebuilding in Africa. It aims to be a conduit between theory and practice.

Articles and book reviews may be submitted by e-mail, as Microsoft Word attachments, to the Managing Editor of the journal at malanj@accord.org.za, with a copy to ajcr@accord.org.za.

Articles should be of good academic quality, and should be between 6 000 and 8 000 words in length. An abstract of between 100 and 200 words and a few lines about the author should be included. Book reviews should be between 1 000 and 1 500 words.

All references, according to the Harvard method, should be included. As far as possible, in-text references should include the page numbers of the sections of sources referred to. In the case of a direct quotation, the exact page number is absolutely necessary. For the purpose of adding extra details, comments or references which may distract attention from the argument in the text, footnotes may be used sparingly. For more information about the referencing system, please see the excerpt from ACCORD's Style Guide, which is available at <http://www.accord.org.za>.

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Contents

Foreword

Jannie Malan

The foreword of our previous issue, a regular one, began as follows: 'All of the articles appearing in this issue are on the wavelength of our journal's name and ACCORD's name. They come with case studies about the attainment of conflict resolution or the orientation towards conflict resolution.' This issue is a special one, on the theme of *environment and conflict*, but its thrust is interrelated with that of our regular issues. This one is mainly focused on our *spatial* environment, but each article actually deals with some aspect of the interaction between the spatial and the *social* environment. The contents of our regular issues are mostly focused on the social environment, but quite often there are specific references to consequences for the spatial environment.

The topics in this issue remind one of what Sicilian philosopher Empedocles, 25 centuries ago, regarded as the four root 'elements' in nature: fire, air, earth and water. We read about climate change due to global warming, air pollution, land issues and coastal issues, and then also about land inhabitants – animals, and humans of both genders. We get a sense of the urgency of conservation. It may be thought-provoking to note that long before the time when the global human population began increasing by logarithmic leaps and bounds, Empedocles already emphasised that the existing physical matter could not be increased or reduced, but could only be 'combined or separated'. At the same time, however, he also tried to probe the invisible forces behind physical processes, and his

thoughts turned towards the cosmic might of love and of hate. He seemed to have sensed something of our human interrelatedness with our physical environment.

As we read about environmental problems and conflicts of our day, it may therefore be a good exercise to think back over at least 25 centuries and think forward at least 25 centuries – although such 'long' periods are only split seconds in cosmic terms. But if we are reluctant to undertake mind-boggling thought experiments, we may at least pause to think briefly about a few generations of our ancestors and a few generations of our descendants. Then, especially bearing in mind a scenario of the environmental situation our children's children and their children's children will have to cope with, we may turn our thoughts to our current situation.

A fairly small proportion of our global human population seems to have, to some extent, taken note of the worrying fact that our physical and biological environment is under threat. The public media are disseminating news items about global warming: changing statistics, conclusions of seminars, statements of conferences, and reactions of political leaders and business bosses. But it seems as if most of the warning signals and wake-up calls are received with little more than a temporary raising of eyebrows and shrugging of shoulders. Fortunately, however, some impact has already been made by environmentally concerned movements and more and more people seem to be acquiring a green, or at least a greenish, mindset.

With this special issue then, we wish to contribute something from our side. We trust that this set of articles will communicate and spread a very relevant and much needed message. The implied background of this message is obviously that our spatial environment has remained remarkably sustainable over millions of years, but that in the fairly recent past some human 'developments' have begun to threaten the natural sustainability. At first, the harmful impact on our environment was regarded as negligible – if it was noticed at all. The attention and pride were focused on the achievements of inquisitive and creative human beings – such as the discovery of fuel reserves and the designing of the internal combustion engine. Ad hoc threats to themselves, for instance the carbon

monoxide danger, were taken seriously, but were not allowed to dampen the general enthusiasm about machinery, mobility and luxury. By now, however, the threats we short-sighted humans are imposing on nature have become absolutely non-ignorable.

The environment-related problems and conflicts discussed in this issue arose in local situations, where few people, if any, were concerned about the future of our global environment. But in one way or another, each of them may serve as an eye opener – in two ways. First, a local conflict may highlight an urgent need for balancing short-term gains and long-term resource management. Second, such a conflict may and should make us very much aware of our interrelatedness – with air, water, earth and fire, *and* with fellow-humans. So, as we read about environmental conflict and conflict resolution, we may feel the urge to revisit and modify our behaviour with regard to our spatial environment and our social environment. After all, each one of us is interconnected with nature, from its micro to its macro levels. *And so is everyone else around us.* We cannot opt out of our inevitable accountability. We are privileged to live on the living organism-friendly surface of planet Earth, and we are obliged to let other living organisms – of both genders – live.

We sincerely thank the authors of these articles for sharing their accounts, findings and recommendations with us and we appreciate our opportunity of passing such existential and *co*-existential material on to our readers.

Environmental conflicts: Key issues and management implications

*Urmilla Bob and Salomé Bronkhorst**

Abstract

Environmental conflicts have emerged as key issues challenging local, regional, national and global security. Environmental crises and problems throughout the world are widespread and increasing rapidly. In relation to these concerns, the article discusses the following aspects: people and the environment, environmental conflicts, climate change and environmental conflicts, and management implications. The section on people and the environment illustrates the range of ecosystems services provided, interactions, relationships and issues pertaining to access. Specific key types of conflicts as well as the main manifestations and implications of these conflicts are examined in the next section, which includes biodiversity, environmental air quality, forestry, water, land and natural resource management conflicts. This is followed by a discussion of the impacts of climate change in relation to environmental conflicts. Finally, the discussion focuses on managing environmental conflicts. Key aspects of the final section pertain to available tools and approaches, and recommendations arising from the articles in this issue.

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Introduction

The association between the environment and conflicts is varied and complex. The causes of environmental conflicts vary across the globe and their manifestations differ considerably. Causes can range from control over vital environmental resources such as fossil fuels to contestations over natural resources at the community and/or household level. Conflicts can manifest in various ways – from outright wars and even genocide to disagreements at the local level. There seems to be agreement that while conflict depends on the actions (not necessarily violent) of actors, it relates to incompatibilities. In fact, Wallensteen (2007:13–15) argues that conflict is formed of three parts: incompatibility, action and actors – and therefore a 'complete definition' of conflict is 'a social situation in which a minimum of two actors (parties) strive to acquire at the same moment in time an available set of scarce resources' (Wallensteen 2007:15).

The African Centre for the Constructive Resolution of Disputes (ACCORD 2002:4) also argues in a similar vein that conflict is:

> ...a state of human interaction where there is disharmony or a perceived divergence of interests, needs or goals. There is a perception that interests, needs or goals cannot be achieved due to interference from the other person(s).

Whatever form conflict takes, it is likely to have several impacts (albeit at different geographical scales) which may include physical harm to both humans and the natural resource base, impact on productivity levels and economic development more generally. The articles in this special issue highlight that environmental change and conflicts affect livelihoods and health, and exacerbate poverty and inequality, with women often carrying a disproportionate burden. The focus on environment and conflict alludes to the myriad influences that human beings exert over the earth's natural resource base and processes and to the way in which natural events, processes and even environmental protection can affect human life. There is also

growing consensus in both the academic and political spheres that people are exerting increasing control over the natural environment with a range of consequences. Furthermore, the phenomenon of privatising nature in its many forms (especially land ownership) is prevalent. Humans have and continue to compete for control of the natural environment, while it is used as a sink for the effects of global economic growth. However, what is becoming clear is that the natural environment can fight back. This is most noticeable in the increase in natural hazards (droughts, floods, etc.), the concern over global warming with resultant extreme climatic events and the problems associated with invasive or alien species.

This special issue is aimed at presenting key issues relating to environmental conflicts and exploring the nexus between environmental considerations and increased conflict on the African continent. In particular, while environmental conflicts are on an increase, it remains a relatively neglected field of research. This article together with the articles in this issue highlight the importance of critically examining environmental conflicts, related impacts on both humans and nature as well as the need to consider management aspects.

People and the environment

Daily (1999, cited in Le Maitre et al. 2007:369) identifies a range of ecosystems services provided by nature, which include:

- Stabilising and regulatory processes: purification and maintenance of the gas composition of the air, regulation of the hydrological cycle, partial stabilisation of climate, moderation of weather extremes, and control of the majority of potential pest species.
- Regeneration processes: generation and renewal of soil fertility, purification of water as well as the detoxification and decomposition of wastes, pollination and dispersal of seeds/spores necessary for revegetation.
- Production of goods: food, durable materials and industrial products, genetic resources and pharmaceuticals.

- Life-fulfilling functions: aesthetic beauty, serenity, scientific discovery and preservation of options for the future.

This range of ecosystem services shows how critically important these processes are to the functioning of the Earth's systems and to human survival, livelihoods and lifestyles, and vice versa. Nature as a resource therefore provides, either directly or indirectly, material needs for food production, living space, health maintenance (including provision of medicines) and supply of energy and livelihood materials (Bob et al. 2008:17).

There is widespread recognition and acceptance that the Earth's resources are finite and that they operate in the context of a single yet complex and interrelated system. Steffen et al. (2004:2) state:

> The environment at the scale of the earth as a whole – the passing of the seasons, the vagaries of weather and climate, the ebbing and flowing of river systems and glaciers, the rich diversity of life in all its forms – has been something within which people have had to operate, subject only to great forces of nature and the occasional perturbations of extraterrestrial origin. Earth's environment has been a bountiful source of resources as well as a remarkably stable life support system that has allowed human civilisations to develop and flourish.

There is therefore an intricate and inextricable relationship between *Homo sapiens* and the development of societies. Over time, the control humans have over the environment has increased considerably and today people are the main custodians and consumers of the natural environment. In fact, largely due to the sheer size of the global population and our activities, a dramatic transformation of the Earth's environment and natural systems (global change) is clear, demonstrating that the abundance of nature and its ability to adapt to and absorb human impacts are under serious pressure (Steffen et al. 2004:2). Economic activity, for example, has increased nearly tenfold between 1950 and 2000 (Steffen et al. 2004:2). During the same period, the world's population doubled from less than 3 billion to 6 billion. The world's population now is more tightly connected than ever before because of globalisation of

economies and information flows (Steffen et al 2004:2). In this issue, Ahmed (2010) highlights the importance of population growth in contributing to environmental conflicts and degradation in coastal zones. Moodley et al. (2010) explore the linkages between the Rwandan genocide, high population growth and density, the struggle over land, and how a resource such as land can be manipulated to incite people to violence. These cases show that to meet the United Nations' Millennium Development Goal of halving the number of people living in extreme poverty by 2015 without using the massive resource subsidy from nature in ways that may prove environmentally catastrophic, individuals, communities and countries will have to be required to design poverty reduction strategies that are consistent with resource conservation objectives (Barrett et al. 2005:193).

On the other hand, natural or human-induced environmental conditions (including rain patterns, natural hazards such as earthquakes and tsunamis, slopes and terrain, availability of water resources, and quality of land) can also be a critical source of vulnerability and insecurity for people. Some of these conditions such as climatic conditions and natural hazards can strain household and community coping strategies. Poor communities in particular are at risk because they are exposed more frequently to such shocks and they do not usually have the necessary infrastructure and resources to cope with them. The importance of coping and adaptation capabilities is highlighted by Reuveny (2007:661): 'The key issue is not how strong a disaster is per se, but rather how strong it is relative to the ability of people to withstand it'.

Access to natural resources and assets is also vital to achieve livelihood security, especially in poor communities and households that often rely directly on natural assets to ensure daily survival and livelihoods. However, livelihood activities can often destroy the natural resource base by over-use and degradation, which can contribute to desertification, deforestation, soil erosion, declining water tables and other types of environmental damage – that in turn affect livelihoods. Often, in vulnerable contexts where resources are limited, the lack of alternatives results in increased environmental degradation that leads to higher levels of poverty and risk, partly causing what is generally called the poverty trap. Often also, the resultant impacts are

increased household and community conflicts as individuals compete over declining resources.

In this issue, the role that vulnerability plays in conflicts is emphasised by a number of the authors. For example, Perry et al. (2010) examine how vulnerable women in particular are often disproportionately affected by environmental change and environmental conflicts because of gendered power relations, especially in terms of control of and access to resources such as land. Jaggernath (2010) examines how economic growth and industrial development, environmental racism and air pollution can lead to conflicts, when poor and marginalised racial groups suffer the environmental and health consequences of development.

In light of such interactions between the environment, people and conflicts, it is therefore important to understand how ecosystems function and respond to changes (whether natural or human-induced). As Ashton et al. (2005:449) state, 'ecological processes are important from a human-needs perspective, for the goods and services they provide'. Many environmental conflicts are related directly to this aspect as people attempt to secure control over natural resources.

In this issue, Okech (2010) addresses one element of such control, that of environmental conservation, where biodiversity is protected, often by excluding people from making use of certain environmental goods and services in a particular region. Bob (2010) also highlights the dilemma between conservation and restitution claims under land reform in Sub-Saharan Africa, where people were once forcefully relocated to free areas for conservation. Because of the complex nature of and delays in dealing with such land claims, some conservation areas have been illegally occupied (Bob 2010), likely leading to environmental degradation and fuelling of conflicts.

Environmental conflicts

Several authors (Castro and Nielson 2003; Yasmi et al. 2006) argue that conflict emerges when stakeholders have irreconcilable differences or incompatible interests, values, power, perceptions and goals. Furthermore, if unresolved

or not managed, conflicts are likely to escalate and intensify. White et al. (2009:244) state: 'What distinguishes conflicts from mere disagreement is thus a behavioural expression of formerly latent attitudes where one party is perceived to take action at the expense of another party's interests'. Some examples of expressions of conflicts are threats, beating, appropriation, insurgency, skirmishes, and interstate or intrastate wars (Reuveny 2007:656). Competition for finite environmental resources, divergent attitudes and beliefs as well as institutional factors trigger and exacerbate such environmental conflicts (Hellström 2001). The issue of scarcity, whether perceived or actual, is a crucial component of understanding environmental conflicts. Broadly, scarcity conflicts characterise most environmental contestations and disputes addressed in this issue.

Numerous types of environmental conflicts are identified in the literature and include:

- *Biodiversity conflicts*: conflicts between people about wildlife or other aspects of biodiversity (White et al. 2009:242). This also includes conflicts relating to conservation of protected areas, green technologies as well as fair trade and patenting rights in relation to biodiversity and indigenous knowledge linked to natural resources. These conflicts can occur internationally and have serious regulatory and policy implications. Impacts on the natural resource base in terms of land clearing for development and agricultural production as well as the effects of genetically modified crops on biodiversity are important considerations as well. There is evidence to suggest that if conservation and environmental management policies are not formulated and implemented in a holistic way to balance the needs and interests of conservation and people, it can lead to conflict. For example, in this issue Okech (2010) finds that in Kenya environmental protection and management can create situations where 'people become the victims of animals' and then retaliate by killing animals for bushmeat or to protect their crops or cattle from disease and predators. Linked to biodiversity conflicts are natural resource management (NRM) conflicts. Yasmi et al. (2006:538) highlight that conflicts, many of which include violence, in NRM are on an increase and

are complex because of multiple actors and the wide range of issues and management strategies. However, what is important to underscore is that conflicts over environmental resources can result in violent conflicts and this can transcend nation-state boundaries.

- *Coastal zone conflicts.* Conflicts in coastal zones are interesting in that they could develop from a combination of other types of conflicts. In this issue, Ahmed (2010) considers such conflicts in particular and highlights that coastal areas are unique in the dynamics they produce around environmental conflicts. This has to do with high development demands, high population density, environmental degradation and importantly, poor and disjointed management to balance conservation and development. The author highlights two types of coastal zone conflicts – those related to ecosystem change and those related to coastal development.

- *Conflicts disproportionately affecting women.* Women are often vulnerable in the broader sense (physically, economically, socially and politically) and therefore often carry a disproportionate brunt of the effects of environmental conflicts and stress. A number of authors in this issue highlight this point. Perry et al. (2010) assert that while the actual costs of environmental conflicts on women are multifaceted and hard to measure, women often experience greater food and economic insecurity, and are affected by unsafe or illegal practices. Omolo (2010) found that women in pastoral communities in Kenya are made vulnerable through cattle raids, which are often the result of droughts. Bob (2010) also highlights that apartheid-induced land scarcity has led to women being abandoned, experiencing violence and widows being dispossessed of land.

- *Conflicts about air quality and noxious pollutants.* This is a key type of environmental conflict – prominent in the literature and in this issue (see Jaggernath 2010) – that relates to issues pertaining to social justice and the right to live in a healthy environment. Mix and Shriver (2007) focus on local resident perceptions and concerns. It is important to note that these studies also highlight divergent perceptions over environmental threats,

> which are important in terms of managing these conflicts. Furthermore, an important theme is environmental racism and the links between poverty and vulnerability. While most conflicts relate to demonstrations and legal disputes as local residents and environmental activists mobilise communities to assert their rights, there are also incidences of violent conflicts. Environmental conflicts associated with air quality issues, such as in the case of the South Durban Basin (SDB) in South Africa, often also receive considerable media attention.

Other key types of conflicts include land and water conflicts, which are discussed below.

Land conflicts

Globally, but particularly in Africa, a significant proportion of people is dependent on land to make a living. As noted by Kok et al. (2009:42):

> The importance of land in conflicts relates to people's ability to make a living or make a profit. Land scarcity or ambiguous property rights can contribute to grievances and violent conflict. This is particularly the case when alternative livelihoods are absent, and is often exacerbated when communities are armed…Moreover, when land contains valuable mineral resources, conflicts can arise between local communities and those who seek control over land for resource extraction…Population growth and movement, international markets, insecure property rights and legislation, climate change, environmental degradation and a myriad other factors all appear to be variables that need to be tracked in analysing conflicts where land plays a role. Finally, desertification, unsustainable use or drought can bring communities with competing livelihoods into further conflict.

In this issue, Bob (2010) considers land conflicts in Sub-Saharan Africa. The author draws attention to the many reasons and complex interplay of issues that can lead to conflict, such as the role of power in securing land tenure and the way poverty and inequality often limit access to land. Land can also be

used as a tool for manipulation by those with power. Moodley et al. (2010) for example emphasise the key role that land played in the Rwandan genocide. Land was not the primary reason for the genocide, but became a tool whereby ordinary citizens, whose livelihoods were increasingly vulnerable because of shrinking sizes of land, were incited to kill and take their neighbour's land and belongings. The authors also highlight the vicious feedback circles where the genocide led to environmental degradation and deforestation, in turn creating tensions.

Water conflicts

Klare (2001:57, cited in Gleditsch et al. 2006:362) states that by 2050 the increased demand for water could produce 'intense competition for this essential substance in all but a few well-watered areas of the planet'. Countries that share rivers therefore have a higher risk of military disputes or water wars (Gleditsch et al. 2006:361). Furthermore, several countries rely on water sources from outside their boundaries. Local and international competition over water resources will increase. This is likely to have impacts on national security as well as threaten livelihoods at the local level. The water itself is not only a source of conflict, but the resources in the water bodies, specifically fish, are also points of contestation. This is particularly relevant in contexts where communities or countries share boundaries. The problems are likely to be worse in contexts where boundaries are not clear and there are competing claims for resources. For example, Onuoha (2008:35) illustrates how environmental degradation and in particular diminishing water resources in Lake Chad has created conflicts and undermined livelihood sustaining activities in Cameroon, Chad, Niger and Nigeria. The study specifically highlights conflicts between and among fishermen, pastoralists, farmers and in some cases state security agents. Furthermore, Onuoha (2008:35) underscores the implications of conflicts that often degenerated into large-scale intra-ethnic, intra-state and inter-state conflicts.

Water conflicts are also directly linked to food security and the provision of fresh water. Water is a crucial resource for agricultural productivity and contestations over water rights and access can (and do) undermine agricultural

productivity levels. Furthermore, water degradation and conflicts are also linked to the migration of biodiversity (including people). For example, the migration of people in search of better sources of water is a widespread phenomenon in Africa. In the northeast of Tanzania (Pangani River Basin) migration has led to the convergence of pastoralists and farmers and to rapid population increases of both human beings and livestock (Mbonile 2005:41). Intensive water conflicts were caused, in which different irrigation systems (traditional and modern large-scale types) and uses of water (as hydropower generation) also played roles.

Climate change, discussed next, is deemed to intensify environmental conflicts and is inducing new forms of environmental conflicts.

Climate change and environmental conflicts

It is now widely recognised that climate change is having and will have significant impacts on social, economic and ecological systems and processes as socio-economic inequalities widen locally as well as globally (Intergovernmental Panel on Climate Change, IPCC, 2007). Thomas and Twyman (2005:122) state that an examination of climate change needs to include the relationships between global processes (including emission effects and international conventions), national responses and local outcomes, and particularly the effects of national decisions and policies on local opportunities and abilities to adapt. Thus, aspects relating to environmental conflicts are important to consider. Steffen et al. (2004:16) identify a range of proximate/direct (immediate human activities that drive a particular change) and underlying (fundamental needs and desires of individuals and groups) drivers affecting the natural environment and intensifying climate change. The direct drivers of human activities associated with climate change are land clearing (especially removal of forests/natural ecosystems) and land cover conversion, introduction of alien species, agricultural practices, fossil fuel and biomass burning, and poor water use and management practices (including groundwater removal). The underlying human-induced drivers include an increase in demand for a wide range of goods and services including basic needs (food, water, clothing, shelter, health and

employment), transport, recreation and leisure activities, safety and security, and entertainment and luxury items.

The impacts of climate change on socio-political systems are not new. For example, Davis (2001, cited in Barnett and Adger 2007:641) shows how the El Niño events and famines of the 19th century, triggered by droughts, resulted in political and economic colonisation that deprived local people of their entitlements to natural resources. Barnett and Adger (2007:642) further argue that it is important to consider how violent conflict is itself a powerful cause of human insecurity and vulnerability to climate change. Thomas and Twyman (2005:115) identify the implications of climate change for equity and justice among vulnerable groups at local and sub-national levels. Equity and justice, they assert, are important to consider because the poorest and most vulnerable groups (especially in developing countries where natural resource dependency is high) will disproportionately experience the negative effects of climate change.

Barnett and Adger (2007:639) state that climate change is increasingly being called a 'security' problem because there is concern that climate change may increase the risk of violent conflict. The underlying proposition is that climate change is likely to undermine human security by reducing the natural resource base and limiting access to existing natural resources which are central to sustainable livelihoods, especially in developing contexts as indicated earlier. In specific contexts, direct and indirect impacts of climate change on human security may in turn increase the risk of violent conflict (Barnett & Adger 2007:639). Nordås and Gleditsch (2007:627) state that conflict-inducing effects of climate change have emerged in the literature and although several causal chains and/or paths to these conflicts have been suggested, there is a gap in terms of providing substantial evidence for these claims.

This point is mirrored in Omolo's (2010) empirical study in this issue. In light of increased droughts in the area, and given that livestock forms the foundation for food security in Kenya, competition over grazing land and water has increased, leading to violence. While the author reports that people have adopted a number of coping strategies to deal with climatic variability,

such as diversification into agriculture, vulnerability is intensified because of an increase in militarised cattle raiding, attributed in part to economic decline in the Horn of Africa. Moreover, Reuveny (2007:656) illustrates that climate change-induced migration (referred to as environmental migration), which is likely to be more frequent given the increase in extreme weather events, can create and intensify violent conflicts. This will be particularly acute in lesser developed countries where, because of limited options to adapt to or mitigate climate change, people are more likely to leave affected areas. The Christian Aid Charity (cited in Nordås and Gleditsch 2007:629) warns that '184 million people could die in Africa alone as a result of climate change by the end of the 21st century' and that 'at least one billion people will be forced from home as the effects of climate deepen an already burgeoning global migration crisis'.

While fundamental environmental factors for environmental migration are land degradation, droughts, deforestation, water scarcity, floods, storms and famines linked to food insecurity (Reuveny 2007:662), environmental migration can also result from development. In this issue, Jaggernath (2010) finds that nearly 78% of residents in the SDB would move out of the area if they received compensation and could move closer to their work. Omolo (2010) highlights that women from pastoral communities are often forced to move to cities during times of environmental stress and that some have turned to prostitution for survival.

Managing environmental conflicts

Environmentally related conflicts are linked to political, economic, social and ecological contexts. Very few studies or intervention strategies to address these conflicts adopt an integrated and interdisciplinary approach. Rather, one aspect is focused on in a fragmented manner and the others are neglected. However, it is important to emphasise that a focus on 'conflict' underscores the social and political aspects. The power dynamics and social components are crucial. Not all environmental conflicts have negative impacts, however. Conflicts can be important focal points to highlight social, economic and environmental problems. For example, from an ecological perspective, conflicts can draw attention to environmental problems and result in conservation efforts. White

et al. (2009:243) state that conflict management is necessary to reduce negative impacts (and promote positive effects).

While planning is a prerequisite for effective management and implementation in any context, it often remains an ideal rather than a reality (Paterson 2007:4). Ahmed (2008:45) reveals that although environmental concerns and agendas are increasing and management is being advocated by governments worldwide, current approaches remain regional, sectoral and unsustainable despite the proliferation of international policies and treaties. Furthermore, improper land use planning and ineffective implementation of policies are worsening the situation and contributing to *ad hoc* (and often inappropriate) interventions. This has devastating impacts on the biophysical environment and the long-term sustainability of the environment. Additionally, the impacts on people, especially the poor and vulnerable, can be dire. Environmental Impact Assessments, Social Impact Assessments and Strategic Environmental Assessments remain important legal and procedural tools to manage the environment, particularly with regard to current and intended development. However, the implementation of these tools requires due consideration for a range of factors, some of which are summarised below as broader recommendations for managing environmental conflicts.

Recommendations

Information management and knowledge production is an important component of conflict management. This article and this issue have shown that several aspects relating to environmental conflicts (especially in relation to climate change and the impacts on women) remain under-researched. Specifically, Nordås and Gleditsch (2007:633–634) propose five areas that need further examination in relation to climate-conflict relationships that are relevant to environmental conflicts more generally:

- Examining scientifically the interface between climate change models and conflict models including geographic variations, rates of change and adaptive measures.

- Considering and specifying what types of violence are likely to result from climate change. This will require conflict monitoring.
- Balancing the positive and negative effects of climate change as well as the effects of various strategies of adaptation.
- Continuing to disaggregate the effects of climate change in systematic conflict models (in relation to geographical variations and types of change) to ascertain differing outcomes.
- Focusing on national security issues in both developing and developed countries. The construction of security scenarios is also advocated.

It is important, as Timura (2001:104) indicates, to incorporate the social and cultural nature of environmental conflicts such as the roles that social histories, symbolically mediated perceptions, and local political economics play in the outbreak of violence. Wittmer et al. (2006:5) present criteria which can address both ecological and social complexities for selecting instruments/approaches to resolve environmental conflicts. They include pertinent information, legitimacy, social dynamics and costs.

White et al. (2009:243) argue that existing approaches to addressing natural resource conflicts have regional differences with developed countries largely adopting a structured legal framework, usually financed by public agencies, while in developing countries conflicts are addressed through case-specific approaches. They propose an integrated and functionally applied (based on indicators) framework to understand conflict dynamics and inform models that are capable of describing spatio-temporal aspects in different contexts to provide decision support for biodiversity management. Furthermore, a participatory analytical and management approach is advocated. The use of appropriate indicators is particularly useful in assessing the effectiveness of a specific intervention or management strategy as well as providing a basis for the identification of best practices.

Gender sensitive climate change and environmental management policy is essential. This issue highlights the need for integrated approaches to natural resource management and conflict resolution that take into account the vulnerabilities and rights of women. Perry et al. (2010) discuss a number of

interesting strategies devised by women in order to deal with the effects of and take action in environmental conflicts which include advocacy, travelling and staying in groups, and avoidance techniques. The strategies, according to the authors, appear to be entirely contextual, based *inter alia* on the socio-economic, political and cultural environment, and the level at which they are implemented. While women's participation in local stakeholder forums on resource conflicts appears to be crucial and clearly invaluable, the authors highlight that often women are excluded and that peace negotiations are often dictated by men. Omolo (2010) argues that there are ways to better manage common grazing lands, reduce the vulnerability of pastoralists and to help the vulnerable (especially women) adapt. The author calls *inter alia* for coordinated, informed and gender sensitive policy making and implementation; better management of common grazing lands; the creation of gender sensitive safety nets for times of environmental stress, such as livestock insurance and credit facilities; and assistance to help pastoralists diversify their livelihoods.

Environmental management and environmental protection should balance the needs and interests of the environment, the people and especially the vulnerable. Targeted, flexible, well-informed and contextual approaches to NRM and conflict resolution are necessary. This should go hand in hand with helping those dependent on the environment to develop independent capacity to withstand shocks resulting from environmental change. While the separation between the ecological system and governance systems (decisions people make on how to manage and use the environment) is artificial (Bob 2008:1–2), 'humans should be considered as an integral and interdependent part of the global ecological system' (Ashton et al. 2005:450). In this issue, Okech (2010) argues that if NRM policies on conservation in particular are not formulated and implemented in a way that balances the needs and interests of conservation and people, it can lead to conflict. The Kenya case highlights the plight of pastoralists in the Horn of Africa and especially the importance of partnerships in addressing these challenges. Ahmed (2010) also highlights that Integrated Coastal Zone Management (ICZM) is a useful administrative and policy tool for sustainably managing coastal zones and any conflicts. However, key challenges relate mainly to management, a lack of political buy-in and

weaknesses in how information is presented to policy makers and those implementing them. The author also highlights the importance of ensuring stakeholder input and engagement and warns that if these challenges are not addressed, conflicts in coastal areas may increase, especially as a result of climate change and greater economic and population growth.

Narrow environmental protection efforts that do not *consider and engage with the dynamics beyond particular borders* (be it that of parks or countries) are at best short-sighted, and at worst, can lead to attacks on biodiversity, and to violence and poverty. Biodiversity issues often are viewed as being part of government agendas, but governments frequently lack the political will and/or resources required to protect the environment. While geographical boundaries exist to demarcate nation states, the location and movement of nature (including flora, fauna, air, water, pollutants and pests) are influenced by natural forces and processes that are not restricted to person-made boundaries (Bob et al. 2008:24). Furthermore, human mobility has also increased the movement of certain species of plants and animals. The case of Kenya in this issue is a good example.

Yasmi et al. (2006:538) emphasise the importance of achieving constructive conflict resolution in NRM and highlight the importance of local government structures and traditional leaders in managing conflicts in developing contexts. *Community-based approaches to NRM and conflict resolution* are deemed to be useful, particularly to promote locally based, indigenous management strategies. There is also increased attention in the literature to human intervention and technology in the overall management of environmental risks and conflicts (Mubareka and Ehrlich 2010; Raleigh and Urdal 2007). Specific approaches to effectively address environmental conflicts or manage environmental impacts of other forms of conflict are advocated which include environmental education programmes, environmental legislation/policy interventions, and the use of spatial technologies such as remote sensing and the Geographic Information System (GIS).

Planning and management of land activities should take into account environmental, social, political and other aspects. Bob (2010) in the article on

land conflicts advocates for land registration supported by adequate conflict resolution measures, and for land management and even psycho-social approaches to conflict. The author also stresses that communal land administration should remain under the ownership of communities and advocates for a contextual approach in communal land tenure. Addressing vulnerability and increasing the resilience of communities in order to prevent land conflicts and increase human security are essential. Finally, the author stresses the need for gender sensitive approaches and the valuable role that women's organisations can play in dealing with land conflicts.

Post-conflict peacebuilding processes should take into account the effect a conflict had on the environment and the stresses on the environment and people in the post-conflict period. In post-conflict situations there is a need for a long-term vision for sustainable development to balance environmental and social objectives and in particular to address vulnerability, unemployment and population growth. The impacts of the Rwandan genocide, as highlighted by Moodley et al. (2010), include a loss of biodiversity as a result of deforestation, the clearing of wetlands, clearing of conservation areas, and government housing policies. The authors argue that these are the results of the sheer number of returnees and refugees that need to be accommodated, and of the population density and resulting stresses on livelihoods, partly as a result of the genocide. Another key issue is the burning of fossil fuels for energy by 90% of Rwandans. Integrated forms of environmental management and a renewed focus on the development of affordable green technologies for use by poor households are essential to safeguard Rwanda's remaining environmental endowments for its people and posterity.

The importance of *accountability, communication and governance* is also an important aspect raised in this issue. Key aspects that emerged in Jaggernath's (2010) study in the SDB are that industry needs to be accountable to local residents, who pay the price for development but see few of the benefits. In addition to better communication and consultation on new developments and allaying health fears, the study finds that industries should show a greater commitment to Corporate Social Responsibility, and give benefits back to the community in the form of reserved jobs and community development.

While only briefly touched upon, the study also shows a clear need for greater engagement by local government in NRM and in dealing with conflicts. It is unclear what role local civil society organisations play in the area, but it would be instructive to investigate what role they do or can play.

Conclusion

Environmental conflicts take on different forms and have multiple and varying impacts in different contexts. In particular, key points of conflict are in relation to climate change, conservation, water quality and availability, air quality and management aspects. Furthermore, a disconcerting trend is the migration levels associated with environmental and other conflicts that often result in existing or new conflicts emerging in receiving areas.

The matter of vulnerability remains an important aspect of understanding environmental conflicts. This issue highlights that the poor, marginalised groups and especially women are more likely to be impacted by environmental degradation and conflicts, whatever their types. In turn the poor are often dependent on environmental resources for livelihoods and energy – leading to environmental degradation. Furthermore, environmental degradation and diminishing environmental resources are linked to several conflicts from international to intra-national/local levels. However, what is a neglected field of research is the extent to which conflicts result in environmental degradation. Wars and other types of violence (such as invasions and destruction of property) can denude the natural resource base in terms of quality and/or quantity. This in turn causes further tensions and conflicts as resources become scarce. In particular, the vulnerable, the poor and especially women who remain reliant on the natural resource base in developing contexts are most likely to be affected. Thus, this cycle contributes to both an increase in poverty and vulnerability as well as environmental degradation. The natural resource base is in itself extremely vulnerable during periods of conflict and becomes the focus for looting and exploitation. Also, as Le Billon (2001:561) states, 'resources not only financed, but in some cases motivated conflicts, and shaped strategies of power on the commercialisation of armed conflict'. The impacts of climate change are likely to worsen this situation and make

environmental conflicts phenomena that are more widespread globally. It is therefore imperative that environmental conflict dynamics are studied and appropriate resolution and management strategies employed to reduce these.

Environmental conflicts and/or threats of conflicts are emerging as critical issues for security and conflict research. These types of conflict also influence political processes and pose unique challenges in relation to how they are managed, including how government structures anticipate points of stress and insecurity. The magnitude and diversity of environmental conflicts and related risks are complex and have significant implications for the stability of natural, social, political and economic contexts and locations. Thus, environmental conflicts can threaten nature and social security.

Sources

ACCORD. 2002. *Transforming conflict.* Facilitator's reference manual. Durban, ACCORD.

Ahmed, F. 2008. Development pressures and management constraints in the coastal zone. *Alternation*, 15 (1), pp. 45–65.

Ahmed, F. 2010. Approaches to and tools for managing environmental conflicts in coastal zones in Africa: Challenges and prospects in relation to Integrated Coastal Zone Management (ICZM). *African Journal on Conflict Resolution*, 10 (2), pp. 31–47.

Ashton, P.J., M.J. Patrick, H.M. MacKay and A.V.B. Weaver 2005. Integrating biodiversity concepts with good governance to support water resources management in South Africa. *Water SA*, 31 (4), pp. 449–455.

Barnett, J. and W.N. Adger 2007. Climate change, human security and violent conflict. *Political Geography*, 26, pp. 639–655.

Barrett, C.B., D.R. Lee and J.P. McPeak 2005. Institutional arrangements for rural poverty reduction and resource conservation. *World Development,* 33 (2), pp. 193–197.

Bob, U. 2008. Introduction: Nature and people. *Alternation*, 15 (1), pp. 1–16.

Bob, U. 2010. Land-related conflicts in Sub-Saharan Africa. *African Journal on Conflict Resolution*, 10 (2), pp. 49–64.

Bob, U., K. Swart, B. Maharaj and P. Louw 2008. Nature, people and the environment: Overview of selected issues. *Alternation*, 15 (1), pp. 17–44.

Castro, A.P. and E. Nielson 2003. *Natural resource conflict management case studies: An analysis of power, participation and protected areas.* Rome, Food and Agriculture Organisation (FAO).

Gerber, J-F., S. Veuthey and J. Martínez-Alier 2009. Linking political ecology with ecological economic in tree plantation conflicts in Cameroon and Ecuador. *Ecological Economics*, 68, pp. 2885–2889.

Gleditsch, N.P., K. Furlong, H. Hegre, B. Lacina and T. Owen 2006. Conflicts over shared rivers: Resource scarcity or fuzzy boundaries. *Political Geography*, 25, pp. 361–382.

Hardin, G. 1968. The Tragedy of the Commons. *Science*, 162 (3859), pp. 1243–1248. Available from: <http://www.garretthardinsociety.org/articles/art_tragedy_of_the_commons.html>

Hellström, E. 2001. *Conflict cultures – qualitative comparative analysis of environmental conflicts in forestry*. Silva Fennica Monographs 2. Helsinki, The Finnish Society of Forest Science and The Finnish Research Institute.

Hubbard, P., R. Kitchin, B., Bartley and D. Fuller 2002. *Thinking Geographically*. London, Continuum.

Intergovernmental Panel on Climate Change (IPCC) 2007. IPCC Fourth Assessment Report – Working Group 111 Report 'Mitigation of Climate Change'. Available from: <http://www1.ipcc.ch/ipccreports/ar4-wg3.htm>.

Jaggernath, J. 2010. Environmental conflicts in the South Durban Basin: Integrating residents' perceptions and concerns resulting from air pollution. *African Journal on Conflict Resolution*, 10 (2), pp. 137–152.

Kok, A., W. Lotze and S. van Jaarsveld 2009. Natural resources, the environment and conflicts. African Centre for the Constructive Resolution of Disputes (ACCORD). Available from: <www.accord.org.za> [Accessed 16 March 2009].

Le Billon, P. 2001. The political ecology of war: Natural resources and armed conflicts. *Political Geography*, 20, pp. 561–584.

Le Maitre, D., P.J. O'Farrell and B. Reyers 2007. Ecosystem services in South Africa: A research theme that can engage environmental, economic and social scientists in the development of sustainability science. *South African Journal of Science*, 103, pp. 367–376.

Mbonile, M.J. 2005. Migration and intensification of water conflicts in the Pangani Basin, Tanzania. *Habitat International*, 29, pp. 41–67.

Mix, T.L. and T.E. Shriver 2007. Neighbours, nuisances and noxious releases: Community conflict and environmental hazards in the atomic city. *The Social Science Journal*, 44, pp. 630–644.

Moodley, V., A. Gahima and S. Munien 2010. Environmental causes and impacts of the genocide in Rwanda: Case studies of the towns of Butare and Cyangugu. *African Journal on Conflict Resolution*, 10 (2), pp. 103–119.

Mubareka, S. and D. Ehrlich 2010. Identifying and modelling environmental indicators for assessing population vulnerability to conflict using ground and satellite data. *Ecological Indicators*, 10, pp. 493–503.

Nordås, R. and N.P. Gleditsch 2007. Climate change and conflict. *Political Geography*, 26, pp. 627–638.

Okech, R. 2010. Wildlife-community conflicts in conservation areas in Kenya. *African Journal on Conflict Resolution*, 10 (2), pp. 65–80.

Omolo, N.A. 2010. Gender and climate change induced conflict in pastoral communities: case study of Turkana in north-western Kenya. *African Journal on Conflict Resolution*, 10 (2), pp. 81–102.

Onuoha, F.C. 2008. Environmental degradation, livelihoods and conflicts: A focus on the implications of the diminishing water resources of Lake Chad for North-Eastern Nigeria. *African Journal on Conflict Resolution*, 8 (2), pp. 35–62.

Paterson, A. 2007. Wandering about South Africa's new Protected Areas Regime. *SA Public Law*, 22 (1), pp. 1–33.

Perry, E., C. Potgieter and U. Bob 2010. Environmental conflicts and women's vulnerability in Africa. *African Journal on Conflict Resolution*, 10 (2), pp. 121–136

Raleigh, C. and H. Urdal 2007. Climate change, environmental degradation and armed conflict. *Political Geography*, 26, pp. 674–694.

Reuveny, R. 2007. Climate change-induced migration and violent conflict. *Political Geography*, 26, pp. 656–673.

Steffen, W., A. Sanderson, P. Tyson, J. Jager, P. Matson, B. Moore III, F. Oldfield, K. Richardson, J. Schellnhuber, B.L. Turner II and R. Wasson 2004. *Global change and the Earth system: A planet under pressure - Executive summary*. New York, Springer.

Thomas, D.S.G. and C. Twyman 2005. Equity and justice in climate change adaptation amongst natural-resource-dependent Societies. *Global Environmental Change*, 15, pp. 115–124.

Timura, C.T. 2001. 'Environmental conflict' and the social life of environmental security discourse. *Anthropological Quarterly*, 74 (3), pp. 104–113.

Wallensteen, P. 2007. *Understanding conflict resolution*. London, Sage.

White, R.M., A. Fischer, K. Marshall, J.M.J. Travis, T.J. Webb, S. di Falco, S.M. Redpath, and E. van der Wal 2009. Developing an integrated conceptual framework to understand biodiversity conflicts. *Land Use Policy*, 26, pp. 242–253.

Wittmer, H., F. Rauschmayer and B. Klauer 2006. How to select instruments for the resolution of environmental conflicts. *Land Use Policy*, 23, pp. 1–9.

Yasmi, Y., H. Schanz and A. Salim 2006. Manifestation of conflict escalation in natural resource management. *Environmental Science and Policy*, 9, pp. 538–546.

Approaches to and tools for managing environmental conflicts in coastal zones in Africa: Challenges and prospects in relation to Integrated Coastal Zone Management (ICZM)

*Fathima Ahmed**

Abstract

Conflicts in coastal zones arise as a result of the variance between divergent interests, within limited and dynamic socio-spatial and ecological dimensions, with little effort at critical consensus. Coastal zones worldwide exhibit three classical internal trademarks – high pressures for development, management weaknesses to protect coastal ecosystems and the deterioration of environmental conditions – all of which exacerbate conflicts over use and access of coastal zones. These conflicts are further expected to intensify against the backdrop of global climate change, with their location specific manifestations and impacts. Coastal zones in Africa are particularly vulnerable, as burgeoning population increases and rapid economic growth compound pressures on and intensify conflicts over scarce/stressed resources. Furthermore, the situation is particularly acute as deteriorating environmental conditions impede social and economic development, and are linked to the pervasiveness of hunger, poverty and disease, which engage in a vicious cycle of environmental conflicts. As coastal environments become excessively anthropocentric, ecological dimensions

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cannot obviate the impact of human behaviour. Integrated approaches present powerful frameworks for analysing human-environmental conflicts, understood as ecological change, together with human knowledge and practice. Efforts at conflict resolution should be aimed at improving environmental conditions in tandem with improving the level of technical skill and capacity to mitigate environmental degradation. The challenge is to balance the need for short-term gains with long-term integrated resource management, heralded as Integrated Coastal Zone Management (ICZM). This article examines the challenges and prospects for approaches and tools to manage environmental conflicts in Africa's coastal zones.

Introduction

The concept of an ecosystem offers a constructive framework for examining the linkages between humans and the environment, as environmental conflicts are typified as combining high degrees of societal and ecological complexity and vulnerability (Wittmer et al. 2006:1). Homer-Dixon (1999, cited in Raleigh and Urdal 2007:677) elaborates on this complexity by asserting that society and ecology engage in reciprocal feedbacks, in a process referred to as 'resource capture and ecological marginalisation':

> Resource capture occurs when the degradation and depletion of a renewable resource (a decrease in supply) interacts with population growth (an increase in demand) to encourage powerful groups within a society to shift resource access (that is, to change the resource's distribution) in their favour. These groups tighten their grip on the increasingly scarce resource and use this control to boost their wealth and power. Resource capture intensifies scarcity for poorer and weaker groups in society. Ecological marginalisation occurs when unequal resource access (skewed distribution) combines with population growth (an increase in demand) to cause long-term migrations of people to ecologically fragile regions...High population densities in these regions, combined with a lack of knowledge and capital to protect the local ecosystem, cause severe resource degradation (a decrease in supply).

Several authors concur that adverse environmental change falls disproportionally greater on the poor, worsening their risk to hazards, their well-being, and increasing the incidence of social conflict; all of which have dire implications on inter- and intra-generational equity (Parnell 2000:2; Millennium Ecosystem Assessment 2003:7; Brownlie et al. 2006:A–12). The interface between poverty and the environment is widely recognised as particularly important in Africa, which is considered as 'one of the world's most vulnerable natural and social regions' (Parnell 2000:1). It is advocated that mitigation of environmental conflict calls for approaches aimed at greater 'environmental entitlement' (increased access and social justice) accorded to the poor (Parnell 2000:8; Millennium Ecosystem Assessment 2003:14).

Integrated Coastal Zone Management (ICZM) is essentially about conflict resolution, as it takes place in a limited coastal space and water, where the amount of useable land and other resources available is limited, and where a plethora of interests converge and interact. The article draws on the premise of resource scarcity/stress of African coastal zones, recommending and reinforcing the desirability of managing coasts in an integrated manner by underscoring the importance of participatory approaches and extending societal contributions to incorporate spatial dimensions in decision support for ICZM. Spatial dimensions include land use change, physical attributes, perceptions related to land quality and suitability of existing and proposed activities. This article undertakes a desk top study focusing on the key debates and issues in relation to the use of specific approaches and tools for managing environmental conflicts in African coastal zones.

Importance of coastal zones and increasing pressures

Planet Earth is a coastal planet, on which land and sea interact intensively and extensively along the world's total 1 634 701 km of coastline (Martínez et al. 2007:255), producing the world's most unique and attractive areas. Coastal environments occupy one of the most dynamic interfaces between land and sea, and they support some of the most diverse and productive habitats (Mclean and Tsyban 2001:356). Furthermore coastal zones stand out as areas of extraordinary changes, shaped both by natural processes and human society which impact either

directly on coastal processes and systems and/or indirectly through modification of the natural processes and global climate change (Land-Ocean Interactions in the Coastal Zone 2005:1). Coastal zones comprise specialised interdependent systems which are of particular importance – from environmental, social and economic points of view. Due to the many habitat types and wealth of genetic diversity, coastal ecosystems provide multiple services, which have recently been estimated as at least 40% of the value of the world's ecosystem services (Gattuso and Smith 2007:2). Their unique ecosystems are also important for biodiversity refuge and coastal protection. Furthermore, coastal zones act as both environmental regulators and sinks, presenting important feedbacks in land-coast interactions that determine thresholds and boundaries for system resilience to global environmental change (Turner et al. 1995:5). In addition, they are also important socio-economic zones, 'sustaining livelihoods through flows of income derived from the *in situ* utilisation of natural coastal capital and through global trading networks' (Turner 2004:2).

Coastal zones around the world share a number of characteristics that define both their significance and susceptibility – they have the world's highest population density, developed economies, and the most vulnerable environment (Shi and Singh 2003:145). Kenya, Tanzania and Mozambique, for example, provide stark examples of countries with most of the major towns and cities located in the coastal strip (Turner et al. 1995:7). Projected population growth to 2050 indicates a 98% growth expected from less developed regions with 35% from sub-Saharan Africa, the world's fastest growing region (Akegbejo-Samsons 2009:1). Some 60% of the world's human population live within about 100 kilometres of the shore (Turner 2004:1). Urban growth, as a result of migration in tandem with population growth is also expected to impact on African coastal cities as adverse agricultural conditions force people to seek employment in coastal cities (Akegbejo-Samsons 2009:1).

There are several generic non-demographic effects of climate change which are similar across a range of societal and geographic settings (prevalence of vulnerable livelihoods, poverty and weak states), which interact with population changes, resulting in subsequent disastrous impacts on coastal ecosystems, thereby intensifying recourse to possible conflict (Barnett and Adger 2007:643).

The variety of demands for utilisation and protection collide in this area making it a zone of conflicts, but also of potentials (Lourenço and Machado 2007:2), if managed appropriately.

Types of coastal zone conflicts

Kahl (2006, cited in Raleigh and Urdal 2007:678), building on the notion of resource scarcity, asserts that demographic and environmental stress (DES) attributed to the interaction between resource degradation, population growth and unequal resource distribution, puts significant pressure on both society and state institutions, providing fertile grounds for environmental conflicts. Kahl further distinguishes between two outcomes of DES: the weakening of the state's functional capacity, where the sheer scale of resource demands outweighs the ability of the state to meet these demands; and the weakening of the state's social cohesion, where elites within the state may compete over how to use strained resources either geographically or sectorally (Kahl 2006, cited in Raleigh and Urdal 2007:679). The conflicts relate to two key areas, coastal ecosystem change and coastal development, which are discussed below.

Conflicts related to coastal ecosystem change

In most countries coastal resources (coastal waters and beaches) are considered common property available equally to all citizens, with the government as 'trustee' (Jinn et al. 2003:139). This common property nature makes it impossible to exclude those who do not pay for using them, and as a result there is no incentive to conserve resources. As a result, overuse and exhaustion can occur when utilisation or harvest rates exceed the population growth rates of species or the ability of ecosystems to recover from disturbances (Jinn et al. 2003:139). Too often, traditional controls over the allocation and use of coastal space and coastal resources disintegrate when privatisation and/or markets and associated societal behaviours contrary to traditional controls become prevalent (Olsen and Christie 2000:7). Nielson et al. (2004:152) indicate that impacts on African fisheries are a significant example of such common property conflicts where their exploitation and markets are increasingly operating in the international domain and opportunities in globalisation are largely translating into exclusion.

They assert that this has resulted in local fishing communities losing control over and access to the fisheries resources, as the case of foreign harvesting of shrimp along the Mozambican coast demonstrates.

Considerable portions of people in African countries depend on fish for protein, and thus near-term impacts on the fishery sector may also affect human nutrition and health (Akegbejo-Samsons 2009:6). Fisheries are also under pressure from other uses of the coastal and freshwater environment such as infrastructure, industrial development, aquaculture, tourism and other environmental changes. The result is the competition for space in ways that lead to reduced productivity of fisheries resources, as, for example, the development of tourism on Lake Kariba in Zimbabwe, which led to large areas being closed to fisheries by local communities (Jul-Larsen et al. 2002 cited in Nielson et al. 2004:152). The conversion of multiple-use coastlines to a single-use resource has given rise to social disruption and conflicts as it tends to displace other stakeholders and often also the traditional and community use of coastal space.

Habitat loss and degradation in coastal zones are occurring worldwide through activities such as reclamation projects, conversion of mangroves for aquaculture, and removal of coastal forests for development and agriculture (Nelson et al. 2006:8). Aquaculture, the world's fastest growing food production activity, plays an essential role in the livelihoods of millions of people (Creel 2003:4). Aquaculture and fisheries provide sources of nutrition, foreign exchange earnings and employment, but also have negative social, economic and environmental consequences such as loss of ecosystem services with regard to coastal protection and waste processing, loss of livelihoods of people, intensive groundwater abstraction and consequent pressures for water for local communities, pollution due to effluent discharge and depletion of the wild stock due to disease outbreaks in association with the introduction of exotic species (Burke et al. 2001:7).

The contributions of these 'free' ecosystem goods and services to national economies (including well-being) are substantial, yet they are generally ignored or underestimated by decision-makers (International Union for Conservation of Nature 2007:1). The costs of externalities associated with loss of ecosystem goods and services tend to be considerable (Van den Bergh 2000:5). This is

particularly acute in coastal zones due to a lack (or absence) of adequate market price data, together with inadequate (or absent) property rights regimes which ensure that resource values can be practicably appropriated, thereby assigning ecosystem services with little or zero value and weight in policy decisions (Jinn et al. 2003:139).

Conflicts related to coastal development

People in developed coastal areas rely heavily on infrastructure to ensure their safety against natural hazards and to support their well-being. Pressures from the urbanisation of coasts and the support of principles of sustainable development by many Southern African states have added to the challenge to local authorities and society who are already battling to cope with the contradictory demands associated with ensuring economic growth, service provision, preventing social exclusion and maintaining local democracy (Parnell 2000:15). According to Glavovic and Boonzaier (2007:1), confronting poverty and social equity are arguably the most challenging issues facing the South African government, and the coast has a significant role in meeting basic needs and improving the well-being of coastal communities, where 40% of the country's population is located. A situation analysis conducted by the United Nations Development Programme (UNDP) reveals that South Africa has persistently high unemployment, poverty, high HIV/AIDS infection rates, a dual formal/ informal economy, a low skills base and wide urban/rural disparities (United Nations Development Programme 2006:2). Given the value of the coast, these areas offer development opportunities (primarily port facilities, roads and housing) which may promote local and regional economic development (Department of Environmental Affairs and Tourism 2006:170). However, as Parnell (2000:15) states, across the Southern African region, the situation is fraught with problems, as the cost of political transition has diminished the staff of even the functional municipalities.

Infrastructure investment, mainly in pollution prevention issues, such as sewerage, wastewater and solid waste management, has fallen behind schedule due to the lack of adequate planning, legislation and financing in many countries (Burak et al. 2004:519), resulting in pollution of groundwater, water courses and coastal waters from untreated sewer and other contaminants. Iwugo et al.

(2003:122–123) assert that poor industrial wastewater disposal and sanitation practices in Lagos have led to severe water scarcity as a result of pollution. Water-related diseases can further lead to health problems in Lagos as well as neighbouring areas and countries using the same coastal waters, because water pollution has no boundaries (Iwugo et al. 2003:122–123). This could potentially lead to inter-state conflicts.

Parnell (2000:16) further cautions that there exists a wide gap between 'the predominately green agendas of many official agencies and the agendas of community groups, who do not necessarily use the language of environment (green or brown), even when they are mobilising around questions of water, waste and pollution'. For many poor, day-to-day survival is a priority – this difference in priorities has been dubbed the 'issue of class and power in the articulation of environmental conflicts' (Blowers 1997, cited in Dastidar 2007:2). Conversely, the impacts of human actions on ecosystems are often slow to become apparent and hence ecosystems are managed in ways that benefit the short-term, while long-term costs go unnoticed or are ignored (Greenfacts 2005:5). This combination of time lag and absence of strategic thinking can transfer the costs of current changes to future generations.

Urban development in many coastal regions has led to increased shoreline modification and destruction and degradation of terrestrial and aquatic habitats (Grimm et al. 2008:265). With more than one-quarter of the population in Eastern and North Africa living within 100 kilometres of the coast and most cities concentrated along the coastline, the vulnerability to climate change disaster from sea level rise, tidal waves and storm surges will increase (Vordzorgbe 2007:1). Snoussi and Aoul (2000:1033) indicate that the development of industrial and tourism activities specifically in the Northwest African region has generally been highly concentrated in the coastal zone. The impacts on livelihoods are likely to be more significant to population with high resource-dependency, and people in more environmentally and socially marginalised areas (Barnett and Adger 2007:643). Coastal zones also attract a high proportion of migrants searching for employment opportunities in coastal cities, but many are without homes and proper sanitation, and such large-scale movements of people may increase the risk of conflict in host communities (Barnett and Adger 2007:643).

Many of the world's coasts have become committed to development, where economics strongly influence how trade-offs in coastal development are rationalised and decisions are made over resources, and where there are important preferences in allocating funds, resources and lands (International Union for Conservation of Nature 2007:2). In most developing countries, the authority and the responsibility to manage such resources are not vested in local institutions but in distant governmental agencies and powerful private interests, which results in 'winners' and 'losers' in allocation and use of resources (Olsen and Christie 2000:9). According to Martinez et al. (2007:267), in general, countries with high population densities on the coast had the lowest coastal ecosystem service product values ('highly degraded') because of intense exploitation of coastal resources.

Despite the complexity, coastal systems are mostly managed by agencies with single-resource or single-sector approaches, often acting independently. As noted by Cicin-Sain et al. (2000:293), this management model of sectoral atomisation is 'a carryover from the time when ocean resources were viewed as unlimited and ocean uses as independent of one another'. In addition, management authority is shared by various administrative bodies whose domains of action overlap, and whose territories of competence generally do not correspond to the ecological and human scales of the problems, leading to a geographical atomisation (Bille and Mermet 2002:915). This breeds unsustainable, or at least greatly sub-optimal, development (Bille and Mermet 2002:915).

Management challenges and opportunities

Stojanovic and Ballinger (2009:49) assert that the effectiveness of institutional arrangements and policies for governance have become key questions within the sustainability paradigm. With regard to coastal and marine areas, ICZM has been discussed as a possible governance concept. Many African countries have implemented ICZM strategies to manage their coastal zones. Although definitions differ, the common theme traversing definitions of ICZM initiatives is that of sustainability. Ahmed (2006:34) states that ICZM is increasingly an accepted management framework to address coastal and marine environmental

conflicts and establish management needs which are aimed at achieving sustainable use of coastal resources.

In Namibia, ICZM places emphasis on the integration of management structures and procedures by investing in human and technical capacity building and the coordination of sectoral interests, where benefits are understood to translate through improved efficiencies and better coordination (Parnell 2000:14). In Mozambique, ICZM was designed to link directly to other national development strategies, which are based on sector specific coastal action (for example, fishing, transport or tourism), that was designed to meet general development objectives as well as to protect the coast (Parnell 2000:14). In South Africa, the ICZM programme is explicitly committed to a pro-poor focus, in an attempt to redress the flaws of apartheid inequalities which denied the majority of people rights to the coastline and its resources, as well as to the economic opportunities provided by coastal development and infrastructure (Glavovic and Boonzaier 2007:2–4).

According to Olsen (2003:348), ICZM initiatives designed to advance specific coastal contexts towards coastal management must be designed to be sustainable over long periods of time (often several decades), be adaptable to rapidly changing conditions, and provide the mechanisms to encourage or require particular forms of resource use and collaborative behaviour among institutions and user groups. Community participation (including the different knowledges of the coast) is essential for any ICZM programme to be effective. On the one hand, effective ICZM is important to improve the well-being of communities who depend on coastal resources now and in the future while, on the other hand, ICZM needs to coordinate and mediate conflicts emanating from the different users and functions of the coastal zone (Hale et al. 1998:6). Furthermore, according to Xiuwan (2002:107), policy and decision making in the context of sustainable development require rapid, effective and efficient access to and integration of appropriate current information from a wide range of sources and disciplines, including spatial information (such as land cover change) which can demonstrate the potential in monitoring progress towards sustainable development. Adopting a spatial analytical approach can also inform good governance that contributes to sustainable development.

Developing suitable and reliable information which is easily accessible and consultable according to management objectives and capable of lending support to strategic decision making regarding likely environmental change that takes place in coastal zones is paramount (Trujillo et al. 2003:1). Sardá et al. (2005:427) underscore the importance of environmental information systems in ICZM processes. They specifically developed decision support tools as a methodological approach for coastal management which includes

- the development of an environmental indicator-based report;
- the use of the geographic information system (GIS); and
- the incorporation of different types of graphical packages.

They stress the importance of spatial tools and information for decision making and management.

By reviewing secondary literature and providing a synthesis of the ideas in existing studies of coastal management, Stojanovic et al. (2004:283) identify important factors for successful ICZM which include:

- Comprehensiveness: an approach of taking a sufficiently wide scope and full view of issues, including cumulative impacts, given that ICZM seeks to consider the coastal zone as a system of interconnectedness. The authors cite Cicin-Sain and Knecht (1998) who outline various dimensions to comprehensiveness which include setting geographical boundaries for initiatives and the level of decision making at different geographical scales, specifically in terms of identifying actors/stakeholders and political responsibility for decision making (Stojanovic et al. 2004:283).
- Participation: a process by which there are opportunities for common contribution and balanced sharing of activities by interested parties. Participation is important since there is general consensus that if people participate in the process of taking a decision or developing a plan, they are more likely to support it. Participation also provides avenues for sharing of information and learning.
- Cooperation: a process by which agencies operate together and are coordinated to one end. The basic premise is that more can be achieved when individuals or groups work together towards a common goal.

- Contingency: an approach that seeks to account for local variations in strategy, environment or task. Contexts differ and it is possible that variations may account for or be related to certain causes.
- Precaution: an approach or activities undertaken in advance to protect against possible danger or failure. Specifically, anticipating and predicting the likely causes of environmental degradation, rather than reacting to their outcome, should mean that environmental management prevents the costs that originate in rectifying damages.
- Long-termism: an approach that recognises that environmental management needs more than brief views of environmental circumstances to understand and manage the links between the human and natural environment. This includes understanding how environmental changes are buffered by externalities, whether reactions are incremental or related to thresholds, and how antecedent conditions affect coastal change.
- Focusing: a 'structured consideration of a problem in which an individual attends to the present experience' (Kantor and Zimring 1976:74, cited in Stojanovic et al. 2004:287). In this regard, stakeholder decision analysis and focus groups (workshops in particular) are identified as key tools for focusing on which aid groups of decision-makers (and other stakeholders) to identify and prioritising important environmental issues at the coast. In part, this research adopted this methodological approach together with other data collection techniques.
- Incrementalism: a recognition that management is an iterative process that proceeds in a step-by-step manner. This approach seeks to be realistic and pragmatic in that environmental management that takes a stepwise development will have greater opportunity to incorporate disseminated experience and make detailed assessments on important issues, whilst returning to neglected implications later.
- Adaptability: a more flexible and experimental approach that encourages greater social responsibility from those involved in management. It can increase capacity since it has a high learning element. Additionally, information is viewed as both a basis and a product for action.

These ideas are further supported in the South African National Environmental Management: Integrated Coastal Management Act (Act No. 24 0f 2008) (Republic of South Africa 2009), and highlighted by Celliers et al. (2009:3–7) in their guide to this Act.

PROCOAST (2000, cited in Banica et al. 2003:38) has outlined the following areas as a constraint to ICZM initiatives: the separation of terrestrial and marine components of the coastal zone from the legal and institutional point of view; sectoral approaches of economic development planning and management of coastal areas and resources; lack of cohesion and consistency in policies, planning, investment and management strategies at different administrative levels; and lack of political awareness of the strategic importance of coastal areas and resources. While the argument for integration is theoretically compelling, in practice, these principles are seldom realised, largely as a result of political and institutional weaknesses (Burak et al. 2004:516). Francis and Torell (2004:300) concur and have attributed the proliferation of a wide range of anthropogenic disturbances in the Indian Ocean Region to poorly planned economic development, under-resourced government institutions, and weak implementation of existing policies and laws. This suggests that in order for ICZM to work efficiently, it requires political buy-in.

Conclusion

Administration and policy for coastal zone management, which will promote sustainable development, is clearly an important part of addressing coastal conflicts (both existing and potential) given the increased demands on our coasts, the potential for increased points of contestation relating to climate change, and the vulnerability of both people and ecosystems that reside there. ICZM in Africa is increasingly becoming recognised as an appropriate approach towards this aim. With reference to the literature reviewed and findings presented, the key problem in relation to the nature of information required for coastal zone management lies not so much in the provision or the content of the information itself, but in the way it is presented to those who formulate and implement policy and take management decisions. This study has also indicated that stakeholder input into decision making is crucial, and can go a long way to either support

or reject policy implementation and management in the area. The continuation of the current trajectory is likely to yield large amounts of conflict, which will eventually undermine sustainable development. An integrated perspective is therefore immediately required.

Sources

Ahmed, A.K. 2006. Concepts and practices of resilience: A compilation from various secondary sources. Paper prepared for the Coastal Community Resilience Programme, US Indian Ocean Tsunami Warning System (IOTWS) Programme, Bangkok.

Akegbejo-Samsons, Y. 2009. Demographic trends, resource allocation and climate change in sub-Saharan Africa: Policy implications for sustainability. Available from: <http://www.openmeeting2009.org/pdf_files/Pdf%20papers/Full%20paper%20IHDP%202009%20A%20version.pdf> [Accessed 15 February 2010].

Banica, A., J. Bastard and M. Kosiek 2003. *Integrated Coastal Zone Management (ICZM): A framework to tackle environmental issues? Danish Approach.* Published Thesis, Centre for Environmental Studies, The University of Aarhus, Denmark.

Barnett, J. and W.N. Adger 2007. Climate change, human security and violent conflict. *Political Geography*, 26, pp. 639–655.

Bille, R.L. and L. Mermet 2002. Policy and practice: Sectoralisation of an Integrated Coastal Management Programme: A case study in Madagascar. *Journal of Environmental Planning and Management*, 45, pp. 913–926.

Brownlie, S., B. Walmsley and P. Tarr 2006. Guidance document on biodiversity, impact assessment and decision making in Southern Africa. Compiled by the Southern African Institute for Environmental Assessment, as part of the Capacity Building in Biodiversity and Impact Assessment project of the International Association for Impact Assessment (IAIA).

Burak, S., E. Dogan and C. Gazioglu 2004. Impact of urbanisation and tourism on coastal environment. *Ocean & Coastal Management*, 47, pp. 515–527.

Burke, L.A., Y. Kura, K. Kassem, C. Revenga, M. Spalding and D. Mcallister 2001. *Coastal Ecosystems.* Washington, DC, World Resources Institute.

Celliers, L., T. Breetzke, L. Moore and D. Malan 2009. *A User-friendly guide to South Africa's Integrated Coastal Management Act.* The Department of Environmental Affairs and SSI Engineers and Environmental Consultants, Cape Town, South Africa.

Cicin-Sain, B. and R. Knecht 1998. *Integrated coastal and ocean management: Concepts and Practices.* Washington, DC, Island Press.

Cicin-Sain, B., R.W. Knecht, A. Vallega and A. Harakunarak 2000. Education and training in integrated coastal management: Lessons from the international arena. *Ocean and Coastal Management*, 43, pp. 291–330.

Creel, L. 2003. *Ripple effects: population and coastal regions*. Washington, DC, Population Reference Bureau.

Dastidar, S. 2007. *The Poverty of Environmental Planning*. London, Development Planning Unit, University College.

Department of Environmental Affairs and Tourism 2006. South African Environment Outlook: A report on the S*tate of the Environment*. Chapter 7. Pretoria, Department of Environmental Affairs and Tourism.

Francis, J. and E. Torell 2004. Human dimensions of coastal management in the Western Indian Ocean region. *Ocean and Coastal Management*, 47, pp. 299–307.

Gattuso, J. and S.V. Smith 2007. Coastal zone. In: Cleveland, C.J. ed. *Encyclopedia of Earth*. Washington, DC, Environmental Information Coalition, National Council for Science and the Environment.

Glavovic, B.C. and S. Boonzaier 2007. Confronting coastal poverty: Building sustainable coastal livelihoods in South Africa. *Ocean and Coastal Management*, 50, pp. 1–23.

Greenfacts. 2005. Scientific facts on ecosystem change. Available from: <http://www.greenfacts.org/> [Accessed 24 March 2008].

Grimm, N.B., D. Foster, P. Groffman, J.M. Grove, C.S. Hopkinson, K.J. Nadelhoffer, D.E. Pataki and D.P.C. Peters 2008. The changing landscape: Ecosystem responses to urbanisation and pollution across climatic and societal gradients. *Frontiers in Ecology*, 6, pp. 264–272.

Hale, L., E. Meltzer and M. Ngoile 1998. *Application of international experience to formulation of a national policy for coastal management for the Republic of South Africa*. In: Coastal Management Policy Programme, *Lessons Learnt from Past Experience*. Cape Town: Coastal Management Policy Programme.

International Union for Conservation of Nature 2007. Natural ecosystems as coastal development infrastructure, *The World Conservation Union*, 5. Available from: <http://iucn.org/coastalinfo/> [Accessed 4 July 2008].

Iwugo, K.O., B. D'Arcy and R. Andoh 2003. Aspects of land-based pollution of an African coastal megacity of Lagos. Diffuse Pollution Conference, Dublin 2003 Poster Papers.

Jinn, J., Z. Wang, S. Ran and C. Yun 2003. Study on coastal resource evaluation theories and methods. International Conference on Estuaries and Coasts. Hangzhou, China.

Land-Ocean Interactions in the Coastal Zone 2005. Science Plan and Implementation Strategy. International Geosphere-Biosphere Programme (IGBP) Report 51/IHDP Report 18. Stockholm, IGBP Secretariat.

Lourenço, N. and C.R. Machado 2007. Understanding territory dynamics in coastal areas: A methodological approach to analyse socio-economic and biophysical interactions. ENCORA, 1st Thematic Network Conference, Venice, Italy, 12–13 March.

Martinez, M.L., A. Intralawan, G. Vazquez, O. Perez-Maqueo, P. Sutton and R. Landgrave 2007. The coasts of our world: Ecological, economic and social importance. *Ecological Economics*, 63, pp. 254–272.

Mclean, R.F. and A. Tsyban 2001. Coastal zones and marine ecosystems. In: McCarthy, J.J., O.F. Canziani, N.A. Leary, D.J. Dokken and K.S. White 2001. *Climate change 2001: Impacts, adaptation, and vulnerability*. Cambridge, Cambridge University Press.

Millennium Ecosystem Assessment 2003. *Ecosystems and human well-being*. Washington, DC, Island Press.

Nelson, G.C., E. Bennett, A.A. Berhe, K. Cassman, R. DeFries, T. Dietz, A. Dobermann, A. Dobson, M. Janetos, D. Levy, N. Marco, B. Nakicenovic, R. O'Neill, G. Norgaard, D. Petschel-Held, P. Ojima, R. Watson and M. Zurek 2006. Anthropogenic drivers of ecosystem change, ecology and society, 11. Available from: <http://www.ecologyandsociety.org/vol11/iss2/art29/> [Accessed 20 July 2008].

Nielsen, J.R., P. Degnbol, K.K. Viswanathan, M. Ahmed, M. Hara and N.P.R. Abdullah 2004. Fisheries co-management – an institutional innovation? Lessons from South East Asia and Southern Africa. *Marine Policy*, 28, pp. 151–160.

Olsen, S. and P. Christie 2000. What are we learning from tropical coastal management experiences? *Coastal Management*, 28, pp. 5–18.

Olsen, S.B. 2003. Frameworks and indicators for assessing progress in integrated coastal management initiatives. *Ocean and Coastal Management*, 46, pp. 347–361.

Parnell, S. 2000. Environment and poverty in Southern Africa – regional linkages. Background Paper prepared for DFID (Department for International Development, United Kingdom) SA and CA, November 2000.

Raleigh, C. and H. Urdal 2007. Climate change, environmental degradation and armed conflict. *Political Geography*, 26, pp. 674–694.

Republic of South Africa 2009. *National Environmental Management: Integrated Coastal Management Act, Act No. 24 of 2008*. Cape Town, Government Printer.

Sárda, R., C. Avila and J. Mora 2005. A methodological approach to be used in integrated coastal zone management processes: The case of the Catalan Coast (Catalonia, Spain). *Estuarine Coastal and Shelf Science*, 62, pp. 427–439.

Shi, H. and A. Singh 2003. Status and interconnections of selected environmental issues in the Global Coastal Zones. *Ambio*, 32, pp. 145–152.

Snoussi, M. and E.H.T. Aoul 2000. Integrated coastal zone management programme: Northwest African region case. *Ocean and Coastal Management*, 43 (12), pp. 1033–1045.

Stojanovic, T.A. and R.C. Ballinger 2009. Integrated Coastal Management: A comparative analysis of four UK initiatives. *Applied Geography*, 29, pp. 49–62.

Stojanovic, T., R.C. Ballinger and C.S. Lalwani 2004. Successful integrated coastal management: Measuring it with research and contributing to wise practice. *Ocean and Coastal Management*, 47, pp. 273–298.

Trujillo, A.J., J. Pino and F. Breton 2003. The role of coastal zone information systems in a socio-environmental change study within a spatio-temporal and interdisciplinary approach: A case study of the Catalonian coastal zone. Presentation at Integrating information in

Coastal Zone Management – Fifth International Symposium on GIS and Computer Cartography for Coastal Zone Management, Palazzo Ducale, Genova, Italy, 16–18 October.

Turner, K. 2004. Integrated environmental assessment and coastal futures. In: Vermaat, J., L. Bouwer, K. Turner and W. Salomons eds. 2005: *Managing European coasts: Past, present and future*. New York, Springer.

Turner, R.K., S.E. Subak and W.N. Adger 1995. Pressures, trends and impacts in the coastal zones: Interactions between socio-economic and natural systems. Centre for Social and Economic Research on the Global Environment (CSERGE) Working Paper GEC 95–09 on the Global Environment, University of East Anglia, and University College London.

United Nations Development Programme (UNDP) 2006. *Country programmes and related matters*. Draft country programme document for South Africa (2007–2010), Second regular session, New York.

Van den Bergh, J.C.J.M. 2000. Ecological economics: Themes, approaches, and differences with environmental economics. Department of Spatial Economics: Free University (Netherlands), Amsterdam.

Vordzorgbe, S.D. 2007. Climate change and risk management in Africa: Major issues. United Nations International Strategy for Disaster Reduction (UN/ISDR), Expert Background Paper for the Session on Risk Management and Climate Change, World Economic Forum on Africa, Cape Town, 13–15 June.

Wittmer, H., F. Rauschmayer and B. Klauer 2007. How to select instruments for the resolution of environmental conflicts? *Political Geography*, 26, pp. 674–694.

Xiuwan, C. 2002. Using remote sensing and GIS to analyse land cover change and its impacts on regional sustainable development. *International Journal of Remote Sensing*, 23, pp. 107–124.

Land-related conflicts in Sub-Saharan Africa

*Urmilla Bob**

Abstract

Sub-Saharan Africa has a history of land dispossession and contestation which have resulted in various types of inequalities and a skewed distribution of land resources. Land in Sub-Saharan Africa has been subject to conflict, conquest, expropriation and exploitation thus resulting in the many discrepancies that exist today. This has greatly influenced the socio-economic and political positions of different groups of people. This situation has resulted in numerous land conflicts, and in most Sub-Saharan countries the land question and past inequalities remain unresolved. This article shows that there are various types of land conflicts in Sub-Saharan Africa. Furthermore, land conflicts are generally influenced by a range of complex and interrelated factors. Specifically, aspects relating to poverty and inequality as well as land reformation processes are relevant given that contestations over land resources are most noticeable among the poor. Additionally, land conflicts are intensifying and becoming more widespread. The article also discusses key aspects that need to be considered when managing land conflicts. It is important to note that this article draws heavily on a South African perspective and is not an exhaustive review of the range of land-related conflicts on a diverse continent where significant variations exist. The focus is on highlighting key aspects and identifying commonalities.

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Introduction

Land and related resources such as water and biodiversity are vital in marginalised communities since they offer diversified livelihood opportunities and alternatives. Land also provides a sense of security in contexts where formal employment opportunities and access to resources are limited. Land resources continue to have major historical, cultural and spiritual significance. As a result, land has been a source of conflict and contestation. Given its importance, access to and availability of land resources are critical to ensuring real and long-lasting improvement in social, economic and political well-being, especially in vulnerable societies that are prone to instability and conflicts. Specifically, the amount and type of land in Sub-Saharan Africa available to households and communities are critical to food production and stability. Odgaard (2006:5), focusing on Tanzania, states:

> The vital importance of land issues to social and economic development in Africa is unquestionable. The fact that land is becoming an increasingly scarce resource in many parts of the continent, and also a more and more conflict ridden resource, has implied that issues related to land rights and land conflicts now range high on the policy agendas both in African countries and among international donors.

This article examines land conflict issues in Sub-Saharan Africa in relation to the following thematic concerns: access to and control of land, key types of land conflicts discernible, and managing land conflicts.

Access to and control of land

There are varying degrees of land tenure in Africa, the most important of which are freehold/private titles, communal/traditional systems, public land, and squatting. Furthermore, various social dimensions (class, gender, religion, ethnicity) affect access to and ownership of land. Kagwanji (2009:4) asserts that across eastern Africa (specifically Kenya, Uganda, Tanzania and Rwanda) the question of the use and ownership of, and access to increasingly scarce land and related resources has been at the centre of festering conflicts between ethnic

groups in the region. At the community, household and individual levels, a range of factors influence who accesses and controls land resources. These relate to one's bargaining position which influences the level of success or failure in acquiring land. The external factors are broader economic and political forces, quantity and quality of land available, and the local economy and culture. These largely influence market prices and the amount and quality of land available. The internal factors are demographic aspects (such as gender, age, household status and lineage), economic status and social networks. These factors together with local culture can deny rights to certain groups, such as women and generally define who will benefit and be prioritised in terms of accessing land.

Ownership and control of land and related resources are often associated with influence in decision making and power to affect outcomes. Hutchison et al. (1991, cited in Rugege et al. 2007:27) illustrate that ownership, like all real rights, consists primarily of a relationship between a legal subject and a thing or legal object, encompassing complete and absolute control over the thing concerned as well as possible rights and capacities over it. They further assert that land tenure is a key factor in any economy since it confers property rights and defines access to and control over land assets, including natural resources that exist in or on the land. Additionally, it confers rights in relation to the manner in which people own, occupy and transact land. This also entails decisions pertaining to residential and business development, agricultural production and mining, and the use of other natural resources.

Issues of access and distribution are important in the context of land and people's power relationships with it. Viljoen's (2006:2) differentiation between poverty and inequality in the South African context is worth noting: poverty is characterised by the inability of individuals, households or communities to command sufficient resources to satisfy a socially acceptable minimum standard of living, while inequality refers to a state of social organisation in which access to resources and opportunities is unevenly apportioned. Bob et al. (2008:28) state that inequality is often a consequence of political, economic and social processes that concentrate resources in certain hands at the expense of others. In Sub-Saharan Africa the vast majority of the black population have limited access to land ownership and related natural resources, resulting in high levels

of vulnerability and resultant conflicts over land (Bogale et al. 2006; Rugege et al. 2007). Huggins et al. (2005:1) indicate that several studies 'demonstrate that changes in land use and land access have been significant factors in a number of high-intensity conflicts in Africa', but warn that they are not always the 'root causes'. Land control and use is a highly complex and contested issue amongst various stakeholders – including white/large-scale farmers, local communities, traditional authorities and democratically elected local institutions, each with often differing interests.

Another aspect to consider is increased globalisation. Shultz (2000, cited in Bob and Moodley 2003:359) argues that one consequence of globalisation is a decrease in international trade restrictions which is likely to influence the value of and market conditions for land and related resource products. The commoditisation of nature and privatisation of land is increasing worldwide. Furthermore, the trade in natural resources is also likely to increase. Bob and Moodley (2003:359) indicate that the commoditisation of land and natural resources in South Africa is often accompanied by a significant gap between local and global valuation of nature which is most discernable where economic differences are acute. Heightened conflicts over the use, control and ownership of land resources are also likely to occur in these contexts. Additionally, globalisation results in changes in land ownership patterns. This is likely to weaken autonomy and lead to vulnerable groups being exploited. This is also linked to the exploitation of local communities and is most discernible in relation to contestations over mining rights and harvesting of sought after plants for medicinal purposes. These contestations are worsened when rights are vested in the hands of multinational companies. Conflicts can also arise between local communities and governments who collude with these multinational companies.

Key types of land conflicts in Sub-Saharan Africa

Wehrmann (2006:2) states that a useful way to classify land conflicts is that offered by conflict research which examines conflicts according to the social level at which a conflict takes place: inner-personal, interpersonal, inner-societal and inter-societal/international. While the inner-personal is not relevant to land conflicts, the rest are discernible in the African context. Kinsey (2004:1669)

specifically uses the Zimbabwean experience to show the failures of resettlement programmes and the political motivations for land occupations (and resultant conflicts), and highlights the interlocking relationships among property, poverty and conflicts.

Reuveny (2007:656) cites several examples of land conflicts that resulted in environmental migration. For example in Africa, 600 000 people moved from central/northern Ethiopia to the southwest/west regions because of drought and famine which resulted in nomad-farmer conflicts over land. During the early 1990s in Rwanda 1,7 million people moved from the central regions and rural south to northern Rwanda and Zaire as a result of ethnic conflicts and genocide which were exacerbated by land and water scarcity and degradation. Declining access to land, or rather to the returns from human uses of land, is seen as a key process that causes livelihood contraction and hence increases the risk that people will join armed groups (De Soysa et al. 1999, cited in Barnett and Adger 2007:644).

Several potential areas of land conflict within and between rural 'communities', and between rural people and state institutions exist. Types of post-apartheid rural land-based conflicts cited in the literature that are likely in communal areas of KwaZulu-Natal, South Africa, are listed below as illustrative examples relevant to Sub-Saharan Africa more generally (Carton 2000; Cousins and Hornby 2002; Cross and Friedman 1997; KZN Provincial Team 2002; Majeke 2005; Van der Waal 2004):

- Conflict between households, neighbourhoods and neighbouring 'communities' over land rights and boundaries.
- Conflict between traditional and 'non-traditional' local organisations in land management and dispute resolution.
- Inheritance-related conflict among family members.
- Conflict between 'newcomer' households and long standing residents.
- Conflict arising from household mobility.
- Generational conflict over land use and appropriation of benefits.

- Conflict between interest groups over appropriate land purposes.
- Distribution of benefits from land development projects.
- Escalating levels of crime and violence undermining both land rights and land management practices.
- Gender conflict over land access, land use and appropriation of benefits.

These are also noticeable in other land conflict studies which focus on Africa. For example, similar trends were found in Swaziland where Mkhabela (2006:58) identified the following potential sources of land conflicts: inequitable access to land and gender bias, overpopulation on Swazi nation land, land degradation, tenure insecurity, farm squatting and land scarcity, speculative trends in the land market, slow socio-cultural changes and lack of control due to non-existence of land rights. Bogale et al. (2006:134) examine the negative consequences of scarcity-induced land-related conflicts in Ethiopia which has resulted in high levels of household vulnerability. They observed that the absence of clearly defined property rights and management plans have led to the over-exploitation of the hillsides, leading to perpetuation of poverty and food insecurity.

Andrew (2003:117) argues that small-scale mining found in remote areas of developing countries routinely generates land use conflicts (occasionally involving armed conflicts), usually with large mining companies, which have significant adverse impacts on the natural environment and local populations. Hilson (2002:149) examines the impacts of land use disputes (linked to competition over land plots) between small- and large-scale miners in Ghana. In most cases these intense conflicts have also involved regional governmental officers and security forces.

Theron (2009:4) and Van Leeuwen (2009:1) highlight land-related conflicts in post-conflict environments, showing how in Burundi returnees (former refugees and displaced people) face considerable challenges in reclaiming and securing their land rights. Theron (2009:5) argues that 'if a large number of returnees are not able to reclaim their land and other properties, their frustrations could lead to violent actions'. Furthermore, Van Leeuwen (2009:7) warns that land disputes in Burundi need to be framed beyond 'returnee-related conflicts' if interventions

and peace-building efforts are to have long-term success. He asserts that disputes were related to a range of factors that also need to be understood such as the limited size of family property, patriarchal customary inheritance practices, cultural values attached to property and manipulations by state representatives.

Andre and Platteau (1998, cited in Deininger and Castagnini 2006:324) assert that in Rwanda extreme land scarcity coincided with accumulation of land by individuals with access to non-agricultural incomes, which led to land conflict as one of the principal reasons for the outbreak of the civil war in 1994. Campbell et al. (2000:337) show that the land use conflicts in the south-eastern Kajiado district, Kenya, reflect the ongoing conflicts over access to scarce land and water resources between herding, farming and wildlife. Deininger and Castagnini (2006:321) indicate that ineffective land policies in Uganda have increased the frequency of land conflicts and reduced productivity levels.

The above discussion briefly summarises some of the key land conflicts in Sub-Saharan Africa, highlighting pertinent examples. Furthermore, Odgaard's (2006:25) observations in relation to Tanzania that conflicts have changed in nature and have been growing and becoming more complex, violent and involving larger numbers of people are relevant in most Sub-Saharan countries. Several of the conflicts identified are also linked to land reform processes, which are discussed next.

Land reform and conflicts

Land reform has been undertaken in almost all countries in Sub-Saharan Africa (Peters 2004:275) and this has particularly been a source of numerous conflicts.

> To the extent that land policies reinforce the tendency of greater land scarcity to amplify pre-existing gender, ethnic, or wealth inequalities with respect to land access, they can contribute to a downward spiral of conflict, resource degradation, and social strife with potentially far-reaching implications for natural resource conservation and agricultural productivity (Deininger and Castagnini 2006:325).

Unravelling Africa's racially skewed land holding pattern is one of the most sensitive and complex issues facing governments on the continent. Land reform in Africa is generally undertaken to address political, social and economic imperatives and is deemed to be central to addressing past injustices in land access and allocation as well as contributing to local and national security. Land reform is viewed as one of the key means for positively changing people's lives. Land reform can take various forms including: the allocation of land itself, compensation, subsidies, laws that protect the land rights of previously disadvantaged groups or a combination of mechanisms. A major challenge facing land reform policy-makers and implementers is how to balance often conflicting social, economic and political land reform imperatives. This and the multiple demands and high number of potential beneficiaries have resulted in a range of land conflicts linked to land reform processes.

Land reform programmes identify specific beneficiaries that are to be targeted in particular projects. The targeting of specific groups is partly a result of governments taking into consideration that there are specific priority groups and the fact that there are limited resources which have to be effectively and efficiently utilised. This often results in conflicts as some people feel that they are disadvantaged and do not benefit from the land reform processes. Also, Huggins et al (2005:1) state that the actual or promised redistribution of land from weaker to stronger parties can fuel and prolong conflicts, as seen in Burundi, Rwanda and the Democratic Republic of the Congo. Additionally, several conflicts arise when the land that is allocated is deemed to be either inappropriate or inadequate. There are several resettlement failures associated with land reform throughout the continent which have resulted in conflicts and, as is the case in Zimbabwe, undermined national security (Kinsey 2004). Furthermore, market-led land reform projects (the approach often adopted in African countries) usually result in the wealthier segments of society benefiting.

The issue of the role of local government and traditional authorities in relation to land control and use in rural communities is highly contested (Deininger and Castagnini 2006; Mkhabela 2006). Deininger and Castagnini (2006:324) state that 'in much of Africa, formal institutions for land administration were often superimposed on traditional structures without clear delineation of

responsibilities and competencies, implying that they tend to lack both outreach and social legitimacy'. There is particularly uncertainty and lack of clarity about the role of traditional authorities in land reform programmes. Specifically, the role of traditional leaders in relation to administration and control of communal lands has been questioned. For example, Peters (2004:269) indicates that in Sub-Saharan Africa the image of negotiable and adaptive customary systems of landholding and land use is flawed; instead exclusions, deepening social divisions and class formation are intensifying land conflicts. In the case of South Africa, there is contestation between traditional institutions and democratically elected local government structures to allocate and manage land. This has in some instances resulted in outright conflicts in certain localities, de-stabilising communities and impeding prospects for peace and development.

Rugege et al. (2007:31) assert that the major problems faced by land management under traditional systems in South Africa are corruption, contradiction of traditional systems with modernity, selling or controlling of land for personal profit and benefits, and discriminatory practices. They indicate that the latter includes discrimination against women and a move towards commercial practices and accumulation. Furthermore, commercial agriculture results in the emergence of a new class who are encouraged to accumulate wealth and land. This, Rugege et al. (2007:32) indicate, can often result in an increase of the landless as wealthier segments of farmers buy out those who can no longer sustain production and survival given competition.

Another aspect that is important to consider is women's land rights and violence. Under most traditional systems land is not allocated to women but to men. Cross and Friedman (1997) assert that the gendered nature of land relations in some instances leads to violence against women. They provide an illustrative example from a study conducted by the Border Rural Committee in South Africa to show how land-induced violence has gender implications. Specifically, the frustration of young men unable to fulfil customary expectations by attaining land and a homestead has contributed to abuse of women from the 1940s. Cross and Friedman (1997) assert that studies indicate that in addition to leading to violence, the pattern of African men being unable to attain land rights as a result of artificial land shortages created by apartheid in South Africa

for most Africans, also contributes to declining rates of marriage, increased divorce and to male desertion of women and children. Carton (2000) warns that these forms of gender abuse should not be overlooked as a potentially dangerous and unforeseen area of conflict. In research undertaken by the author in KwaZulu-Natal, a telling example illustrating the gendered nature of land conflicts emerged during the colonial period. One woman interviewed recalled that under the *amakhosi* (chieftaincy) system when a husband died men in the community took the widow's field. When she went to the *induna* (headman) to settle the dispute he did nothing about it. Her family members from another community came to challenge the men and violence erupted.

The inability of governments to deliver on restitution claims has other unpleasant consequences. In many cases claimants lose faith in the entire process and see land invasions (which often have detrimental impacts on the environment) as the only option to speed up the process and get government attention. In Sub-Saharan Africa, there is yet another group of stakeholders that need to be considered. In terms of land claims, a highly controversial aspect is the future of natural conservation areas. Chellan and Khan (2008) illustrate that wildlife conservation in Africa has often competed with rural indigenous communities for land, water and forests. In many instances communities were forcefully removed from areas to make way for conservation areas. Many claims are on nature reserves or game parks where land invasions, which have often been associated with violence, have already occurred. Environmental and social conflicts have often emerged or been worsened by the slow pace of land restitution and redistribution.

Managing land-related conflicts

As there is no single definition of 'land' and property rights, there is also a wide range of land-related resources and uses, and so are there variations in approaches to the management of land-related conflicts. It is imperative that landscape planning activities, including those linked to land reform processes, take not only the physical facts of an area into consideration, but also deal with the social situation of the people whom the planning affects; that is through collaboration with local actors and stakeholders (Luz 2000; Wheeldon and

Faubert 2009). Spatial methods such as mental mapping help in building consensus and can form a base for resolving conflicts and differences of opinion. It also facilitates discussion on the basis of visual information presented. Wehrmann (2006:1) highlights the importance of reducing conflicts over land in Africa through the implementation of a functioning land registration and/or cadastral system which need to be supported by additional preventive measures such as conflict resolution (including moderation, mediation and arbitration), land management (focusing primarily on clarifying land rights and security of tenure) and psychotherapeutic approaches (for example, trauma counselling).

Communal land tenure will inevitably involve conflicts and disagreements between households and neighbourhoods. Disputes may be discussed and/or resolved in formal and informal institutions and practices. While experience with the implementation of the Communal Property Association in KwaZulu-Natal clearly shows that linkages to, and support from broader institutions are essential, dispute resolution is also a key aspect of local autonomy and realising agency. Van der Waal's (2004) analysis of customary dispute mechanisms in Limpopo cautions against attempts to standardise rules. Similarly in communal land administration there are likely to be differences in the practices of particular communities – while these differences may appear insignificant to the outsider, they are expressions of local agency and autonomy that cannot be removed without undermining the collective action that is essential to manage common property resources.

The concept of human security and land security relates to concepts such as socio-ecological resilience and vulnerability as well as access to and control over land-related resources, especially security in terms of property rights. Folke et al. (2002:437) describe resilience of social-ecological systems as a combination of three characteristics:

- the magnitude of shock that the system can absorb and remain within a given state;
- the degree to which the system is capable of self-organisation; and
- the degree to which the system can build capacity for learning and adaptation.

In terms of land tenure systems and rights, these three aspects are clearly discernible. In Sub-Saharan Africa, there are constant shocks experienced in terms of climate change, collapse of socio-economic systems, ineffective land reform processes and persistent political unrest in many areas. In several of these contexts the magnitude is significant and can range from local to regional levels: as with the Mozambican floods, the civil unrest in Central Africa and the persistent droughts in Southern Africa. In terms of self-organisation, several national and local institutional structures are in a crisis. Additionally, as discussed earlier, there are numerous unresolved issues pertaining to traditional authority systems. These aspects further fuel land conflicts and contestations. Furthermore, it is imperative that land transformation processes consider the natural resource base. In particular, Wessels et al. (2003:157) state that land reform programmes in South Africa should refrain from promoting cultivation (and development) on marginal lands, especially in conflict areas with high biodiversity value. The above illustrates that in many instances, there is a lack of capacity to be resilient and cope with conflicts and shocks. These issues need to be addressed via appropriate policy development and implementation strategies.

It is imperative that community resilience in particular is enhanced. As the United States Agency for International Development (USAID 2006) illustrates, community resilience requires integrating and maintaining an optimal balance between community development (which provides the enabling governance and socio-economic and cultural conditions for resilience), disaster management (which focuses on preparedness, response, recovery and mitigation to reduce human and structural losses from disaster events) and land management (which establishes the environmental and natural resource conditions for resilience and ways of addressing issues with regard to the built environment). The following are specific benchmarks and elements to assess community resilience that is important for land management generally (adapted from USAID 2006:5):

- Governance: Leadership, systems, and institutions provide enabling conditions for participatory management and community involvement with local government.
- Socio-economic and livelihood assets: Local economies are driven by sustainable and diverse livelihoods and healthy and peaceful socio-cultural conditions.

- Resources management: Active management of resources sustains environmental services and livelihoods and reduces risks from hazards.
- Land use management and structural design: Effective land use and structural design complement environment, economic and community goals and reduce risks from hazards.
- Risk knowledge: Community is knowledgeable about episodic and chronic hazards and measures to reduce risks.
- Warning and evacuation: Community is capable of receiving notifications and alerts of hazards, warning at-risk populations, and acting on alert.
- Emergency response: Emergency response institutions and systems are established and maintained to respond quickly to disasters and address emergency needs at the community level.
- Disaster recovery: Plans, systems, and institutions are in place to accelerate disaster recovery, actively engage communities in the recovery process and minimise negative environmental, social and economic impacts from disaster recovery.

Communities and countries in Sub-Saharan Africa generally do not perform well in relation to the above criteria.

In relation to managing land conflicts, the role of women's organisations is important to consider. For example, Campbell et al. (2000:344) show that while the role of women has not formally changed within the Maasai cultural system in Kenya, they have begun organising themselves into formal and informal groupings to improve their economic condition and access land. They assert that women are important land managers and through these groups they are challenging their marginalised economic and political status.

Huggins et al. (2005) and Theron (2009) also highlight the importance of reforming institutional (including policy) and judicial systems related to resolving land conflicts. This includes traditional mechanisms and recognises the importance of non-governmental organisations (NGOs). NGOs in particular can play a useful role as intermediaries in helping to resolve land-related conflicts. However, NGOs increasingly face a range of challenges including lack of human and financial resources.

Conclusion

The resolution of land-related conflicts is key to promoting sustainable development and attaining peace and security in Sub-Saharan Africa. Specifically, the article reveals that it is important to realise that land reform is essential for the empowerment of historically disadvantaged people and communities, and successful development more generally. Effective land reform can reduce conflicts and create stability and security in communities. However, land reform processes that are inadequately conceptualised and implemented can create land-related conflicts.

Clearly, there is a range of land conflicts that vary in terms of intensity, extent of their spatial impact, complexity and impact on different groups of people. The most prevalent of these conflicts relate to

- tenure rights and land security, specifically in relation to ineffective land reform processes and forced migrations leading to civil unrest and instability;
- access to resources (including contestations in relation to agricultural activities, mining and conservation areas);
- inheritance conflicts;
- and more recently, gender-based conflicts.

Land scarcity and unfair market practices exacerbate land-related conflicts. The effective management of land conflicts is required to ensure that long-term, sustainable solutions are found and that the quality of life of those most affected by these ongoing disputes is improved.

Sources

Andrew, J.S. 2003. Potential application of mediation to land use conflicts in small-scale mining. *Journal of Cleaner Production*, 11, pp. 117–130.

Barnett, J. and W.N. Adger 2007. Climate change, human security and violent conflict. *Political Geography*, 26, pp. 639–655.

Bob, U., K. Swart, B. Maharaj and P. Louw 2008. Nature, people and the environment: Overview of selected issues. *Alternation*, 15 (1), pp. 17–44.

Bob, U. and V. Moodley 2003. Globalisation, rural women and access to environmental resources in South Africa. Proceedings of the International Conference: Local land use strategies in a globalising world: Shaping sustainable social and natural environments, 21–23 August 2003, Institute of Geography, University of Copenhagen.

Bogale, A., M. Taeb and M. Endo 2006. Land ownership and conflicts over the use of resources: Implications for household vulnerability in eastern Ethiopia. *Ecological Economics*, 58, pp. 134–145.

Campbell, D.J., H. Gichohi, A. Mwangi and L. Chege 2000. Land use conflict in Kajaido District, Kenya. *Land Use Policy*, 17, pp. 337–348.

Carton, B. 2000. *Blood from your children: The colonial origins of generational conflict in South Africa*. Pietermaritzburg, University of Natal Press.

Chellan, N. and S. Khan 2008. Contesting ecotourism development in the iSimangaliso Wetland Park in KwaZulu-Natal. *Alternation*, 15 (1), pp. 268–289.

Cousins, T. and D. Hornby 2002. Leaping the fissures: Bridging the gap between paper and real practice in setting up common property institutions in land reform in South Africa. No 19 Occasional Paper Series, Land reform and Agrarian change in Southern Africa. PLAAS. School of Government, University of the Western Cape, Cape Town.

Cross, C. and M. Friedman 1997. Women and tenure: Marginality and the left hand power. In Meer, S. (ed) *Women, land and authority: Perspectives from South Africa*. Braamfontein, National Land Committee.

Deininger, K. and R. Castagnini 2006. Incidence and impact of land conflict in Uganda. *Journal of Economic Behaviour and Organisation*, 60 (3), pp. 321–345.

Folke, C.S., T. Carpenter, L. Elmqvist, C. Gunderson, S. Holling and B. Walker 2002. Resilience and sustainable development: Building adaptive capacity in a world of transformations. *Ambio*, 31, pp. 437– 440.

Hilson, G. 2002. Land use competition between small- and large-scale miners: A case study of Ghana. *Land Use Policy*, 19, pp. 149–156.

Huggins, C., H. Musahara, P.M. Kamungi, J.S. Oketch and K. Vlassenroot 2005. Conflict in the Great Lakes Region – How is it linked with land and migration? *ODI: Natural Resource Perspectives*, 96, pp. 1–4.

Kagwanji, P. 2009. *Ethnicity, land and conflict in Africa: The cases of Kenya, Uganda, Tanzania and Rwanda*. Nairobi, Africa Policy Institute Working Paper Series.

Kinsey, B.H. 2004. Zimbabwe's land reform programme: Underinvestment in post-conflict transformation. *World Development,* 32 (10), pp. 1669–1696.

KZN [KwaZulu-Natal] Provincial Team 2002. Assessment of the Msikazi Communal Property Association. Unpublished report prepared for the Department of Land Affairs.

Luz, F. 2000. Participatory landscape ecology – a basis for acceptance and implementation. *Landscape and Urban planning*, 50, pp. 157–166.

Majeke, A.M.S. 2005. The role of traditional leaders in land tenure: The original legal and constitutional framework. Paper presented at the conference on Land tenure reforms and the evolving role of traditional leaders, 16–18 November 2005, in Durban, South Africa.

Mkhabela, T. 2006. Impact of land tenure systems on land conflicts: Swaziland – a country case study. *Africanus*, 36 (1), pp. 58–74.

Odgaard, R. 2006. *Land rights and land conflicts in Africa: The Tanzania case*. Copenhagen, Danish Institute for International Studies.

Peters, P.E. 2004. Inequality and social conflict over land in Africa. *Journal of Agrarian Change*, 4 (3), pp. 269–314.

Reuveny, R. 2007. Climate change-induced migration and violent conflict. *Political Geography*, 26, pp. 656–673.

Rugege, D., U. Bob, V. Moodley, S. Mtshali, O. Mutanga and A. Mthembu 2007. *A literature review for the Baseline Survey on Communal Land Rights Act in KwaZulu-Natal.* Submitted to the Department of Land Affairs, Pretoria.

Theron, J. 2009. Resolving land conflicts in Burundi. *Conflict Trends*, 1 (2009), pp. 3–10.

United States Agency for International Development (USAID) 2006. Coastal community resilience: A guide for planning and action to address Tsunami and other coastal hazards, US Indian Ocean Tsunami Warning System (IOTWS) Programme, Bangkok.

Van der Waal, C.S. 2004. Formal and informal dispute resolution in the Limpopo Province, South Africa. *Anthropology Southern Africa*, 27 (3 and 4), pp. 111–121.

Van Leeuwen, M. 2009. Crisis or continuity? Framing land disputes and local conflict resolution in Burundi. *Land Use Policy*, Article in Press. Available from: <www.elsevier.com/locate/landusepol> [Accessed 15 January 2010].

Viljoen, M.F. 2006. Bridging the economic divide in South African agriculture by improving access to natural resources. *Agrekon*, 45 (1), pp. 1–16.

Wehrmann, B. 2006. Solving land conflict in Africa. Available from: <http://www.gim-international.com/issues/articles/id655-Solving_Land_Conflict_in_Africa.html> [Accessed 20 July 2008].

Wessels, K.J., B. Reyers, A.S. van Jaarsveld and M.C. Rutherford 2003. Identification of potential conflict areas between land transformation and biodiversity conservation in north-eastern South Africa. *Agriculture, Ecosystems and Environment*, 95, pp. 157–178.

Wheeldon, J. and J. Faubert 2009. Framing experience: Concept maps, mind maps, and data collection in qualitative research. *International Journal of Qualitative Methods*, 8, pp. 69–83.

Wildlife-community conflicts in conservation areas in Kenya

*Roselyne N. Okech**

Abstract

Kenya is rich in biological diversity to which wildlife resources contribute a significant proportion. Many of the regions with abundant and diverse wildlife communities remaining in East Africa are occupied by pastoralists. Recent studies show that the majority of the local people around protected areas have negative feelings about state policies and conservation programmes. The alienation of grazing land for the exclusive use of wildlife and tourists has a very direct impact upon the pastoralist communities, and prompts them to raise questions about African wildlife policy – as if it leads to a 'people versus animals' conflict. Nevertheless, large areas of pastoral rangelands have been expropriated for exclusive wildlife conservation use. This has commonly been justified by the argument that pastoralists overstock, overgraze and damage their range while wild animals are seen as existing in harmony with their surroundings. Wildlife-human conflicts, therefore, are a consequence of the problem of resource

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utilisation in conservation areas. Such conflicts do not solve this problem, however, but adversely affect the biodiversity. They harm people and property, and lead to the retaliatory killing of wildlife in 82% of the protected areas. This paper reviews literature that seeks to address the important issue of wildlife-human conflicts and also explores the aspects of pastoralism and conservation in Kenya.

Introduction

Kenya's wildlife is one of the richest and most diversified in Africa. Several of its protected areas and wetlands are internationally recognised and protected as World Heritage Sites, Ramsar Sites (since the Convention on Wetlands was adopted in the Iranian city of Ramsar) and Man and Biosphere Reserves. Kenya's wildlife resource also constitutes a unique natural heritage that is of great importance both nationally and globally. Wildlife resources contribute directly and indirectly to the local and national economy through revenue generation and wealth creation (Ministry of Tourism and Wildlife 2007). For example, in the year ending 30 June 2006, wildlife accounted for 70% of the gross tourism earnings, 25% of the Gross Domestic Product (GDP) and more than 10% of total formal sector employment. On the whole, Kenyan people are depending on wildlife for livelihood, shelter, and for other ecosystem goods and services. Wildlife also fulfils critical ecological functions that are important for the interconnected web of life-supporting systems. Significantly, Kenya's major water towers are found in wildlife-protected areas. Wildlife also has socio-cultural and aesthetic values. Indeed, any adverse impacts on the ecosystem can dramatically alter humans' capacity to survive.

One of the major threats facing Kenya is the loss of biological diversity. Land use changes favouring agriculture and rural and urban development have led to the reduction and modification of wild areas, resulting in the extinction of or threat of extinction to wildlife species and natural areas which serve as their habitat. Kenya's great reservoir of wildlife is increasingly under threat and opportunities are lost for its contribution to the creation of growth, wealth and employment. According to Irandu (2003), the local comunities living near and around the national parks and game reserves are first to pay the price for wildlife

conservation through the destruction of their property, and through death or injuries caused by wild animals. This is especially the case in the big national parks and game reserves in Kenya. According to Munyori (1992a:110; 1992b:16), Sindiga (1999) and Sindiyo (1992:76), wildlife-human conflicts are a problem of resource utilisation in conservation areas. Increasing scholarly attention and policy initiatives attest to the seriousness of the problem. Recent studies show that the majority of the local people around protected areas have negative feelings about state policies and conservation programmes.

Otieno (2003) notes that the Maasai have co-existed with animals for years, but they never see the proceeds from tourism. Instead, they have become victims of the animals. But how did these negative feelings develop? Factors contributing to conflict involving pastoralists comprise socio-economic and political marginalisation, inadequate land tenure policies, insecurity, cattle rustling, proliferation of small arms and light weapons, weakened traditional governance in pastoral areas, vulnerability to climatic variability, and competition with wildlife. Besides, 70% of the wild animals live outside official parks in dispersal areas. The wildlife causes an enormous loss to the people by destroying property and killing humans, because there are so many problem animals. Further, wildlife carries many diseases that are dangerous to livestock. These diseases include malignant catarrh fever, a viral disease that kills livestock and is associated with the wildebeest; foot and mouth disease, a highly contagious viral disease that reduces milk supply and body weight; and East Coast fever.

Should the locals still be expected to appreciate the significance of animals even when their interests are not being addressed? Due to the carving out of land for the national parks and reserves, local communities lost invaluable herding resources and sometimes agricultural land. In this instance, local people bear the cost of conservation because of foregoing the opportunity to use their land in alternate ways. Further, the wild animals in the parks usually move in and out of neighbouring farms and ranches in response to spatial and temporal occurrences in the distribution of fodder and water. The rise in human-wildlife conflict could evolve into a major crisis if a solution is not immediately found (Ogodo 2003).

The lands outside the parks are crucial to wildlife since they serve as dispersal areas. These areas are threatened with increasing 'land sub-division, agricultural expansion and unplanned development of tourist accommodation, thus increasing human-wildlife conflicts' (Kenya 1997:88, cited in Sindiga 1999:21). Amboseli and Maasai Mara provide a good case to examine conflicts between wildlife conservation and local people. The cases provide lessons not only on conflict resolution in conservation but also on the necessity of local support for successful tourism-led conservation. The presence of wildlife which has a capacity to live with many of these diseases without serious impact on their populations is a constant source of frustration to local livestock-keeping. Also, wild animals make cultivation impossible by destroying crops in the fields.

Wildlife in many protected areas (Table 1) is under threat from human encroachment, insularisation, poaching for commercial or subsistence purposes, habitat degradation, encroachment of incompatible land uses, loss of migration and dispersal areas, and ever increasing human-wildlife conflicts. In a scenario where wildlife-induced damages to human property and life are neither controlled nor compensated, negative local attitudes towards conservation and wildlife resources become entrenched (Okello and Wishitemi 2006:90). This is made worse when local communities do not benefit from wildlife resources and are alienated from wildlife-related economic enterprises such as the lucrative tourism industry. When local communities feel that both governments and conservation stakeholders value wildlife more than their lives, livelihoods or their aspirations, retaliation and opposition to conservation initiatives can be swift and uncompromising. One solution to this is to empower communities to manage and benefit from wildlife resources found in communal group ranch dispersal areas. These sanctuaries, for most cases in Kenya, have the tourists in mind as key clients.

Table 1: The threat factors that operate against biodiversity in Kenya's protected areas, their prevalence and severity as stated by protected area officers

Threat factor identified by protected area officers	Number of protected areas where the threat factor exists	Prevalence Threat Index (PTI)
Illegal killing of wildlife for their *bush meat* for the local or regional markets.	48 (96%)	78,5%
Danger to biodiversity arising from the nature and intensity of *human-wildlife conflicts.*	41 (82%)	58,0%
Large mammal *poaching* for international commercial purposes.	40 (80%)	66,0%
Human encroachment in terms of the density and distribution of the human population around protected areas.	36 (72%)	54,0%
Loss, conversion and degradation of wildlife *migration and dispersal* corridors important for the protected area.	35 (70%)	53,5%
Unsustainable use of, demand for and *over-exploitation of natural resources* (water, plant resources and minerals) by the local communities.	23 (46%)	43.5%
Agricultural expansion and other *land use changes* incompatible to biodiversity requirements.	18 (36%)	31,0%

Pollutants from sources external to the protected area that harm biodiversity directly or indirectly.	13 (26%)	21,0%
Negative *tourism impacts* on the welfare of biodiversity and their habitats.	10 (20%)	16,5%
Fencing of an entire protected area or part of it, and its interference in wildlife movements.	5 (10%)	10,0%

Source: Adapted from Okello and Kiringe (2004:59–60)

The potential for tourism expansion, especially in the Tsavo-Amboseli ecosystem, is enormous and is likely to bring higher income to the community if well managed and marketed. However, the increasing network of these community-owned wildlife sanctuaries has to meet some ecological and socio-economic requirements to be viable, acceptable to the local communities and successful. Various threat activities are identified by protected area officers from which 10 main factors threatening biodiversity and conservation are outlined in Table 1.

Illegal killing of wildlife for bush meat occurred in 96% of the protected areas. Danger to biodiversity arising from human-wildlife conflicts (such as harm to people and property, and retaliatory killing of wildlife) occurred in 82% of protected areas, followed by large mammal poaching for the international commercial trade in trophies and other animal products which occurred in 80% of the protected areas. Human encroachment in terms of the density and distribution of the human population around protected areas occurred in 72% of the protected areas, while loss, conversion and degradation of wildlife migration corridors and dispersal areas occurred in 70% of the protected areas. In terms of prevalence based on frequency of mention by protected area officers, illegal killing of wildlife for bush meat had a PTI of 78%. Large mammal poaching for trophies and other products had a PTI of 66%, followed by human-wildlife conflicts with an index of 58%. Human encroachment; and loss, conversion and

degradation of migration corridors/dispersal area had a PTI of about 54% each. Other threat factors had a PTI of less than 50%.

The protected areas susceptible to more than 70% of the identified threat factors were Maasai Mara National Reserve, Ndeere Island National Park, Lake Nakuru National Park, Amboseli National Park, Aberdares National Park, Mount Elgon National Park, Kiunga Marine Park, Mount Kenya National Park, Mombasa Marine Park, Watamu Marine Park, Ruma National Park, Kisite-Mpunguti Marine Park, Malindi Marine Park, Mwea National Reserve, Kamnarok National Reserve, Rimoi National Reserve, and Nairobi National Park. A total of 63% and 54% of the protected areas were susceptible to over 50% and 60% of the threat factors, respectively. Another 34% and 6% were susceptible to over 70% and 80% of the threat factors, respectively.

The impact of tourism on biodiversity

Caalders et al (2000) identified five dimensions that should be considered when measuring the impacts of tourism on biodiversity. They are:

Dimension one: positive versus negative impacts

Tourism can have both positive and negative impacts on biodiversity. Methods for measuring the impacts of tourism tend to focus on the negative impacts. Positive impacts are, however, substantial.

Dimension two: direct versus indirect impacts

Tourism can have both direct and indirect impacts. Examples of direct negative impacts are hunting of endangered species, disturbance of animals and trampling on plants. Some indirect negative effects are induced through pollution of the physical environment, decline of the ozone layer, pollution of rivers, and dumping of waste material. On the positive side, indirect effects are the use of park fees for nature conservation and the consciousness raising of both tourists and the local population.

Dimension three: spatial scale

The spatial scale of impacts can vary from global warming and climate change that have an impact on biodiversity world-wide to trampling that has only

locally bound effects. In between these two extremes, different levels can be discerned. For example, the pollution of ground water has an impact on the entire downstream drainage area. Effects can be restricted to one ecosystem or to a part thereof. Some may be restricted to areas visited by tourists, others spill over into neighbouring areas. It is important to know whether effects are diffuse, or restricted to the source.

Dimension four: time scale

Disturbance caused by tourism can be temporary or long lasting. This depends on the type and seriousness of the impact, but also on the vulnerability and recuperative power of the species or the ecosystem.

Dimension five: different types of impacts

Apart from these general dimensions, different ways in which tourism, or human behaviour, can have an impact on biodiversity can be discerned. In the literature, the following categories have been found: land use and conversion, physical contact, addition of matter, addition of biota, withdrawal of matter, withdrawal of biota, and disturbance.

Policies for resolving wildlife-human conflicts

According to Okello and Wishitemi (2006:91), a number of changes are taking place among community group ranches in Kenya that threaten the interaction between culture and natural resources. Most of these group ranches, especially among the Maasai, are key wildlife dispersal areas and migration corridors for wildlife. Both internal and external forces drive these changes. The collapse of the beef industry in Kenya and a lack of expertise in livestock husbandry have led to the decline of pastoralism as a means of economic livelihood for the Maasai. As a result, poverty has increased, and has been enhanced by ecological constraints of the area (shallow soils and low rainfall that cannot support agriculture except around swamps and along rivers). Due to lack of government incentives and of a properly established beef industry to encourage efficient marketing and pricing for the Maasai livestock, alternative economic means, even though incompatible with cultural and natural resource conservation, have started to gain popularity.

The impoverishment of the Maasai is obvious and their daily struggle for survival is leading them to embrace agriculture in marginal rangelands and to convert wetlands and riverine habitats into farmlands. The rivers and their scarce water resources are frequently diverted to irrigate horticulture farms that are providing greater direct and significant household income than both pastoralism and conservation combined. The Oloitoktok and Kimana areas are now leading in production of onions, tomatoes and vegetables in Southern Kenya. Studies about land use changes in ecosystems (Okello and Megquier 1999; Okello and Conner 2000; Okello and Hadas 2000) reveal that over 70% of the local community in the Tsavo-Amboseli Ecosystem now practise both pastoralism and agriculture, with only a few practising pure pastoralism.

Agriculture expansion does not only destroy natural habitats and alter the character of rangeland landscape, but also fuel the human-wildlife conflicts as wild animals destroy crops more frequently than they harm livestock. Over 40% of group ranch members experience crop damages annually by wildlife compared to only about 21% who experience livestock losses (Okello and Megquier 1999; Okello and Conner 2000; Okello and Hadas 2000). Annual combined losses of both crops and livestock to wildlife become of more significance and of great concern to local communities as over 64% of community members incur both crop and livestock losses annually. These losses of crops and livestock to wildlife, as well as human deaths, insecurity and human injury result in reduced support for conservation. However, traditional interaction over the years has created great tolerance for wildlife among the Maasai, with over 62% of community members still thinking that wildlife should roam freely on their land, and 92% stating that wildlife conservation is important. But now, a majority of them are supporting land uses that are destructive and incompatible to conservation such as agriculture, and an increasing majority of over 60% are supporting and demanding group ranch sub-division into individually owned land parcels.

With about 60% of a local community being illiterate or having a very low level of education, changing attitudes and opinions by creating awareness through formal education may be less successful (Okello and Wishitemi 2006:91). However, partnerships with the local community that target elderly opinion who influence community opinions through informal education and awareness

may influence attitudes towards wildlife conservation. The ecological and socio-economic consequences of land use shift to agriculture that will negatively impact on their culture and conservation need to be explained clearly and consistently. The solutions many local communities are seeking to contain the ever-increasing human-wildlife conflicts, in the absence of direct benefit from conservation, seem to be taking the form of 'separation' rather than 'integration' of culture and natural resource conservation. Fencing and/or translocation of wildlife have/has the support of over 75% of the local communities (Okello and Hull 2001; Okello and Nippert 2001). Major culprits are elephants, lions and baboons as notorious problem animals. Okello and Nippert (2001) observed that as the Maasai continue to incur wildlife-related losses and insecurity rather than benefits, the government and foreign investors continue to draw large amounts of foreign income from parks (Tsavo and Amboseli) through the lucrative tourism industry.

These parks are historically Maasai traditional lands that were taken away from them without compensation or consultation. In view of the significance of wildlife conservation on its own and its tourism value, wildlife-human conflicts will remain a permanent problem in the neighbourhoods of protected areas. As such, the role of policy is to reduce the conflicts to a tolerable level. This involves dealing with problem wildlife and devising mechanisms to allow local people to derive direct benefits from wildlife-based tourism. Such an approach is likely to encourage the residents of those areas to conserve the fauna and flora. The Kenya Wildlife Service (KWS) (1990:41–45) formulated policies to deal with wildlife-human conflicts according to the wildlife and tenure characteristics of land as follows:

- Priority wildlife areas adjacent to the parks. These are wildlife dispersal areas and corridors without which wildlife cannot survive in the parks. These areas have the potential for wildlife-based economic activities, especially tourism. KWS focuses most of its attention on these lands.
- Non-adjacent areas to protected areas but with high conservation value and/or great potential for economic activity based on wildlife. Here KWS policy is to ensure that these areas are protected and that they also are a buffer for the priority wildlife areas.

- Wildlife-human conflict areas whether adjacent to or far from a park. KWS policy is to separate wildlife from other land uses by means of a barrier where possible.
- Non-adjacent areas, unconnected with any protected area or defined priority wildlife area, without severe conflict but with at present only moderate or low potential for wildlife activity. These are marginal areas of wildlife habitation and are not national priority.

Case study: Laikipia

Laikipia is one of 17 districts in the Rift Valley region of Kenya. It spans an area of over 9 500 km^2 and forms part of the 25 000 km^2 Ewaso ecosystem. The Laikipia plains stretch from the Greta Rift Valley to magnificent escarpments which descend into the Northern Frontier district. These plains are physically diverse and scenically spectacular, covered by open grasslands, basalt hills, lonely kopjes and dense cedar forest, fed by the Ewaso Nyiro and Ewaso Narok rivers. It is a multi-ethnic tribal district which pastoralist communities share with ranchers, farmers, horticulturalists and wildlife conservation areas.

The various indigenous communities have joined together in partnership with settlers and ranchers to create a conservation and wildlife haven. It includes extensive arid and semi-arid lands as well as arable and urban areas. Pressures on water and land resources have increased greatly in recent years, due to increased farming activities, rapid population growth, and periodic drought. Although violent conflicts in Laikipia have not reached the scale or intensity of those in many parts of the Horn of Africa, conflicts involving pastoralists associated with resource competition, cattle rustling, and wide availability of small arms are nevertheless widespread and of increasing concern. It thus provides a useful case study to examine in depth the factors contributing to conflict and the issues and priorities for conflict prevention. Cattle rearing on large commercial ranches and community-owned rangelands has for many years been the life-blood of the community. As much of Laikipia has traditionally been used for low intensity grazing it has become a cherished haven for big game. The full cross-section of landowners was initially involved in conservation, and the combination of abundant wildlife and exceptional scenic beauty provided the

basis for many new developments. It is now apparent that without the support of local communities, no meaningful wildlife conservation can be achieved in Kenya (Beresford and Phillips 2000; Okello and Kiringe 2004:56). Many threats arise from the alienation of local communities.

Factors contributing to violent conflicts involving pastoralists

The patterns of division and conflict in Laikipia and similar regions are complex. There are many factors contributing to the risk of violent conflict involving pastoralists, and these have tended to become mutually reinforcing. Some conflicts within and between pastoralist communities, such as raiding and cattle rustling, have a long history and have to some extent become an aspect of traditional pastoralist culture. However, such 'traditional' conflicts have become increasingly destructive and less manageable. The Laikipia case study reveals a number of specific factors contributing to the risk of such conflicts between pastoralist communities:

- Socio-economic and political marginalisation;
- Inadequate land tenure policies;
- Insecurity;
- Cattle rustling;
- Proliferation of small arms and light weapons;
- Weakened traditional governance in pastoral areas;
- Vulnerability to climatic variability; and
- Competition with wildlife.

Efforts to prevent and reduce violent conflicts involving pastoralists in Laikipia and similar districts need to address each of the factors contributing to conflicts, as outlined above. The development of effective actions to tackle such causes of conflict is clearly challenging in the context of Laikipia or similar regions in Kenya. This of course is bound to take years. However, serious attempts to address these problems can contribute substantially to conflict prevention and management if they are recognised as such by the communities involved, even if they fall short of what is required due to lack of capacity. This goal implies a direct

focus on tackling the factors contributing to conflicts involving pastoralists, and on enhancing security and preventing such conflicts.

Way forward for Kenya

Without dispersal areas, most of Kenya's conservation areas cannot effectively and sustainably support viable wildlife populations, and the tourism industry that relies on it. Furthermore, most of the wildlife uses land adjacent to or completely outside protected areas in most parts of the year (Mbugua 1994; Mwangi 1995; Norton-Griffiths 1997; Sindiga 1995, cited in Okello and Kiringe 2004:56). The finding that most of Kenya's protected areas are susceptible to a variety of threat factors implies that biodiversity conservation is facing an ever-increasing challenge. The ten threat factors identified earlier are closely linked to the overall problem of human population increase and associated activities, and these, especially among poor rural communities, lead to expansion of agriculture, even in marginal areas, to meet basic needs. Migration corridors and dispersal areas between protected areas or between a protected area and dispersal range continue to diminish. Good examples can be found around Nairobi National Park (Western 1997), Tsavo-Amboseli areas and around Maasai Mara National Reserve (Ottichilo 2000; Voorspuy 1999, cited in Okello and Kiringe 2004:56) where they are taken up for settlement and agriculture. In the process, wildlife habitats and biodiversity in general are also destroyed. This partly precipitates more human-wildlife conflicts and reinforces negative attitudes to wildlife and the conservation of natural resources among local communities.

It is frustrating to local communities because wildlife-induced losses are generally never compensated. To deal with wildlife-related problems, they may persecute wildlife through displacement and illegal killing. It is obvious that controlling human encroachment and associated activities is a difficult endeavour (Osemeobo 1993). Managing population increases, improved livelihoods and poverty reduction can help reduce human impacts within and around protected areas. Involving local communities in sustainable natural resource use and conservation must be encouraged. No rural-based education about the use of such resources will succeed if local community needs and opinions are not met and incorporated in conservation practice and policies

(Sarkar 1999). If they do not benefit from biodiversity resources, and are not compensated for opportunity costs and wildlife-induced losses, they will not support the conservation of biodiversity. A national land use plan can also help and will put into perspective land use practices that are compatible with the socio-economic needs, natural resource endowment, and ecological and climatic constraints within different regions of the country.

According to Okello and Kiringe (2004:56), there is a general lack of research on the types of threat factors to protected areas, and their prevalence and severity in Kenya. Further, the susceptibility of existing protected areas to these threats is poorly known, and no published comprehensive analysis of the threats is available. The absence of this analysis makes focused conservation efforts difficult. This analysis can be done using two approaches. The first and important step is to identify threat types, their underlying causes, and assess their prevalence. The second step is to make a quantitative assessment of threats by measuring their frequency, intensity and impact on biodiversity and protected areas. In the final analysis the Kenya Wildlife Service needs to enhance the following measures in order to prevent and reduce conflicts:

- Encourage and support policies to enhance the viability of pastoralism;
- Support efforts to address the political marginalisation of pastoralists;
- Enhance coherence engagement with pastoralist regions;
- Support conflict prevention and reduction activities at the district level;
- Support conflict prevention and reduction activities at national level;
- Assist in controlling and reducing small arms;
- Promote security sector reform; and
- Combat cattle rustling.

Conclusion

Pastoralists are marginalised and impoverished in Laikipia and indeed throughout much of the Horn of Africa, and are particularly vulnerable when droughts or developments limit their already restricted access to water and pasture. Moreover, conflicts involving pastoralists are increasingly widespread

and damaging. The patterns of these conflicts, and the factors contributing to them, are complex. It is becoming clear that existing policies and measures relating to pastoralists in Laikipia and similar districts in Kenya are inadequate. Efforts to prevent and reduce conflicts need to be fully integrated into government and development programmes throughout the region, and thus also into the co-operation and assistance programmes of donors. There are many ways in which the KWS can assist in preventing and reducing conflicts involving pastoralists in Laikipia and similar districts. They require systematic and concerted attention, and the development of appropriate and effective partnerships with government, pastoralist and other communities involved, and broader civil society groups.

Sources

Beresford, M. and A. Phillips 2000. Protected landscapes: A conservation model for the 21st century. *Forum*, 17 (1), pp. 15–26.

Caalders, J., R. van der Dium, G. Boon and H.Q. Rivel 2000. *Tourism and biodiversity: Impacts and perspectives on interventions in the Netherlands and Costa Rica*. Cambridge, Cambridge University Press.

Irandu, E.M. 2003. Wildlife tourism and local communities in Kenya. Paper presented at ATLAS-Africa Conference, held in Arusha, Tanzania, 20–22 February 2003.

Kenya, Republic of 1997. *The Eighth National Development Plan for the period 1997 to 2001*. Nairobi, Government Printer.

KWS (Kenya Wildlife Service) 1990. *A Policy Framework and Development Programme 1991–1996*. Nairobi, Kenya Wildlife Service.

Mbugua, N. 1994. Maasai-Game conflicts: Who has right of way? *Sunday Nation*, January.

Ministry of Tourism and Wildlife 2007. Draft Wildlife Policy.

Munyori, N.K. 1992a. Information, education and training needs for sustaining tourism. In: Gakahu, C.G. and B.E. Goode eds. *Ecotourism and sustainable development in Kenya*. Wildlife Conservation International.

Munyori, N. 1992b. Sustained use of wildlife resources for tourism in Kenya. In: Gakahu, C.G. ed. *Tourist attitudes and use in Maasai Mara National Reserve*. Wildlife Conservation International.

Mwangi, E.M. 1995. Land use planning and coordination study: Protected area system coverage. Final report to the Kenya Wildlife Service, Nairobi, Kenya.

Norton-Griffiths, M. 1997. Why Kenyan conservation is failing. *Swara*, 19 (6) and 20 (1), pp. 6–8.

Ogodo, O. 2003. Resolving the conflict calls for a tight balancing Act-Legislator. *East African Standard Newspaper,* Monday 7 July. The Standard Limited.

Okello, M.M. and A. Megquier 1999. The species and spatial distribution of wildlife on Kuku Group Ranch and associated human-wildlife conflicts. Unpublished Research Report, SFS Centre for Wildlife Management Studies. Fall 1999, Nairobi, Kenya.

Okello, M.M. and K. Conner 2000. Wildlife distribution and densities, and associated human-wildlife conflicts on Kuku Group Ranch, Kenya. Unpublished Research Report SFS Centre for Wildlife Management Studies. Fall 2000, Nairobi, Kenya.

Okello, M.M. and K. Hadas 2000. Animal density and distribution on Kuku Group Ranch and related human-wildlife conflicts. Unpublished Research Report SFS Centre for Wildlife Management Studies. Spring 2000, Nairobi, Kenya.

Okello, M.M. and T.J. Hull 2001. Socio-ecological considerations for the establishment of Kuku Community Conservation Area, Kenya. Paper presented to SAMA Conference on New Techniques in Wildlife Management. Pretoria, South Africa, 2–3 October 2001.

Okello, M.M. and H. Nippert 2001. The ecological and socio-economic potential of Kuku Community Conservation Area, Kenya. Unpublished Research Report. SFS Centre for Wildlife Management Studies. Fall 2001, Nairobi, Kenya.

Okello, M.M. and J.W. Kiringe 2004. Threats to biodiversity and their implications in protected and adjacent dispersal areas of Kenya. *Journal of Sustainable Tourism*, 12 (1), pp. 54–69.

Okello, M.M. and B.E.L. Wishitemi 2006. Principles for the establishment of community wildlife sanctuaries for ecotourism: Lessons from Maasai Group Ranches, Kenya. *African Journal of Business and Economics*, 1 (1), pp. 90–109.

Osemeobo, G.J. 1993. Impact of land use on biodiversity preservation in Nigerian natural ecosystems: A review. *Natural Resources Journal*, 33, pp. 1015–1025.

Otieno, A. 2003. Why locals are turning against animals. *East African Standard Newspaper*, Monday 7 July. The Standard Limited.

Ottichilo, W. 2000. An analysis of change in the Maasai-Mara ecosystem of Kenya. Unpublished Ph.D. Thesis, Wageningen University, Wageningen, Netherlands.

Sarkar, S. 1999. Wilderness preservation and biodiversity conservation: Keeping divergent goals distinct. *Bioscience*, 49 (5), pp. 405–411.

Sindiga, I. 1995. Wildlife-based tourism in Kenya: Land use conflicts and government compensation policies over protected areas. *Journal of Tourism Studies*, 6 (2), pp. 45–55.

Sindiga, I. 1999. *Tourism and African development: Change and challenge of tourism in Kenya.* Leiden, African Studies Centre.

Sindiyo, J. 1992. Management proposal for the Mara Dispersal Areas. In: Gakahu, C.G. ed. *Tourist attitudes and use in Maasai Mara National Reserve.* Wildlife Conservation International.

Voorspuy, T. 1999. In safe hands? Threats to Maasai Mara. *Swara*, 22 (1), pp. 5–7.

Western, D. 1997. Nairobi National Park is slowly being strangled by development. *Swara*, 19 (6) and 20 (1), pp. 19–20.

Gender and climate change-induced conflict in pastoral communities: Case study of Turkana in north-western Kenya

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Abstract

Clitmate change-induced conflict is a major global threat to human security and the environment. It has been projected that there is going to be an increase in climate changes resulting in increased droughts and floods in northern Kenya. Climate change impacts will be differently distributed among different regions, ages, income groups, occupations and gender. People living in poverty are more vulnerable to environmental changes. In relation to these concerns, this article discusses the following issues: climate change, pastoralism and conflicts, gender issues in Turkana, and the future of pastoralism in relation to changing climate conditions. Specifically, the first section looks at the impacts of climate change on pastoralism and the livelihoods of pastoralists, and at the types of climate change-induced conflicts in Turkana. The next section focuses on the impact of climate change-induced conflict on women and men's livelihoods, including discussion of the roles and participation in decision making. Finally, the future of pastoralism in relation to changing climate is discussed. The focus will be on scenarios of the past and future projections of rainfall patterns in Turkana,

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the future of pastoralism and the possibility of climate-induced conflicts in the future.

Introduction

Turkana is situated in north-western Kenya. Turkana was initially one district but it was divided into three districts in 2007, forming Turkana Central district, Turkana North district and Turkana South district. The districts form part of the 43 districts in the Rift Valley Province (GoK 2008:19). Turkana covers a total area of 77 000 km^2. The population size in the year 2002 was 497 779 (GoK 2002:8). Turkana's temperature ranges between 24 and 38°C, and the mean temperature is 30°C. The driest months are January, February and September. The districts experience longer rains (which are usually erratic and unreliable, however) between April and July, while short rains are experienced between October and November. The rainfall ranges between 300 and 400 mm per annum, with the lowest rainfall being 120 mm. According to the Welfare Monitoring Survey (WMS 1994, cited in GoK 2002:4 and 8), the overall poverty in Turkana was 74% and food poverty 81%. Turkana Central, Turkana North and Turkana South are some of the poorest districts in Kenya. The overall poverty, also known as absolute poverty, in Kenya was 46% in 2005 (GoK 2005a:13).

Turkana is already experiencing problems related to climate variability and change, mainly droughts and floods. Climate is generally described in terms of the mean and variability of temperature, precipitation and wind over a period of time, ranging from months to millions of years – the classical period being 30 years (Le Treut 2007:96). According to Hegerl et al. (2007:667), climate change refers to a shift in the mean state of climate or its variability persisting for an extended period of time (decades or longer), which might be due to natural changes or persistent anthropogenic changes in the composition of the atmosphere or in land use. While climate variability refers to variation in the mean state of climate on a temporal and spatial scale beyond that of individual weather events, examples of climate variability include extended droughts, floods and conditions that result from periodic El Niño and El Niña events (Hegerl et al. 2007:667). However, despite the marked progress made in recent

years, particularly with model assessments, the climate in many parts of Africa is still not fully understood (Boko et al. 2007:458).

In relation to climate variability and change, resource competition amongst pastoralist groups of land users significantly increases the risk of conflict. The risk is greatest during times of stress (for example, during droughts or floods), when available resources are even more restricted. According to Barnett and Adger (2007:641), environmental change – in isolation from a broader range of social factors – has not undermined human security. These may include poverty, the degree of support (or discrimination) communities receive from the state, their access to economic opportunities, the effectiveness of decision-making processes, and the extent of social cohesion within and surrounding vulnerable groups. All these factors determine people's and communities' entitlements to economic and social capital that in turn determine their capacity to adapt to climate change so that the things that they value are not adversely affected. This article looks at the specific type of conflict in Turkana: livestock raiding and the way in which it has been transformed over the years, from a cultural practice (redistributive raiding) into a more predatory activity/commercial activity.

It has been predicted that climate change will accentuate the gaps between the world's rich and poor. In the developing world, it is an accepted view that women are amongst the poorest and most disadvantaged groups in society and 70% of the 1,3 billion people in the developing world living below the poverty threshold are women (Denton 2001:1). In many societies vulnerability differs between women and men. Women are vulnerable to environmental changes because of their responsibilities in the family, which are exacerbated by the impacts of climate change. Since access to basic needs and natural resources, such as food, water and fuel, becomes hampered, women's workload has increased (Dankelman et al. 2008:10).

This article is based on a study entitled '*Enhancing adaptive capacity of pastoralists to climate change induced vulnerability in northern Kenya*'. The first phase of the project started in January 2008 and ended in December 2009. The study was carried out by the Kenya Vulnerability Research Team (KVRT), comprised

of five institutions, namely: Practical Action, Foodlink Resources, National Environmental Management Authority (NEMA), University of Maseno and Kenyatta University. The project was funded by the International Development Research Centre (IDRC) and the UK Department for International Development (DFID).

Turkana was selected for the study on the basis that it has been subjected to historical and recurrent droughts that have left the region vulnerable. The area is in Arid and Semi Arid Lands (ASALs) where managing short-term climatic fluctuations as well as adapting to long-term changes is critical to sustaining livelihoods. Furthermore, the districts experience structural challenges characteristic of low levels of development, that is, high poverty levels, high illiteracy levels and continuous food insecurity.

The selection of the study sites in Turkana was based on variability of socio-economic activities/types of livelihoods (that is, pure/primary pastoralists and agro-pastoralists), the distance of case study areas from each other (to provide ecological and livelihood differences), existence/non-existence of outside interventions to reduce community vulnerability to droughts/floods (for example, the Arid Lands Resource Management Project [ALRMP] which is being implemented by the Government of Kenya with the support of the World Bank and non-governmental organisations [NGOs]) because these interventions have an influence on community level vulnerability, and security/access of the study site (this is because of frequent inter-ethnic and cross-border conflicts related to access to natural resources like water and pasture). The study sites were Kapua (pure/primary pastoralists) in Turkana North district, Katilu (agro-pastoralists) in Turkana South district and Namoruputh (pure/primary pastoralists but with various interventions by NGOs) in Turkana Central district.

Stratified random sampling was adopted for this study. The determination of the sample size was based on the demographic data and the clustering of households in the settlement areas using statistics from the ALRMP in Turkana. These were found to be more reliable as compared with the information from the public administration officers (Chiefs) which was normally inflated in the expectation

of relief food. The unit of analysis was the individual household, with every third household being selected for data collection. The target respondents of the closed/structured survey questionnaires were based on gender (either a woman or a man household head) in an alternating way. The total populations of the study sites were as follows: Namoruputh – 2 075; Katilu – 5 509 and Kapua – 5 458. The numbers of households in the three study areas were: Namoruputh – 346, Katilu – 918 and Kapua – 910 (altogether 2 174). To enhance statistical accuracy during data analysis, 30% of the households were sampled, giving the following sample sizes: Namoruputh – 104 households; Katilu – 275 households and Kapua – 273 households. These figures were proportionately divided among the villages. Therefore a total of 652 questionnaires were administered at the household level. To complement closed survey questionnaires, Focused Group Discussions (FGDs) were also carried out using open-ended survey questionnaires. The process involved having women only and men only FGDs. A total of 6 FGDs were carried out, 2 at each site, focusing on women and men household heads in the specified study sites. Meteorological data involved the acquisition and analysis of temperature and precipitation patterns from 1960 to 2009, while climate modelling entailed developing climate scenarios of temperature and rainfall for the period of 2020–2040, using the Providing Regional Climates for Impacts Studies (PRECIS) package. The results derived from the model included seasonal variability and annual variability of temperature and precipitation, and mapping out the scenarios.

Climate change, pastoralism and conflicts

Climate variability and change

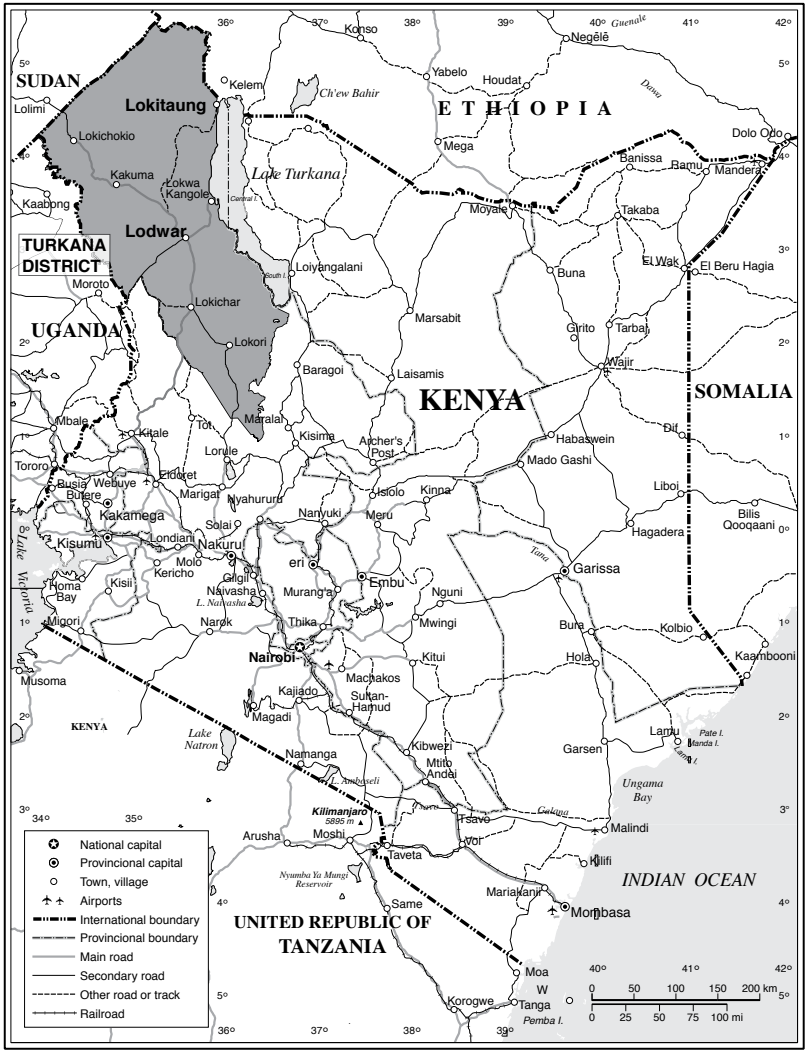
The impacts of climate change are likely to be spatially variable, and developing countries – many in Africa – generally are considered more vulnerable than developed countries due to their lower capacity to adapt (Thomas and Twyman 2005:115–116). Climate variability and change will result in fundamental alterations to ecosystem structures and functions. These in turn will affect human land-use and livelihoods and have the potential to make pastoralists

more vulnerable (Galvin et al. 2004:1). In the future, climate change may become a contributing factor to conflicts, particularly those concerning resource scarcity (Ashton 2002; Fiki and Lee 2004, cited in Boko et al. 2007:443). The KVRT preliminary findings (KVRT 2009) reveal the factors that have contributed to changes in vegetation over the years (which included droughts and floods) in Turkana.

Pastoralism

The Turkana who are seriously affected by inter-ethnic and cross-border conflicts over natural resources are mainly pastoralists. Pastoralism is a lifestyle most adapted to the harsh environments of ASALs. It involves moving animals, exchanging animals and sometimes selling animals to deal with cyclical droughts. The dry and pastoral lands occupy more than 80% of Kenya, and are home to approximately 4 million pastoralists who constitute more than 10% of Kenya's population (Kirbride and Grahn 2008:8). Livestock is their major source of livelihood and food security. Kenya's livestock production accounts for 24% of total agricultural output. Over 70% of the country's livestock and 75% of the wildlife are in the ASALs (GoK 2005b, cited in Orindi et al. 2007:1). The Turkana district borders Ethiopia, Sudan and Uganda as shown in Figure 1 below. Within Kenya, the Turkana district borders West Pokot district, Baringo district, Samburu district and Marsabit district (GoK 2002:4).

Figure 1: Map of Turkana district (Cullis and Pacey 1992:186)



Climate change-induced conflict

The Turkana, like their neighbours, have a livestock raiding culture. Raiding of traditional enemies was previously a means of expanding grazing lands, gaining access to new water sources and most importantly, an economic stratagem of self-restocking and improving social status by acquiring livestock from defeated enemies (Oba 1992:7). This means that each raid is spontaneously followed by counter raids. According to Watson (2003:7), other motivation for raids in pastoral communities is the desire to reduce poverty and hunger, and acquire bridewealth.

The challenging problem is the way in which livestock raiding has been transformed over the years, from a cultural practice/redistributive raiding into a more predatory activity/commercial activity. Watson (2003:9) states that in 'commercial' raiding the promoters may not necessarily be pastoralists themselves, but may also include ex-pastoralists. In Turkana, the increase in 'commercial' raiding includes cases of 'sponsored' raiding where guns are provided to young men by wealthy people who wish to acquire livestock for sale. This has been facilitated by the general economic stagnation in the Horn of Africa which has contributed to the development of informal 'parallel' economies. These markets are unconstrained by national frontiers and are largely controlled by people in positions of political power or with access to weapons (Hendrickson et al. 1998:186). The outcome, due to the use of modern weapons in raids, has been more destructive and has led to lasting hostilities among the Turkana and their neighbouring tribes: the Toposa (Sudan), the Karamojong (Uganda), the Donyiro (Ethiopia), the Merille (Ethiopia) and the Pokot (Kenya).

According to Kirbride and Grahn (2008:21), resource competition also significantly increases the risk of conflict between different groups of land users. This risk is enhanced during times of stress (that is, during drought or floods). For example, it was reported that renewed clashes between the Turkana in northern Kenya and the Toposa in southern Sudan, both seeking to access grazing land and water in the Nadapal Belt, reportedly left more than 20 people dead and 60 000 animals stolen within three months (Daily Nation 2009b). The Nadapal

Belt is inhabited by the two groups and is very productive, but peace has remained elusive. International aid agency Oxfam during the launch of a $9,5 million appeal to help victims of drought (Nairobi, September 2009), said that drought for the fifth year running is driving more than 23 million east Africans in seven countries towards severe hunger and destitution. Absent and unpredictable rains are more common in the region, wet seasons are becoming shorter and droughts have increased from once a decade to every two or three years (Daily Nation 2009a). KVRT preliminary findings (KVRT 2009) point out that the Turkana migrate due to the following reasons: search for pasture and water (52,7%), conflicts (21,9%), search for larger pieces of land (6%), and culture (2%).

Kirbride and Grahn (2008:22) state that community agreements governing access to and the sharing of resources have been developed to prevent recurring conflicts, but these agreements have not been well disseminated. There do exist conflict-mitigating institutions at local and national levels, with officers seconded to them from government, as well as district peace committees. However, their effectiveness in practical early warning of conflicts and rapid response is hampered by a lack of funding and resources from government. Climate change is therefore likely to increase the drivers of conflict leading to pastoralists becoming more vulnerable.

Coping and adaptation strategies

Due to the impact of climate variability and change, the Turkana are diversifying their livelihoods. This process has been hastened by conflicts, especially livestock raids. Various studies have been undertaken on pastoralists' alternative livelihoods in Turkana (that is, Birch and Grahn 2007:2; Galvin et al. 2004:2; McCabe 1990:87; Oba 1992:1). Impacts of global climate change are not only physical and economic, but also social and cultural, jeopardising environmentally based livelihoods in many areas of the world (Orindi et al. 2007:5–6). Due to the long experience of environmental uncertainty in Turkana, the pastoralists have developed a highly flexible social system and an elaborate set of both individual and collective-based survival strategies. These include: mobility; herd splitting;

the redistribution of surplus livestock within social networks; diversification of livestock comprised of camels, goats, sheep, cattle and donkeys to enable them to exploit different expanses of the range during any period of the year; livestock loans and gifts; formation of complex social security networks based on kinship and friendship; reliance on relief food, fishing on Lake Turkana, farming along the rivers and gathering wild fruits.

To support the above literature, Table 1 below indicates KVRT preliminary findings (KVRT 2009) on the emerging coping strategies which include: remittances from relatives; praying; joining merry-go-round groups by both women and men; transformation of pastoralists into agro-pastoralists, especially in areas situated next to water sources; seeking employment (mostly casual labour); engaging in businesses, for example, selling firewood and charcoal as well as weaving baskets. Sources of income varied in the three study sites as follows: Katilu is an agro-pastoralist area situated next to river Turkwell, and a key source of income amongst women and men is selling agricultural produce (for women at 37% and for men at 42%). In Kapua, the sources of income from selling livestock/livestock products amongst women and men were at 3,9% and 21,9%, respectively. Farming is not an alternative livelihood in Kapua because the area is very dry, but another source of income is charcoal burning by both women and men at 37,6% and 41,1%, respectively. On the other hand in Namoruputh, income from selling livestock products amongst women and men was 36% and 48,8%, respectively. In Namoruputh women are highly involved in selling of firewood at 20,4%, while men are more involved in businesses at 14,6%. The KVRT preliminary findings (KVRT 2009) indicate that charcoal burning is more prominent in dry areas with few or no alternative sustainable livelihoods.

Table 1: Sources of income

SOURCES OF INCOME	Kapua		Katilu		Namoruputh	
	Women (%)	Men (%)	Women (%)	Men (%)	Women (%)	Men (%)
Selling livestock products/ Keeping livestock	3,9	21,9	17,6	30,2	36,6	48,8
Farm produce/ Farming	-	-	37,0	42,5	1,1	12,2
Charcoal burning	37,6	41,1	8,1	1,9	-	2,4
Business			4,4	2,8	7,5	14,6
Weaving baskets	40,4	27,4	-	-	-	-
Casual labourer	-	-	1,5	1,9		
Remittance from family/relative	2,8	-	0,7	-	1,1	2,4
Sale Firewood	0,3	-	13,9	4,7	20,4	-
Local brewing	-	-	2,9	-	5,4	2,4

Source: KVRT Study data collected in 2009

Eriksen and Lind (2005:21) observe that the high prevalence of diversification as a livelihood strategy signals efforts by the Turkana to actively manage vulnerability by increasing the reliability of livelihood assets. But the people's involvement in so many coping and survival strategies is also a sign of distress in Turkana livelihood systems. There is a risk of misinterpreting diversification and market activity for a thriving local economy and robust community and household livelihoods. For example, high levels of livestock sales is an indicator of distress.

Mobility as a Coping and Adaptation Strategy

There is a strong link between mobility and climate change-induced conflict. Mobility is a carefully managed process by pastoralists, and relies on large social

networks and the rapid gathering of information on the concentrations of high quality pasture (IIED and SOS Sahel UK 2010:16). Livestock mobility enables pastoralists to take advantage of the ever-changing diversity of dryland ecology. They track the random concentrations of nutrients in space and time. The result of this strategy, when unhindered, is that their livestock are able to feed on a diet that is substantially richer than the average nutritional value of the range they live on (IIED and SOS Sahel UK 2010:15). IIED and SOS Sahel UK (2010:74) argue that pastoralists who are mobile are in a better position to quickly and successfully adapt to a changing climate than those tied to sedentary land uses.

Self-imposed restrictions on mobility due to climate change-induced conflict can have very negative implications for the viability of herds. McCabe (1990:90), for example, estimated that up to one quarter of the territory of the Nginsonyoka, comprising Turkana's best highland grazing areas, was rarely used for fear of livestock raiding. Restrictions on mobility leads to the immediate problem of overgrazing which in the longer term, can lead to serious soil degradation.

The above literature on mobility is in line with KVRT's preliminary findings (KVRT 2009) that reveals that there is rapid change in the Turkana's nomadic lifestyles from nomadism to semi-permanent settlement whereby only part of the family moves in search of pasture and water. There is variation in mobility in the three study sites. Almost all the households stayed permanently in Katilu (97,7%) and Kapua (92,2%), but less than half in Namoruputh (45%). The number of households who did not stay in the same place permanently (and are therefore nomadic) is lowest in Katilu (2,3%) and Kapua (7,8%) and highest in Namoruputh (54,8%). More research is needed to know why mobility is high in Namoruputh and low in Kapua given that both are pure/primary pastoralist areas.

However, pastoralists face many challenges due to their mobility as a coping and adaptation strategy to climate variability and change. According to IIED and SOS Sahel UK (2010:37), instead of being mobile and productive,

pastoralists are increasingly constrained. Farms frequently block access to their grazing areas, national border controls hinder their trade patterns, and the areas they traditionally preserve for times of drought are now national parks or agricultural schemes. In other areas national government policies actively encourage pastoralists to settle and be 'modern'. These policies are often driven by unfounded perceptions that pastoralism is economically inefficient and environmentally destructive. But this is not evidence based.

Reuveny (2007:658) argues that climate change-induced mobility/migration can promote conflict in the receiving areas, and that the intensity of such conflict may vary across cases. This is due to competition over resources, ethnic tensions, distrust and fault lines (for example, migrant pastoralists and resident farmers may compete over land) (Reuveny 2007:659). Therefore, there is sufficient evidence that climate variability and change lead to conflicts. When pastoralists lose their livelihoods, through loss of access to pastures and water due to climate variability and change, destitution threatens and they turn to violence. This is exacerbated by other factors, including the proliferation of small arms, breakdown in customary control and the absence of State governance in remote border areas (IIED and SOS Sahel UK 2010:76). Whether pastoralists will successfully adapt to the current climate variability and change will depend on how the environmental challenges are tackled and whether mobility is secured.

Gender issues in Turkana

The above discussions clearly show that climate variability and change have impacts on both women and men, and that there is gender variation in gender coping and adaptation strategies. However, gender coping and adaptation strategies have been weakened by increased climate change-induced conflicts. Barrow and Mogaka (2007:14) state that the situation of women and men in pastoral communities is not static, as incidences of drought have led to transformation in the socio-cultural and socio-economic organisation of pastoral societies. Due to the loss of cattle and other livestock, women play an active role to ensure family survival through engagement in diversified

income generating activities (Table 1). At the same time, there has been an increase in the number of female-headed households in the ASALs.

Women are particularly vulnerable to insecurity and conflict. This is because women are responsible for their children and cannot flee during periods of raiding. According to Eriksen and Lind (2005:15), raiding and killing have led to several women losing their husbands. Women-headed households are particularly vulnerable because women have poor customary rights to land, wells and livestock. A woman, once married, belongs to the husband's clan, but in some cases finds that the clan is less forthcoming with assistance when her husband has died. Additionally, according to Hendrickson et al. (1998:195), women and children are the first to leave the pastoral sector in times of crisis. They are sent to stay with distant relatives or, ever more, to urban areas where their vulnerability to food insecurity may not be relieved. In some cases, women who have moved to urban areas have been forced to turn to prostitution to survive. Herders dispossessed of livestock are themselves often forced out of the pastoral sector into relief camps or into a search for wage labour. These gradual changes threaten the hopes of recovery as the crucial social ties needed to resume herding are often irrevocably severed.

According to the KVRT study's preliminary findings (KVRT 2009), there is an increase in women-headed households due to the death of a husband, separation/divorce and mothers who remain 'single' (since most men cannot afford bridewealth today due to loss of animals to drought or floods). According to KVRT's findings, female-headed households were at 25% compared with male-headed households (73,8%). A few (0,5%) were child-headed households. The 25% of female-headed households is quite a substantial number considering that Turkana traditionally is a patriarchal society where most household heads were male. Nevertheless, KVRT findings (KVRT 2009) on decision making in Table 2 indicate that despite the increase in the number of female-headed households, their participation in decision making at the individual level in the household is still low in relation to

the following issues: resource use and allocation, investment, and planning about where to move or settle as a way of coping with droughts and floods. This is because decisions are made by husbands/men or community elders (mostly composed of men). However, the level of consultation on decision-making issues by both women and men at the household level is higher. There is need for more in-depth studies to examine what consultation means and entails in Turkana.

Table 2: Who makes decisions at the household level

DECISION MAKING	TURKANA				
	Both women and men (%)	Women (%)	Men (%)	Not applicable/ No response	Total
Resource use at family level	53,2	17,2	29,6	-	100
Resource allocation at family level	50,0	7,8	41,2	1	100
Where a family should settle or move to (in times of drought or floods)	15,0	8,1	60,2	16,7	100

In addition, the KVRT (2009) study also indicates that women in female-headed households are more vulnerable to poverty than women who are married. This is because most women in female-headed households cannot own livestock if they do not have a son or cannot afford to employ a herder. Brody et al. (2008:2) state that gender sensitivity in consultation and decision making is essential for effective mitigation and adaptation responses to climate change. There is a need to recognise the capacity of women and men as well as girls and boys to contribute important knowledge and insights. Yet

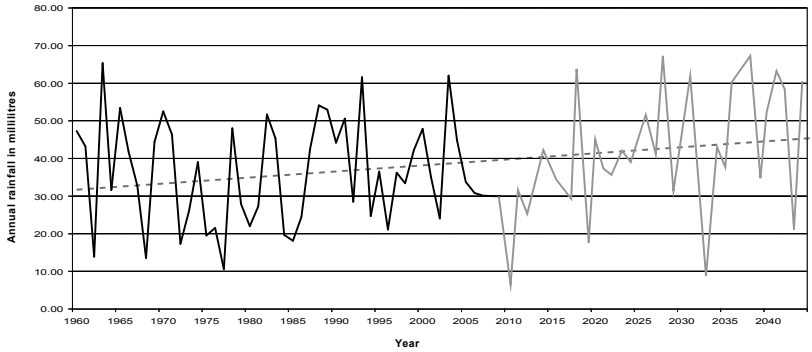
women are more likely than men to be absent from decision making, whether in the household or at community, national or international levels. This is either because their contribution is not valued or because they do not have the time, confidence or resources to contribute.

The future of pastoralism and changing climate

Due to increased climate change-induced conflicts and gender vulnerability, it is important to know the future of pastoralism in order to be able to advise policy-makers on how to strengthen mitigation capabilities and at the same time enhance the adaptive capacity of pastoralists in Turkana. Some analysts argue that the Sahel will continue to dry out as East Africa becomes wetter (Christensen et al. 2007:850). Moreover, climate analyses suggest that there will be highly differential impacts of climate change in East Africa towards the middle of the twenty-first century. Parts of East Africa are expected to become drier, with considerable reduction in the length of the growing season. Other areas, including southern Kenya and northern Tanzania, may become wetter, with increases in the length of the growing season (Thornton et al. 2002, cited in Galvin et al. 2004:1). The projected changes are likely to affect human land use and livelihoods, making these populations more vulnerable.

Figure 2 shows the actual and projected rainfall patterns in Turkana from 1960 to 2040. The figure shows that there have been variations in the rainfall pattern from 1960 to 2009, with seasons of high rainfall to dry seasons without rainfall. Several droughts experienced in Turkana have led to food insecurity, migration and conflicts. Increased rainfall has led to flash floods which have resulted in loss of property, destruction of the infrastructure and diseases. Predictions about the future, according to Figure 2, do not seem positive as the variation in rainfall patterns is expected to continue with wider gaps in rainfall patterns indicating that more droughts and floods will be experienced.

Figure 2: Projected temporal March, April and May (MAM) rainfall season over Turkana as represented by Lodwar (district headquarters for Turkana)



Source: KVRT study, scenarios were developed in 2009

The future of pastoralism remains uncertain. Drought affected areas are estimated to double by the end of the century (from 25% to 50%) and drought periods will likely last longer (Birch and Grahn 2007:1). Impacts are already being reported. In Kenya, the short rains which occurred during the months of October to December were extremely enhanced during the 1997/1998 El Niño-Southern Oscillation (ENSO) episode. This episode was followed by the 1999/2000 drought which has been described as one of the worst drought experiences in Kenya's history by the World Food Programme (WFP 2000, cited in Mworia and Kinyamario 2008:011). According to Oba (1992:1), Kenya also experienced drought in the following years (1960/1961, 1969, 1973/1974, 1979, 1980/1981 and 1983/1984). The outcome of droughts can be devastating for traditional economies, especially if coping strategies are disrupted – particularly by predatory raids on livestock and disruption of land use patterns. Whenever these extreme climatic conditions like drought and floods occur, they impact negatively on pastoralists' livelihoods through loss of human and livestock lives, starvation and destruction of property. Pastoralists' existing coping and adaptation strategies cannot deal with the current frequent and prolonged changes in climate.

Conclusion

Climate change is likely to provoke the drivers of conflict in many livelihood systems, including pastoral production. Climate variability and change have led to increased droughts and floods which have resulted in the loss of animal and human lives, displacements and destruction of property, reduced pasture availability and scarcity of water. This has increased poverty and competition over scarce resources – leading to conflicts, particularly livestock raiding. The way livestock raiding has been transformed from a cultural practice into a predatory/commercial activity with criminal motives and involving the use of automated weapons has caused insecurity in Turkana and hindered pastoralists' mobility – potentially resulting in environmental degradation through soil erosion. In order to cope with these changes pastoralists are diversifying their livelihoods. Nevertheless, livelihood diversification by pastoralists has not resulted in sustainable livelihoods, because it is being done out of desperation or distress. Whether pastoralists will successfully adapt to the current climate change will depend on how the environmental challenges are tackled and whether mobility is secured.

Gender issues in Turkana revolve around women and men's coping strategies to climate variability and change. The impact of climate change-induced conflict has led to an increase in female-headed households due to loss of husbands in conflict. This has increased women's vulnerability because they have poor customary rights in accessing resources.

The future of pastoralism in the context of changing climate remains uncertain. The Turkana rainfall pattern projections for the future do not look positive, as the variations of rainfall patterns will continue with wider gaps in periods of high rainfall and periods of low or no rainfall, implying that there may be more prolonged droughts and increases in floods.

Recognising how conflicts have changed in the modern era offers an important window for examining how herders' livelihoods are being undermined today. In addition, a comprehensive drought contingency plan should be developed

to reduce vulnerability in the drylands, particularly among the pastoralists. The plan would coordinate the use of natural resources among all potential users and minimise the conflicts that have become so frequent and destructive between pastoralists within Kenya and across the borders of neighbouring countries. Moreover, there should also be a drought-coordinating agency to ensure consistency, communication, coordination and responsibility within government and between other agencies, thus reducing the number of inappropriate and uncoordinated initiatives.

There is a need to mainstream gender climate change policies because women and men have different roles in the community and because climate-induced conflict impacts on women and men differently. New types of livestock insurance should be developed and promoted to allow pastoralists to cope with droughts and floods. It is important that credit facilities are made accessible to poor households (with gender considerations) to enable them to restock after drought occurrences and also to support the diversified livelihoods which are already taking shape. This should be combined with capacity building of pastoralists in relation to diversified livelihoods initiatives.

Sources

Ashton, P.J. 2002. Avoiding conflicts over Africa's water resources. *Ambio*, 31, pp. 236–242.

Barnett, J. and W.N. Adger 2007. Climate change, human security and violent conflict. *Political Geography*, 26, pp. 639–655.

Barrow, E. and H. Mogaka 2007. Kenya's drylands – Wastelands or an undervalued national economic resource. The World Conservation Union (or International Union for Conservation of Nature, IUCN). Available from: <http://liveassets.iucn.getunik.net/downloads/kenya_dryland_value_2007.pdf>.

Birch, I. and R. Grahn 2007. Pastoralism – Managing multiple stressors and the threat of climate variability and change. In: United Nations Development Programme. *Human Development Report 2007/2008: Fighting Climate Change: Human Solidarity in a Divided World*. Human Development Report Office, Occasional Paper 2007/45.

Boko, M., I. Niang, A. Nyong, C. Vogel, A. Githeko, M. Medany, B. Osman-Elasha, B. Tabo and P. Yanda 2007. Africa. In: Parry, M.L., O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson eds. *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on*

Climate Change. Cambridge, Cambridge University Press. Available from: < http://www.ipcc.ch/pdf/assessment-report/ar4/wg2/ar4-wg2-chapter9.pdf>.

Brody, A., J. Demetriades and E. Esplen 2008. Gender and climate change: Mapping the linkages - A scoping study on knowledge and gaps. Institute of Development Studies (IDS) report to the UK Department for International Development (DFID). Available from: <www.unep.org/.../climate_change/.../Gender-and-climatechange/DFID_Gender_Climate_Change.pdf>.

Christensen, J.H., B. Hewitson, A. Busuioc, A. Chen, X. Gao, I. Held, R. Jones, R.K. Kolli, W.T. Kwon, R. Laprise, V. Magaña Rueda, L. Mearns, C.G. Menéndez, J. Räisänen, A. Rinke, A. Sarr and P. Whetton 2007. Regional climate projections. In: Solomon et al. 2007, pp. 849–926.

Cullis, A. and A. Pacey 1992. *A development dialogue: Rainwater harvesting Turkana*. London, Intermediate Technology.

Daily Nation 2009a. East Africa drought in fifth year, millions hungry. *Daily Nation* supplement, Tuesday, 29 September 2009. Nation Media group, Nairobi, Kenya.

Daily Nation 2009b. Never ending war between Turkana and Sudanese. *Daily Nation* supplement; Wednesday, 21 October 2006. Nation Media group, Nairobi, Kenya.

Dankelman, I., K. Alam, A. Khurshid, W.B. Ahmed, Y.D. Gueye, N. Fatema and R.M. Kutin 2008. *Gender, climate change and human security: Lessons from Bangladesh, Ghana and Senegal.* Report prepared for Hellenic Foundation for European and Foreign Policy (ELIAMEP) by the Women's Environment and Development Organization (WEDO), ABANTU for Development in Ghana, Action Aid Bangladesh, and ENDA in Senegal. Available from: <www.gdnonline.org/.../WEDO_Gender_CC_Human_Security.pdf>.

Denton, F. 2001. Climate change, gender and poverty – Academic babble or realpolitik? *Point de Vue*, 14, pp. 1–2.

Fiki, O.C. and B. Lee 2004. Conflict generation, conflict management and self-organising capabilities in drought-prone rural communities in north eastern Nigeria: A case study. *Journal of Social Development in Africa*, 19, pp. 25–48.

Eriksen, S. and J. Lind 2005. The impacts of conflict on household vulnerability to climate stress: Evidence from Turkana and Kitui Districts in Kenya. Human Security and Climate Change, An International Workshop, Holmen Fjord Hotel, Asker, near Oslo, 21–23 June 2005. Available from: <wikiadapt.org/.../The_impacts_of_conflict_on_household_vulnerability_to_climate_stress.pdf>.

Galvin, K.A., P.K. Thornton, R.B. Boone and J. Sunderland 2004. Climate variability and impacts on east African livestock herders: The Maasai of Ngorongoro Conservation Area, Tanzania. *African Journal of Range and Forage Science*, 21 (3), pp. 1–2.

GoK 2002. *Turkana District Development Plan 2002–2008*. Ministry of Planning and National Development. Nairobi, Government Printer.

GoK 2005a. *Constituency report on well-being in Kenya. Based on the Kenya Integrated Household Budget Survey 2005/2006.* Kenya National Bureau of Statistics. Nairobi, Government Printer.

GoK 2005b. *Sessional paper on sustainable development of arid and semi-arid lands of Kenya.* Ministry of Planning and National Development. Nairobi, Government Printer.

GoK 2008. *Turkana Central District Development Plan 2008–2012.* Ministry of State for Planning, National Development and Vision 2030. Nairobi, Government Printer.

Hegerl, G.C., F.W. Zwiers, P. Braconnot, N.P. Gillett, Y. Luo, J.A. Marengo Orsini, N. Nicholls, J.E. Penner and P.A. Stott 2007. Understanding and attributing climate change. In: Solomon et al. 2007, pp.665–744.

Hendrickson, D., J. Armon and R. Mearns 1998. Vulnerability: The case of livestock raiding in Turkana District, Kenya. *Disasters*, 22 (3), pp. 186–195.

IIED (International Institute for Environment and Development) and SOS Sahel International UK 2010. Modern and mobile: The future of livestock production in Africa's drylands. Available from: <www.iied.org/pubs/pdfs/12565IIED.pdf >

Kirbride, M. and R. Grahn 2008. Survival for the fittest: Pastoralism and climate change in East Africa, Oxfam International, Briefing Paper August 2008. Available from: <http://www.ciaonet.org/pbei/oxfam/0003433/f_0003433_2544.pdf>.

KVRT (Kenya Vulnerability Research Team) 2009. *Enhancing adaptive capacity of pastoralists to climate change induced vulnerability in northern Kenya.* Preliminary findings of a study findings, undertaken between January 2008 and December 2009. Turkana, Kenya.

Le Treut, H., R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson and M. Prather 2007. Historical overview of climate change. In Solomon et al. 2007, pp. 94–122.

McCabe, J.T. 1990. A case against the tragedy of the commons. *Human Ecology*, 18 (1), pp. 81–103.

Mworia, J.K. and J.I. Kinyamario 2008. Traditional strategies used by pastoralists to cope with La Nina induced drought in Kajiado, Kenya. *Africa Journal of Environmental Science and Technology*, 2 (1). Available from: <http:www.academic journals.org/Ajest>.

Oba, G. 1992. Ecological factors in land use conflicts: Land administration and food insecurity in Turkana, Kenya. Available from: <http://www.odi.org.uk/work/projects/pdn/papers/33a.pdf>.

Orindi, V.A., A. Nyong and M. Herrero 2007. Pastoral livelihood adaptation to drought and institutional interventions in Kenya. In: United Nations Development Programme. *Human Development Report 2007–2008: Fighting Climate Change: Human Solidarity in a Divided World.* Human Development Report Office, Occasional Paper 2007/54.

Reuveny, R. 2007. Climate change-induced migration and violent conflict. *Political Geography*, 26, pp. 656–673

Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller eds. 2007. *Climate change 2007: The Physical Science basis. Contribution of Working*

Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge, Cambridge University Press.

Thomas, D.S.G. and C. Twyman 2005. Equity and justice in climate change adaptation amongst natural-resource-dependent societies. *Global Environment Change*, 15, pp. 115–124.

Thornton, P.K., R.L. Kruska, N. Henninger, P.M. Kristjanson, R,S. Reid, F. Atieno, A. Odero and A. Ndegwa 2002. Mapping poverty and livestock in the developing world. International Livestock Research Institute, Nairobi, Kenya.

Watson, C. 2003. Pastoral women as peacemakers. Community-based Animal Health and Participatory Epidemiology Unit (CAPE) of the African Union's Interafrican Bureau for Animal Resources (AU/IBAR), Nairobi, Kenya. Available from: <www.eldis.org/fulltext/PastoralWomenAsPeacemakersApril2003.pdf>

Welfare Monitoring Survey II 1994. Basic Report. Central Bureau of Statistics. Nairobi, Government Printer.

WFP (World Food Programme) 2000. Kenya's drought: No sign of any let up. WFP, Rome, Italy. Available from: <www.wfp.org/newsroom/in_depth/Kenya.html>

Environmental causes and impacts of the genocide in Rwanda: Case studies of the towns of Butare and Cyangugu

*Vadi Moodley, Alphonse Gahima and Suveshnee Munien**

Abstract

The history of the world has always been punctuated by cycles of violence, regardless of time, region or race. Genocide, which is one of the worst forms of violence, has always led to horrific socio-economic and environmental impacts. The last decade of the 20th century was the most turbulent Rwanda has ever experienced in its history. The country was ravaged by civil war, genocide, mass migrations, economic crisis, diseases, return of refugees and environmental destruction. Rwandan families were affected by and are still dealing with impacts such as death, disease, disability, poverty, loss of dignity and imprisonment. This paper uses a geographical perspective, more specifically the geography of conflict, to assess the environmental causes and impacts of the genocide in Rwanda, more than a decade after the genocide. Primary data used in this article were obtained from fieldwork undertaken in Cyangugu and Butare Towns, case studies chosen not only because of their particular history

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before, during and after the genocide but also because of their heterogeneous population and physical landscapes. Empirical evidence obtained and secondary data sources indicate that the genocide in Rwanda destroyed not only human resources and social and cultural structures but also infrastructure, development facilities and natural resources which had serious negative consequences on the total environment.

Introduction

Known poetically as the 'Land of a Thousand Hills' due to its relief, Rwanda is a tiny, landlocked republic lying south of the equator in East-Central Africa (World Bank 2004:20) and lies between (roughly) 1°S and 3°S, and 29°E and 31°E (Central Intelligence Agency: The World Factbook 2002:356). The country is bounded by Lake Kivu and the Rusizi River on the west; on the south by the Ruhwa and Akanyaru Rivers; on the east by the Akagera River; and on the northwest by a chain of volcanoes. Rwanda's neighbours are Uganda to the north, Burundi to the south, Tanzania to the east and the Democratic Republic of the Congo to the west and northwest (MINECOFIN 2002:344). It had a population size of 9,6 million in 2008 (PRB 2009:4). The land area is 26 338 square kilometres (World Bank 2004:20) with a high population density of 365 per square kilometre (PRB 2009:4). It is one of the most densely populated countries on the African continent with population pressure on scarce land threatening the physical environment and the social harmony in the country (World Bank 2004:20).

In the last decade of the 20th century almost every Rwandan household was affected by at least one of the following: economic crises, civil war, internal displacement, mass emigration, political transition, returning refugees, destruction of natural resources and most importantly the genocide (Verwimp and Baval 2005:272). Moreover, the environmental degradation caused by the massive population displacements caused vast economic losses to the country. The government made serious efforts to resettle people by making more land available. However, this resulted in biodiversity and natural resources being destroyed. Forests and woodlands came under strain as is evidenced by the reduction in area of the Nyungwe and Akagera National Forests after the

genocide (REMA 2009:86–87). According to Gahima (2007:4), although there has been a proliferation of research on Rwanda by scholars who go beyond simply describing the political and historical causes of the genocide as a result of the hatred between the Hutu and Tutsi ethnic groups, there have been few attempts to assess the voices of people and leaders on the environmental impacts of the genocide in their daily lives (Gahima 2007). It is also clear that environmental impacts cannot be discussed in isolation from the socio-economic and political dynamics in the country and the backdrop of the genocide itself. This article will attempt to fill this gap, using primary and secondary information sources to satisfy the following objectives: (1) to provide a conceptual basis by discussing genocides and conflicts; and (2) to evaluate the environmental impacts of the genocide. Empirical data were obtained from two case studies from a larger study that focused on the social and environmental impacts of the genocide. The case studies are from different historical and geographic areas, the semi-urban towns of Butare and Cyangugu in Rwanda. Butare was chosen due to the large number of people killed (100 000 according to Melvern 2000:171), and Cyangugu because it was an environment that was most affected by the genocide. In this area destruction lasted longer than in other parts of the country, and there was a massive return of refugees and the emergence of grouped settlements (Imidugudu) established by the state (Ministry of Infrastructures 2004:23).

In both areas, a representative sample of 100 residents was drawn from the population by using multistage sampling techniques. Stratified random sampling was the most appropriate technique. Within each town, a stratified sample of two subgroups was selected according to location and socio-economic status. One subgroup was comprised of high-income residents, living in a suburban area and the other subgroup was from a semi-urban area with low-income residents, living in modest housing. Within these two subgroups, two cells were selected randomly. From each cell a random sample of 25 households was chosen. In total, there were four cells chosen which made up the 100 residents for the study. Community leaders, one from each of the four cells, were purposively selected and semi-structured questionnaires were used in these interviews. The questionnaire at the household level focused on attitudes, perceptions and experiences on issues pertaining to their lives including the environment before

and after the genocide, whilst that for the leaders was based on infrastructure and environmental management in their administrative units after the genocide.

To better understand the environmental causes and impacts of the genocide and to determine the contextual basis of the discussion that follows, a brief overview of genocides and conflicts will be discussed. The next section will discuss environmental issues based on primary data from the survey and secondary sources. However, due to the multiple aspects comprising the environment, the focus in this article has been narrowed down to a few key dimensions that had significant impacts on the environment – destruction of biodiversity, deforestation, farming and agricultural activities, housing and the construction of new facilities, fuel and energy sources and the spread of malaria due to deforestation.

Conflicts and Genocides

Conflicts

Laue (1993:256) defined conflict as 'escalated natural competition between two or more parties about scarce resources, power and prestige'. Parties in conflict believe they have incompatible goals, and their aim is to neutralise, gain advantage over, injure or destroy one another (Laue 1993:257). According to Fry and Bjorkqvist (1997:26), conflict, although inevitable, is not inherently pathological, sick behaviour or always dysfunctional. Some conflicts are harmful but they may, in some cases, improve society and social relations on a long-term basis. Conflict can be a constructive force in social life (Fry and Bjorkqvist 1997:26). Toft (2004) in his book '*The geography of ethnic violence: Identity, interests and the indivisibility of territory*' approached the issue of conflicts and genocide in particular within the geography of ethnic violence and argues that conflicts are complex phenomena which are the results of either socio-political, economic or environmental disintegration. Turshen (2001:57) emphasised, for instance, the world market and massive poverty as the roots of genocide in addition to the colonial legacy and the indifference of Western ruling classes. The theoretical links between geography, society and conflicts were also

highlighted by Ferguson (1994:59) who emphasised that genocides had negative consequences on the infrastructure, structure and superstructure.

Genocide

According to the United Nations (cited in Destexhe 1996:5), genocide

> ...means any of the following acts committed with intent to destroy, in whole or in part, a national, ethnic, racial or religious group, including (a) killing members of the group (b) causing serious bodily or mental harm to members of the group (c) deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part (d) imposing measures intended to prevent births within the group by forcibly transferring children of the group to another group.

This terminology has been reviewed and enriched and even subjected to controversies by social scientists who have shown that all mass murders or massacres are not necessarily genocide (Staub 1992:8), but one can also conceive genocide where there is no murder (Robbins and Robbins 2003:151). Genocide as stated by McCullum (1995:105) is deliberate murder born of the myth that one ethnic group, race or creed is superior to another and that it is thus legitimate to eliminate that 'other' to gain power. Calvocoressi (2005:656) states that the massacres of the 1990s in Rwanda were the clearest instances of genocide since the adoption in 1948 of the genocide convention by the United Nations (UN). However, some scholars have a number of problems with the UN definition. Chalk and Jonassohn (1990:10–11) argue that the UN definition 'is responsible for much of the confusion that plagues scholarly work in the field' because it lacks rigour.

Muberanziza (2004:6) contends that when an act is committed with the intention to destroy a group in whole or in part it constitutes genocide and the number of victims does not matter. According to Destexhe (1996:4), 'the specificity of genocide does not arise from the extent of the killings'. For Staub (1992:8) the notion of mass killing is no longer enough to define genocide. It is also argued that genocide may or may not consist of murder. One can conceive of genocide

where there is no murder but other acts such as rape and torture which do not kill or cause the deaths of members of a group (Robbins and Robbins 2003:151). Genocide may include the purposeful submission of a group to conditions of existence leading to total or partial physical destruction. For example, the deprivation of food and health care can be seen as an act of genocide (Mann 2005:4; Muberanziza 2004:6). Genocide can also consist of measures aimed at hindering births or the transfer of children of one group to another, and attacks on the physical and mental integrity of victims (Muberanziza 2004:6). Some scholars such as Mann (2005:4) have underlined the role of the State in carrying out genocide and the responsibility of the international community in acknowledging its occurrence.

Thus scholars have improved our understanding of genocides and went beyond the simple description of ancient hatred as their main cause (Mamdani 2001; Melvern 2000; Naimak 2001; Nyankanzi 1999; Pottier 2002; Prunier 1995; Staub 1992). The work by Nyankanzi (1999) showed for instance that all genocides were not ethnically or racially based. Mamdani (2001:9–20) attempted to understand the dynamics behind the slaughter by exploring the difference between settlers and natives which has made the causes of genocide in general and in Rwanda in particular much easier to understand.

Causes of genocides

Socio-political

There is no common cause of genocide; it all depends on the different historical background of each country and how perpetrators define the group and how they determine who is a member (Karen 1996:6). On the Asian continent, communism as a socio-political and economic doctrine was the context in which genocide occurred, notably in Cambodia and China (Destexhe 1996:19). The Khmer Rouge communist leaders in Cambodia combined extremist ideology with ethnic animosity and disregarded human life to repress and murder and cause misery on a massive scale (Chalk and Jonassohn 1990:270). In Africa genocide and the strategy of dividing people in colonies were used to conquer and exploit people and gain economic and political power (Mann 2005:428). In

the case of Rwanda, genocide was a carefully planned and executed exercise to annihilate Rwanda's Tutsi and Hutu populations who disagreed with extremist politics. Here, genocide had much more complex roots than just deep ethnic hatred (Keane 1995:8; Melvern 2000:11). Its main causes were socio-political. They were rooted in the manipulation of the history of Rwanda by both colonial and post-colonial leaders and can therefore be attributed to both internal and external factors. The history of Rwanda was manipulated before independence by Western colonisers (Germany and Belgium) and after independence by inefficient local leadership (Turshen 2001:57) and the failure of democracy (Mann 2005:4). International indifference and the involvement of some Western countries who are accomplices made it possible for genocide to occur (Barnett 2005:551).

Economic

Economic factors have also shaped and worsened the effects and the extent of the genocide (Utterwulghe 1999). Turshen (2001:57–58) notes that four socio-economic factors shaped the extent of genocide: (1) the abrupt drop in the price of coffee, coupled with a 1989 currency devaluation and rapid inflation after 1990; (2) a structural adjustment programme combined with a drought in the southern regions which turned into a famine; (3) the war in the north (1990) that drained government resources and created huge refugee camps in the north of Kigali; and (4) the 'paradox of democratisation in Africa' which caused opposition to the already embattled government.

Cultural

The roots of violence in Rwanda are 'more complex than most people had imagined' and the terms Hutus and Tutsis refer to constructed categories of different socio-economic positions within Rwandan society (Jennings 2001:65). Melvern (2000:11) states that these two ethnic groups shared the same language, culture and lived in the same village with intermarrying and people exchanging identities. A 'pure ethnic divide is a myth' (Melvern 2000:11). According to Mamdani (2001:9–20), it was the Belgian reform of the colonial State in the decade from the mid-1920s to the mid-1930s that established Hutus

as indigenous Bantu and Tutsis as alien Hamites. This Hamitic hypothesis, he argues, explained away every sign of civilisation in tropical Africa as a foreign import. Hutu and Tutsi became political identities connected to the origins of the violence (Mamdani 2001:9–20).

The Rwandan genocide 'was not a simple matter of mutual hatred between tribes erupting into irrational violence' (Keane 1995:7). Documentary evidence shows that the killings were planned in advance by a clique (family and in-laws) close to President Habyarimana who resented power-sharing with the Tutsi (Melvern 2000:42–43; Keane 1995:10). According to Pottier (2002:9), 'Rwanda's bloodbath was not tribal. It was rather a distinctly modern tragedy, a degenerated class conflict minutely prepared and callously executed' which the world failed to see. This indicates the complexity of the genocide in Rwanda and suggests that if class (related to resource access as well) issues are not adequately addressed, the prospect of another genocide exists.

Environmental Factors

Environmental factors also played a key role in shaping the genocide. Rwanda, is a small country whose population increased from 1 887 000 in 1948 to more than 7 500 000 in 1992 (IRIN 2002). Such a high population within a small land area makes it one of the most densely populated countries in Africa (IRIN 2002). Population densities range between 310 (UNDP 2003:3) to 410 (Pan African News Agency 2000) inhabitants per square kilometre. There is no doubt that Rwanda's overpopulation and poverty problems somehow lay at the heart of increasing ethnic tensions. As the population grew and sub-divisions amongst family members increased, the amount of available land for subsistence purposes decreased drastically, leaving many landless and unemployed. As a result, people were easily encouraged by political leaders to kill the Tutsis so that they could take possession of their land (African Rights 1995:6). African Rights (1995:6) state that 'the men who planned and implemented the genocide, called upon the population to loot the property of Tutsis, the people marked out for extinction as a principal strategy for encouraging mass participation in the slaughter'. Land, therefore, became an object of lasting conflict not only in Rwanda but also in other African countries (Robbins and Robbins 2003:73). This manipulation by

the Habyarimana regime through its policies is clearly evident in Boudreaux's (2009) article on 'Land Conflict and Genocide in Rwanda' as discussed below.

Boudreaux's (2009:85) critical review of Diamond's (2005) book '*Collapse*' in her article provides some useful insights on why Rwanda is not 'a modern day Malthusian Crisis'. Diamond, she contends, did not consider the reasons for Rwandans being tied to their land. These are:

> Lack of a formal market that would allow people to sell land and move to more urbanised areas, government policies that limited the movement of citizens from the countryside to urban centres, tightly controlled markets that limited entrepreneurial opportunities for people who might wish to leave farms, and a general pro-rural ideology imposed by the pre-genocide Habyarimana government (Boudreaux 2009:85).

She further contends that land conflict was not the primary impetus for violence and genocide, but that government policies limiting land sales, freedom of movement and labour opportunities as well as non-use of family planning and mismanagement of conflicts in a peaceful way were factors that led to the discontent of people in the country (Boudreaux 2009:85).

The problem of small land is certainly not enough to explain the atrocities which took place in Rwanda. Countries such as Belgium and Swaziland are as small as Rwanda, but they never experienced genocide. Thus poverty, overpopulation and unemployment are not the determinant causes of the genocide in Rwanda but are among factors which facilitated the recruitment of militias among young people, who had nothing to lose, just before 1994 (Semelin 2005:26–30). According to African Rights (1995:6), a superficial analysis of the genocide would blame poverty, overpopulation, the environmental and economic crisis for the tensions which led to the killings. They also contend that possible reasons lie within the socio-political structures that manipulated people from sources of resentment and despair to commit acts of violence (African Rights 1995:6). Briefly, the roots of the Rwandan genocide lie in the country's colonial legacy, misunderstanding of democracy and other indirect factors such as the working

of the world market, massive poverty, class divisions within the Rwandan society, and the cynical indifference of the Western ruling classes (Melvern 2000:11–12).

Environmental impacts

State of biodiversity

Rwanda is part of the Albertine Rift eco-region and is considered a biological hotspot. It contains a variety of endemic mammals, birds, butterflies, fish and amphibians (REMA 2009:67). The demands of high population densities and increased land shortages have resulted in large-scale conversion of natural habitats for mining, agriculture and human activities (REMA 2009:72). Because natural resources are becoming scarce, poaching of several species, including mountain gorilla, buck and elephant for trade and consumption is increasing. The biological hotspots in the country are further stressed due to the large numbers of refugees and returnees in the post-genocide camps and resettlement plots, increased competition for and reliance on the natural environment for basic survival (REMA 2009:73). The country has also lost wetland biodiversity (UNEP and IISD 2005:3). The loss of this valuable asset is due to extensive drainage and irrigation, reclamation for rice production, sugar cane growing and grazing of livestock during the dry season (REMA 2009:77). This has caused devastation of the environment leading to environmental degradation.

Deforestation

Natural forests have covered 36% of the country but since 1990 forest have declined by 78% (UNEP and IISD 2005:3). In 1960 the forest cover was 607 000 ha but by 1995 it decreased to 221 000 ha and deforestation is growing at a rate of 7% per annum since the genocide (Niyongabo 2004:27). The country has one of the highest deforestation rates in Central Africa (UNEP and IISD 2005:3). This is largely due to the scarcity of land which is a critical issue and may have been a contributory factor for the genocide. Landless people comprise 11,5% of the population and about 29% possess less than 0,2 ha of land and 60% less than 0,5 ha (Niyongabo 2004:26). Land demand is high in Rwanda and issues of limited access may fuel further conflict.

After the genocide mass clearing and removal of forests took place. This was for the purpose of making more land available for the relocation of refugees and displaced persons, firewood, logging for settlements and road construction. Additionally overgrazing and cultivation have led to deforestation (UNEP and IISD 2005:3). From 1993 to 2006 protected areas have been reduced by 92% (PRB 2009:6). For example, the Akagera National Park as well as the Gishwasti and Mukura forests were some of the areas partly cleared and reduced in size to build refugee camps and to resettle returnees (REMA 2009:86). About 15 000 ha of forests were destroyed and 35 000 ha damaged during the genocide (REMA 2009:86). Additional figures released by REMA (2009:79) indicate that forests and woodlands decreased in size by 64% to cater for the needs of the growing population and for resettlement purposes. Moreover, factors such as illegal logging and tree felling, charcoal production, agricultural practices, mining, beekeeping and bushfires have been identified to have an impact on national forest reserves (REMA 2009:79).

Farming and agricultural activities

The growth of the towns of Butare and Cyangugu after the genocide increased unemployment and people were forced into subsistence agriculture and informal activities. Subsistence agriculture was undertaken in areas surrounding houses and on the outskirts of the city (MINITERE 2001:3). Before the genocide all households from the suburbs of Butare lived off farming with related activities and more than 90% after the genocide. The only difference is that daily worker activities increased after the genocide due to lack of land for those who migrated to town. The survey results further reveal that household farming was the most important source of income before the genocide (75%) and after the genocide households involved in farming decreased to 57% because of the scarcity of land for those migrants from rural areas who moved to the urban areas.

Additionally, due to the scarcity of agricultural land, wetlands were increasingly being used after the genocide. A survey carried out by REMA (2009:96) established that wetlands comprise approximately 165 000 ha of land, 92 000 ha of which are used for agricultural and fishery purposes. UNEP, UNDP and Government of Rwanda (GoR) (2007:70) have also confirmed an indiscriminate

conversion of wetland into agricultural fields resulting in the loss of the recharging and purifying capacity of wetlands that is essential for the survival of certain species of flora and fauna. REMA (2009:96) explained the escalation in the encroachment and use of wetlands as a 'hang-over' of the genocide caused by the limited access to resources and underdeveloped services in the country.

Housing and the construction of new facilities

The Rwandan government introduced the national human settlement policy, known as Imidugudu, in 1996 which focused on group settlement. A negative aspect of this type of housing, according to the leaders and households interviewed, was its effects on the environment. Large areas of forests were simply destroyed for resettling households. During the genocide, numerous facilities were destroyed and the construction of new facilities had serious negative effects on the environment. Forests were destroyed in some areas to create new facilities, and this led to soil erosion. In Butare and Cyangugu the interviews and observation showed that the small natural forest and woodlands decreased considerably after the genocide. Causes highlighted by respondents were: resettlement, fuel purposes, commercial purposes and construction. The main construction material after the genocide was wood. Timber and other wood products for construction contributed to deforestation in the Butare and Cyangugu areas.

Fuel and energy sources and deforestation

Deforestation has been aggravated by households seeking wood as a source of energy because they cannot afford electricity even though they live in the urban and semi-urban areas of Butare and Cyangugu. According to the majority of households surveyed (75%), the main source of fuel was and remains wood and charcoal for cooking and lighting. Paraffin was used by 82% of households. REMA (2009:81) confirms that the structure of livelihoods of 90% of Rwandans makes forest resources such as wood the primary source of domestic energy. During the field survey, 84% of households stated that they had easy accessibility to charcoal before the genocide, but accessibility to wood sources decreased after the genocide for 67% of households. The limited access to wood sources

is reinforced by the fact that reliance on charcoal as the main energy source increased from 28% before the genocide to 49% during the time of the study. Households reported that wood became scarce and expensive because of the government's environmental policy to protect forests from destruction by people using firewood and timber for cooking and building. Limited access to a basic need, coupled with the high demand may eventually lead to situations where conflicts could arise.

Spread of malaria

The primary research also shows that malaria has now become evident in Cyangugu and other areas where previously this was rare. Most leaders reported that after the genocide malaria posed a significant problem with serious consequences for much of the population. Leaders attributed the prevalence of the disease to poor environmental management and poverty. The increase in malaria spread is confirmed by PRB (2009:4) who state that the incidence rate of the disease has increased from 3,5% in 1982 to 48% in 2003 due to environmental, health and population factors such as disease resistance, population density and population movements that have increased breeding areas for mosquitoes. The National Malaria Control Programme has been implemented in the country to combat the disease (PRB 2009:4).

Conclusion

The genocide in Rwanda was a tragedy in which over 800 000 were killed. As with other genocides in the world, the one in Rwanda was complex with multidimensional causes and effects. Environmental causes, such as land scarcity, the increasing pressures of population on the land only aggravated the circumstances that led to the genocide. Severe environmental damage was caused during and after the genocide by the mass movement of refugees and the internal displacement of people. However, the most pressing environmental impact in Rwanda is increased deforestation for the purposes of housing construction, building of new facilities, the use of wood for energy and most importantly, the clearing of forested areas for agricultural purposes. Extensive deforestation has resulted in the loss of biodiversity and genetic resources. Moreover, due to

the limited land available, many wetlands in the country have been destroyed by misuse and soil erosion has increased through overgrazing. However, there is some hope in Rwanda. According to PRB (2009:2), the country has a national planning and policy framework, Rwanda's Vision 2020. This document discusses the interaction between population, health and the environment and recognises that the problems in the country cannot be solved in isolation. Such grand policy frameworks are common amongst most African countries, but the problem is in the implementation, especially in a country like Rwanda where there are enormous inequities and continuing mistrust in the aftermath of the genocide. Although there is a democratic government in place, this is only the starting point. The key focus should be on establishing a strong economic base so that the structures, infrastructures and superstructures of the country that were destroyed during the country can be rebuilt. The country has adopted an Economic Development and Poverty Reduction Strategy in line with its Vision 2020 (PRB 2009:2). However, there is still an over-reliance on external aid with many of the mandatory obligations. African countries, including Rwanda need to become more self-sustaining within the context of the global economy.

The country has also committed itself to reduce poverty by signing the United Nations Millennium Declaration to achieve the Millennium Development Goals (MDGs) by 2015. In order to achieve the targets set out by the MDGs, the natural increase in population needs to be reduced. Additionally, issues of population growth and redistribution are central to maintaining environmental sustainability and performance. High population densities, scarcity of natural resources, such as land, coupled with over-utilisation of existing natural resources will increase environmental degradation. A holistic and integrated approach to environmental management should be introduced, in light of the complex issues resulting from the genocide. These should include policies that introduce and facilitate the use of cost-effective alternate energy options to reduce pressures on wood and forest resources as energy sources. The relocation and redistribution of Rwandans after the genocide is a major contributing factor to current environmental pressures and issues such as the spread of malaria, which may be worsened by poor redistribution and relocation practices coupled with inadequate health facilities. A lot has been done in Rwanda to recover from

the devastation of the genocide but there is still a long way to go. It is only hoped that the present generation and generations that follow will not make the same mistakes as in the past.

Sources

African Rights 1995. *Rwanda, death, despair and defiance.* London, African Rights.

Barnett, M.N. 2005. The UN Security Council, indifference and genocide in Rwanda. *Cultural Anthropology*, 12 (4), pp. 551–578.

Boudreaux, K. 2009. Land conflict and genocide in Rwanda. *The Electronic Journal of Sustainable Development*, 1 (3), pp. 86–95.

Butler, D. 2007. Enforced starvation: Exploring individual criminal responsibility for state-induced famines. Available from: <http://www.nottingham.ac.uk/shared_hr/cpub/Butler.pdf.> [Accessed 26 March 2007].

Calvocoressi, P. 2005. *World Politics 1945–2000.* London, Pearson Education.

Chalk, F.R. and K. Jonassohn 1990. *The history and sociology of genocide: Analysis and case studies.* New Haven, Yale University Press.

CIA (Central Intelligence Agency) 2002. The World Factbook. 2002. Introduction to Rwanda. Available from: <http://www.appliedlanguage.com/country_guides/Rwanda_country_introduction.shtml.> [Accessed 21 March 2007].

Destexhe, A. 1996. *Rwanda and genocide in the twentieth century.* New York, New York University Press.

Diamond, J.M. 2005. *Collapse: How societies choose to fail or succeed.* New York, Viking Penguin.

Ferguson, R.B. 1994. The general consequences of war: An Amazonian perspective. In: Reyna, S.P. and R.E. Downs eds. *Studying war: Anthropological perspectives (War and Society).* Langhome, PA, Gordon and Breach.

Fry, P.D. and K. Bjorkqvist eds. 1997. *Cultural variation in conflict resolution: Alternatives to violence.* Mahwah, NJ, Laurence Erlbaum Associates.

Gahima, A. 2007. The socio-economic impacts of the genocide and current developments in Rwanda: Case studies of the towns of Butare and Cyangugu. Unpublished Master's Dissertation, Department of Geography and Environmental Studies, University of KwaZulu-Natal, Durban.

IRIN (Investigator Relations Information Network) 2002. Population growth, environmental destruction and genocide. Available from: <http://medilinkz.org/news/news2.asp?NewsID=907>.

Jennings, C. 2001. *Across the Red River, Rwanda, Burundi and the heart of darkness.* London, Phoenix.

Karen, V.L. 1996. International dimensions of genocide. Available from: <http://www.veritnet.com/Karen/genocide.html#cause> [Accessed 20 September 2005].

Keane, F. 1995. *Season of blood: A Rwandan journey*. London, Penguin Books.

Laue, J.H. 1993. *Resolution: Transforming conflict and violence*. Occasional Paper 7. Institute for Conflict Analysis and Resolution. Fairfax, VA, George Mason University.

Mamdani, M. 2001. *When victims become killers: Colonialism, nativism and the genocide in Rwanda*. Princeton, Princeton University Press.

Mann, M. 2005. *The dark side of democracy: Explaining ethnic cleansing*. Cambridge, Cambridge University Press.

McCullum, H. 1995. *The angels have left us: The Rwanda tragedy and the churches*. Risk Book Series. Geneva, World Council of Churches Publications.

Melvern, L. 2000. *A people betrayed: The role of the West in Rwanda's genocide*. Cape Town, National Assessment of Educational Process.

MINECOFIN (Ministry of Finances and Economic Planning) 2002. *Rwanda Indicators Development*. Kigali, MINECOFIN.

Ministry of Infrastructures 2004. *Cyangugu Master Plan*. Kigali, Ministry of Infrastructures.

MINITERE (Ministry of Land, the Environment, Forest and Natural Resources) 2001. *Politique nationale de l'habitat*. No. 10. Kigali, MINITERE.

Muberanziza, A. 2004. Une définition juridique du génocide. *Dialogue*, 233, pp. 3–15.

Naimak, N.M. 2001. *Fires of hatred: Ethnic cleansing in twentieth century Europe*. Harvard, Harvard University Press.

Niyongabo, J. 2004. Where sustainable agriculture means agricultural productivity? The case study of Gikongoro in Southwestern Rwanda. Unpublished Master's Thesis, Department of Economic History, Lund University, Lund.

Nyankanzi, E.L. 1999. *Genocide in Rwanda and Burundi*. Vermont, Rochester.

Pan African News Agency 2000. *Rwanda: Land scarcity may jeopardize peace process*. Available from: <http://www.reliefweb.int/w/rwb.nsf.> [Accessed 5 June 2006].

Pottier, J. 2002. *Re-imagining Rwanda: Conflict, survival and disinformation in the late twentieth century*. Cambridge, Cambridge University Press.

PRB (Population Reference Bureau) 2009. *Integrating population, health and the environment in Rwanda*. Washington, DC, Population Reference Bureau.

Prunier, G. 1995. *The Rwanda crisis 1959–1994, History of genocide*. Kampala, Fontain.

REMA (Rwandan Environmental Management Authority) 2009. Rwanda State of the Environment and Outlook Report. Available from: <http://www.rema.gov.rw/soe> [Accessed 20 February 2010].

Robbins, S. and S. Robbins 2003. *Africa, a continent in agony: We accuse!* Ann Arbor, MI, Capsal.

Semelin, J. 2005. *Purifier et detruire: Usages politiques des massacres et genocide*. Paris, Seuil.

Staub, E. 1992. *Roots of evil: The origins of genocide and other group violence*. Cambridge, Cambridge University Press.

Toft, D.C. 2004. *The geography of ethnic violence: Identity, interests and the indivisibility of territory*. Princeton, Princeton University Press.

Turshen, M. 2001. The political economy of rape: An analysis of systematic rape and sexual abuse of women during armed conflict in Africa. In: Moser, C. and F.C. Clark eds. *Victims, perpetrators or actors? Gender, armed conflicts and political violence*. London, Zed Books. pp. 55–68.

UNDP (United Nations Development Programme) 2003. Human development report: Human development indicators 2003. Available from: <http://www.undp.org/hdr2003/indicator/cty_f_RWA.html> [Accessed 26 March 2007].

UNEP (United Nations Environment Programme) and IISD (International Institute for Sustainable Development) 2005. *Connecting poverty and ecosystem services: A series of seven country scoping studies. Focus on Rwanda*. Published for UNEP by IISD, Winnipeg, Manitoba.

UNEP, UNDP and GoR (Government of Rwanda) 2007. *Pilot Integrated Ecosysytem Assessment of Bugesera: Poverty and Environment Initiative Project*. Rwanda Environment Management Authority.

Utterwulghe, S. 1999. Rwanda's protracted social conflict: Considering the subjective perspective in conflict resolution strategies. *The online Journal of Peace and Conflict Resolution,* 2 (3). Available from: <www.trinstitute.org/ojpcr/2_3.utter.htm> [Accessed 21 March 2007].

Verwimp, P. and J.V. Baval 2005. Child survival and fertility of refugees in Rwanda. *European Journal of Population*, 21, pp. 271–290.

World Bank 2004. *Education in Rwanda: Rebalancing resources to accelerate post-conflict development and poverty reduction*. London, Macmillan Press.

Environmental conflicts and women's vulnerability in Africa

*Edwin C. Perry, Cheryl Potgieter and Urmilla Bob**

Abstract

This article examines environmental conflicts and women's vulnerability in Africa. Environmental resources are critical to poor women's productive and reproductive lives in Africa. Environmental resources diversify livelihoods and are key to the survival strategies women adopt. Environmental conflicts are of concern in several parts of Africa and they have gendered impacts that need to be considered. This article focuses on two main aspects. The first examines the linkages between environmental conflicts, women's vulnerability and gender-based violence. The second considers environmental conflicts, access to resources and women's vulnerability. In particular, the focus is on the way

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in which conflicts restrict women's access to and control of environmental resources. Additionally, the impacts of environmental degradation which tend to characterise environmental conflicts are considered. The article also briefly discusses women's responses and adaptation strategies to the challenges they confront in relation to environmental conflicts.

Introduction

Pillay (2009:91), in an examination of Liberia, asserts that conflict is highly gendered and that men and women experience conflict differently. Veuthey and Gerber (2009), focusing on logging conflicts in Southern Cameroon, assert that although there is more research recently on women and the environment in terms of development impacts, a focus on gender in resource conflicts remains neglected. This article seeks to understand the relationships between women, violence and environmental conflicts, especially in Africa. In particular, two aspects which are the main impacts that women experience in relation to environmental conflicts are critically examined. The first is in relation to gender-based violence since environmental conflicts increase women's vulnerability significantly. The second is a focus on environmental conflicts reducing the quantity and quality of environmental resources available to women. Access to environmental resources impacts directly on women (and their households) achieving sustainable livelihoods and attaining food security.

Environmental conflicts, women's vulnerability and gender-based violence

For the purposes of this article, the World Health Organisation's (2002:5) definition of violence is used:

> The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation.

Additionally, the United Nations (1995:121) defines violence against women as:

> Any act of gender-based violence that is likely to result in physical, sexual or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or private life.

This definition allows for the critical examination of what violence is (or is perceived to be), the nature and forms of violations against women, what impacts these violations have on women, the context in which these violations take place (spatial dimensions) as well as the power dynamics associated with violence against women. According to Morrell (2002:37), violence and violation in society 'is best understood using a gender perspective' since 'a gendered analysis allows an examination of violence in terms beyond victim and perpetrator'. Violence against females is undoubtedly one of the most disconcerting aspects of a society that promotes hierarchical power relationships on the basis of class, race, ethnicity and gender as well as other divisions.

Undoubtedly, environmental conflicts often breed a culture of violence and the most vulnerable are more likely to be victimised. The concept of vulnerability is important with regard to conceptualising both poverty and violence in society. It is imperative that poverty is viewed not only as being poor but also as linked to having higher levels of risk of becoming poor or poorer, especially in times of change and stress/shocks. The ability to withstand shocks and stressors is often linked to the assets available to a particular individual or household. Chambers and Conway (1992:9) state:

> A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.

Assets may take a variety of forms: stores of financial wealth; physical possessions/property; productive resources (such as land and businesses), human assets such as labour and education; and social capital.

Most gender-based violence is characterised by the assertion of power and control over females. Those who use violence may bully, intimidate, verbally insult, sexually coerce, or physically harm others into submission (Nadesan 2000 illustrates these in the Asian context) and these forms of violence characterise environmental conflicts. Perry (2002) and Rude (1999) state that it is best to view violence in the context of a continuum where physical violence in the overt sense of physical assaults, shootings, mutilation and so on, is at one end. They indicate that closely related to this is threatened violence – either verbally expressed or denoted by specific actions. Although no physical harm to a person actually results, it is important to note that this can be deemed to be abuse and harassment (especially emotional and psychological abuse) which in itself are forms of violence. There are several environmental conflict (or conflicts in general) situations that imply that violence is possible and has a gendered component. For example, more men carry weapons and this implies that men are more likely to be the perpetrators of violence and women the victims. Furthermore, men tend to have the power (specifically money and position) to organise and plan violent attacks while women generally do not. This analysis underscores the contention that although much of the debate on violence focuses on physical violence and sexual violence, it is imperative that there is also a need to understand the dynamics of dominance and hierarchy in its various forms in society from one end of the continuum to the other. It is this that permits a more nuanced comprehension of women's vulnerability during periods of environmental conflicts.

Women's fear of crime and violence is much greater than that of men in any situation. This can be attributed to the pervasiveness of patriarchy in society. In marginalised communities, abject poverty, severe overcrowding, desperate land hunger and insecure tenure status, a breakdown of traditional familial and community structures as well as 'dumping' people from different backgrounds together heighten vulnerability for most women. The gendered division of labour in most countries also makes women the first to suffer from the direct

and indirect depredations wrought by violent conflict (Brittain 2003, cited in Barnett and Adger 2007:644). Environmental conflicts are no exception.

The main forms of violence against women that are experienced during times of environmental conflicts relate (but are not limited) to theft, physical abuse and assault, psychological abuse, sexual harassment and sexual assault (including rape), reproduction violence which can be linked to sexual violence (such as unwanted pregnancies, unsafe abortion, complications from high risk pregnancies and sexually transmitted diseases) and exploitation such as overpricing of goods and services. Sexual harassment and sexual assault are deemed to be the most horrific among the various forms of violence. Pain (1991:417) argues that sexual violence is unique in its nature as a crime and that rape in particular is one of the most traumatic of crimes. These crimes can have long lasting effects and can add to women's fear, which is considered as one of the foundations of patriarchal control. Mackenzie (2009:1) states that the emphasis on 'immediate' and 'hard' security issues over 'everyday politics' has meant that rape as a tactic of war in Sierra Leone and children born as a result of rape are two issues that have largely been pushed to the margins of conflict, development and security studies. This is the case in most environmental conflict situations where rape and other forms of sexual violence are increasingly used as a weapon of war.

Garcia-Moreno (1998) asserts that most survivors suffer from post-traumatic stress disorders (psychological, emotional and spiritual damage) as a result of violence and the fear of violence. Furthermore, for the majority of women the persistent insults, abuse, confinement, harassment and deprivation of financial and physical resources may prove more harmful than physical attacks and result in women living in a permanent state of fear and sub-standard mental and physical health (Garcia-Moreno 1998). Linn et al. (1996) indicate that the consequences of disclosure of being violated, especially in relation to sexual victimisation, may be disastrous and can include rejection, blame, 'social death' and even further violence.

The interest in violence against women has become marked in the past several years. Women's movements, service providers, non-governmental organisations

(NGOs), researchers and development practitioners have begun to underscore the need to examine issues pertaining to women and violence linked to conflicts. Of particular interest is the way in which violence and/or the fear of violence contravene women's rights, constrain women's ability to participate meaningfully in and benefit from development and transformation processes, and impact on their quality of life. Issues concerning women and violence have been overlooked when broad-based social, economic and political planning has taken place in dealing with conflicts. Violence and/or the threat of violence can contribute significantly to maintaining gendered relations of subordination. Conflicts contribute significantly to reinforcing power and control in different spheres of our society including homes, communities, educational institutions, workplaces as well as social places. These power relations are highly gendered and women tend to bear the brunt of impacts in the productive and reproductive spheres.

Violence against females takes place more frequently during periods of conflict, especially when physical violence characterises the type of conflict experienced and when the conflict occurs in societies that tend to be patriarchal. Women's vulnerability increases significantly during periods of violence, and environmental conflicts are no exception. This aspect is particularly important given that environmental conflicts often result in displacement, migration and/or refugees.

The spatial dimensions related to women and environmental conflicts are important to consider. The imposition of gendered constraints on the use of space and environmental resources is a critical aspect that impacts on women's lives during periods of conflict. Women rely heavily on the natural resource base and are most impacted by environmental conflicts that further degrade the natural resource base, limit or deny access to resources and create insecure spaces for women. The latter is also linked to the social construction of space into 'safe' and 'unsafe' areas, and the social control of women's spaces.

Environmental conflicts often result in increased places of high risk for women. Often, security personnel's inability to protect resources and innocent people also exacerbates the situation. For example, Simiyu (2008:30) shows the security

personnel's inability to wipe out the militia involved in resource conflicts in Western Kenya. In fact, the security personnel adopted the strategy of turning on residents for withholding information and treated all young men as suspected militia fighters. Simiyu (2008:31) states that according to media reports and local human rights organisations, as well as the Kenya National Commission on Human Rights (KNCHR), this change in tactics on the part of the police resulted in widespread human rights violations. They allegedly tortured and killed innocent suspects, destroyed houses in the settlement scheme where militiamen were suspected to be in hiding, looted property, extorted money from the residents, and sexually abused women (KNCHR 2008, cited in Simiyu 2008:31). The forests became a haven for the perpetrators of the violence. An example is that on the 4th of April 2008 the police rescued three women who had been raped and tortured by a gang in the forest after being abducted (*Daily Nation,* 6 April 2008, cited in Simiyu 2008:36).

While studies have demonstrated that gender-based violence is a characteristic of environmental conflicts (see for example Brocklesby and Hinshelwood 2001; Fred-Mensah 2003; Ogra 2008; Veuthey and Gerber 2009), there are very little data available on the actual and perceived spatial distribution and understanding of gender-based violence and vulnerability related to environmental conflicts. The sources and meanings of how women themselves perceive the environment and the conflict are critical to understand gender and violence. The main sources of information about women's vulnerability in environmental conflict situations are based primarily on official (usually police) statistics, victim surveys and a series of estimates by organisations working with survivors of violence. It is important to note that there is consensus that in most cases violence against women is not reported to official sources, including the police. Furthermore, victim surveys and information from the survivors of violence tend to be limited to specific case studies and/or anecdotal experiences. Despite their limitations, these studies provide valuable information about the plight of women and key issues in relation to a gendered analysis of environmental conflicts. However, there have been numerous calls to provide more substantive information and rigorous research about the nature, scope and dimensions of the problem.

There are also political consequences in relation to women's increased vulnerability. The earlier discussion illustrated how fear of victimisation restricts women's lives and causes distress. Additionally, particularly when conflicts result in extreme violence, vulnerable community members often retreat from public spaces. Given the patriarchal nature of societies, women's participation in the public sphere is generally limited in any event. This retreat often results in women's experiences and issues not being raised when the impacts of the environmental conflict/s are being discussed and intervention strategies are being developed.

Environmental conflicts, access to resources and women's vulnerability

There is acceptance that poverty and environmental degradation (an important aspect of several types of environmental conflicts) have disproportionate impacts on African women (especially those who reside in rural areas). The feminisation of poverty is well documented. However, there is a dearth of studies that examine the feminisation of environmental conflicts in relation to the disproportionate burdens and increased vulnerability women face as a result of environmental conflicts. Their vulnerability is also directly linked to the fact that although women constitute more than half of the population and provide the majority of the food supply in developing countries, they have limited access, ownership and co-ownership to land and natural resources. Specifically, Mkhabela (2006:67), examining land conflicts in Swaziland, states that women's contribution to labour and management in food production has been put between 60 and 80%. Therefore, environmental conflicts have a direct impact on their lives, especially in poor communities. Pillay (2009:98) illustrates that in the case of the Liberian violence, women were less concerned about redress and reparations for sexual violence but more concerned about the loss of their livelihoods as well as their ability to access resources such as safe water and services such as education and health care.

In the context of rural Africa, the multiple burdens on women are particularly acute due to women's economic dependence on men, reinforced by cultural

traditions and religious practices that dictate women's relationships and roles in societies as well as the relationships to resources, especially land. Power relations from the household to the highest public level impede women's ability to lead productive and fulfilling lives. Extensive research shows that in comparison with men, women are generally at a disadvantage in terms of control and access to resources, including land (Agarwal 1996, focusing on India; Cross and Hornby 2002, focusing on South Africa; Fred-Mensah 2003, focusing on the Ghana-Togo border; Rao 2006, focusing on India). Women are less likely to reallocate the few resources they do command. Yet, women are key environmental managers and consumers. Their vast knowledge about the environmental resources they use is key to sustainable development. Sustainable livelihoods have direct links to women and their access to natural resources such as water, firewood, medicinal plants, wild foods and agricultural land. Environmental conflicts often resulted in restricted access to or degradation of these vital resources.

Women are also important traders of environmental resources in rural areas. Competition over resources and pricing can sometimes create conflicts. For example, Bennett et al. (2001:371) demonstrate the gendered nature of tropical fishery conflicts over price in Ghana. They show that while the fishermen claim that women traders did not offer a fair price for the catch, the women contend that the fishermen were unrealistic about what the catch is worth. Bennett et al. (2001:371) further state:

> Although at first this appears to be market competition rather than conflict, the women traders reported that the fishermen often abscond to other villages to avoid credit repayments. At this point what was competition appears to become a conflict as the rules are broken.

Human-wildlife conflicts are a major source of environmental conflicts in Africa, particularly Sub-Saharan Africa where protected areas are important for the economy and nature conservation efforts. However, the history of conservation areas in Africa has generally been one of dispossession and marginalisation of local communities. Several conflicts characterise Africa's protected areas and relate to loss of life or physical harm to humans by wildlife attacks, crop damage,

stock predation, property damage, natural habitat destruction, contestation over the distribution of levies/fees, poaching, etc. Ogra (2008:1408) illustrates the gendered nature of human-wildlife conflicts in protected areas in India which are also relevant to Africa. She found that costs of human-wildlife conflicts included decreased food security, changes to workload, decreased physical and psychological well-being, economic hardship, and at times an increase in illegal or dangerous activities. The research also showed that women bore a disproportionate burden of these effects because of relationships between gendered uses of space, work, status, and identity. Ogra (2008:1408) asserts that it is important to address both visible and hidden costs of human-wildlife conflicts for members of park communities, and specifically calls for increased gender-sensitivity in human-wildlife conflict research.

Environmental conflicts can also result in environmental degradation that can have an impact on the health and well-being of people. Women in particular could be differently impacted than men. For example, air pollution has often been linked to weakening of women's reproductive health status.

Smiley and Roux (2005) illustrate that while individual people experience stress due to personal events (deaths, marriages, job changes), communities of people also experience daily stress due to features in their neighbourhoods (such as crime and environmental changes such as floods). They assert that these environmental stressors have the potential to impact entire communities, and yet are difficult to define and measure. Several studies also illustrate that environmental damage can have particular significance for the poor (Dasgupta et al. 2005). Brocklesby and Hinshelwood (2001) in particular demonstrate that a common perception of the poor is that environmental quality is an important determinant of their health, earning capacity, security, energy supplies, and housing quality. Kuo and Sullivan (2001) illustrate the power of the physical environment to influence human aggression. Also, environmental conflicts often result in physical deterioration which leads to potential offenders viewing the areas and inhabitants affected as potential targets. Furthermore, the impacts and concerns are highly gendered. Therefore, the cost of environmental conflicts for the have-nots (who are often poor women and children) is greater, given restricted access to resources and opportunities as well as fewer available

mechanisms – such as the ability to move, or resources to increase protection – to cushion the effects of being victimised.

The actual costs of environmental conflicts on women are highly complex given the impacts on productivity levels (specifically since women are usually involved in the informal economy) and costs associated with what Frank (2005:33) refers to as 'victimless' crimes such as gambling, drug crimes, and prostitution. Furthermore, 'hidden crimes' such as corruption, fraud and sexual offences cannot be easily quantified as there are no methodologies that produce reliable estimates. Thus, examining the impacts of environmental conflicts and costing these in society are difficult to achieve.

Women's responses and adaptation strategies

Various factors affect who is impacted by environmental conflicts, how they are impacted and how they respond. These factors include positions related to gender, class, age, ethnicity, race, location, etc. which influence significantly women's experiences of and reaction to environmental conflicts and/or the perceived threat of these conflicts. Several authors (Bogale et al. 2006; Brocklesby and Hinshelwood 2001; Dasgupta et al. 2005; Ogra 2008; Smiley and Roux 2005) specifically highlight the links between poverty, vulnerability and environmental conflicts. Additionally, women and children are the poorest of the poor globally. Thus, women are particularly vulnerable in contexts, especially in marginalised areas where insecurity is relatively high and people often lack resources and opportunities to adequately cope with impacts that emerge from environmental conflicts. In addition to the strain that poverty places on households, it also impairs the ability of certain members of a household (such as women, the elderly and children) to leave a violent household or community. They are bound by economic dependence, and usually also by cultural ties.

Women are not simply victims, however. They engage in a range of strategies to minimise negative impacts and they adopt several survival strategies to respond to environmental conflicts. These range from outright protestation (which can take the form of violent confrontation), through covert acts of resistance, to cooperation (which entails contestation and bargaining between actors with

differential access to economic, political and social power and environmental resources). This relationship can vary in form, content and the arenas within which it takes place. The content depends on a spectrum of economic, social or political rules, practices and institutions. The arenas within which it takes place can be the household, the community and the state levels. These arenas can either reinforce or weaken each other's impact.

There are several examples of women organising to protest against environmental degradation. For example, the Green Belt Movement in Kenya is a well known organisation established by 2004's Nobel Peace Prize winner Wangari Maathai. The organisation was established in 1977 under the auspices of the National Council of Women in Kenya and organises poor women in Kenya to combat deforestation and environmental degradation. Another example is illustrated by Veuthey and Gerber (2009) who discuss women-led resistance movements to commercial logging in south-eastern Cameroon. The resistance arose because most of the socio-environmental costs of the international logging trade were imposed on rural populations and especially women in rural areas who rely on the forest resources for oil, medicine and other non-timber products.

Women adopt several coping strategies in response to real and perceived threats of violence during periods of environmental conflicts. Adopting a range of protective (intended to reduce or deter the risk of violence) and prevention strategies can play a major role in reducing women's vulnerability and increasing levels of security during periods of environmental conflicts. Some of these strategies include:

- Approaching government, especially at the local level, to increase policing/ law enforcement in the area where the conflict is taking place.
- Travelling in groups and staying together in refugee camps. The latter is an example of women moving out of an area to locations that are perceived to be safer.
- Creating defensible spaces such as installing security measures in their homes.
- Keeping away from particular people, places and situations that are deemed to be risky or dangerous, and avoiding individuals or institutions that do

not support the access of women to environmental resources. Avoidance is the most common strategy adopted by women although it results in several inconveniences to them.

- Seeking assistance and support from NGOs who set up refuges for women and children. In addition to the focus on the survivors of violence, many organisations arrange briefings and workshops for police and court officials to help them understand the significance of violence against females and enable them to deal more sensitively and justly with the cases that come before them.
- Negotiating and bargaining, which can include influencing negotiations and decisions behind the scenes by recruiting relatives of the chief and powerful men and women in the community or by persuading males to arbitrate on their behalf.

Women also adopt strategies of control and deception. Strategies of control involve women assuming personal control over environmental resources or specific spaces. Strategies of deception can take the form of deceiving decision-makers about personal circumstances such as marital status. It can also include the manipulation of men in authority, especially those who control access to, and allocation and distribution of environmental resources.

Bogale et al. (2006:138) highlight the importance of women's participation in forums created to involve local stakeholders affected by resource conflicts in Ethiopia, and Wijeyaratne (2009:34) underscores the importance of women's participation in peace keeping processes in general, drawing from research undertaken in the Democratic Republic of the Congo and Uganda. Bogale et al. (2006:138) specifically show how participatory research methods can be used to permit participants to visualise complex issues through the use of simple techniques. This approach also allowed resource governance issues to be passed to local institutions such as youth groups and women's associations. However, it is important to note that several local organisations are generally not accessible to women and tend to be dominated by men. Wijeyaratne (2009:34) states that in broader based peace negotiation processes, 'when women do manage to get to the negotiating table, they are often confronted with the challenges of being

included on equal standing with male counterparts, and of including substantive women's rights and gender equality provisions into agreements'. Pillay (2009:9) supports this position and states that in the Liberian peace processes in 2003 women were generally excluded from the formal peace talks and only a select few participated as observers despite their activism. Thus, women's presence is not the only issue. More important is making certain that there are spaces created and resources allocated to ensure effective and meaningful participation of women.

Conclusion

There is a need to develop gender-sensitive conceptual frameworks and methodologies that specifically focus on women and violence in relation to environmental conflicts. A multi-conceptual and interdisciplinary framework examines the spatial, economic, social and political dimensions. Furthermore, policy considerations for addressing gender issues relating to environmental conflicts need to be considered and should include recognising that environmental conflicts and the violence associated with these types of conflict are not gender neutral. It is clear that females experience a more heightened and widespread fear of violence and vulnerability associated with environmental conflicts that constrains their mobility, livelihood strategies and opportunities as well as level of participation in peace-keeping and decision-making processes.

Focusing on the importance of women and environmental conflicts underscores the role of women as environmental resource managers, their vulnerability to restricted and limited resource availability, and the need to develop environmental programmes aimed at assisting women. This article demonstrates that poverty and gender dynamics are central to understanding environmental conflicts and that these are particularly devastating for Africa's poor women.

Sources

Agarwal, B. 1996. *A field of one's own: Gender and land rights in South Asia*. Cambridge, Cambridge University Press.

Barnett, J. and W.N. Adger 2007. Climate change, human security and violent conflict. *Political Geography*, 26, pp. 639–655.

Bennett, E., A. Neiland, E. Anang, P. Bannerman, A. Aiq Rahman, S. Huq, S. Bhuiya, M. Day, M. Fulford-Gradiner and W. Clerveaux 2001. Towards a better understanding of conflict management in tropical fisheries: Evidence from Ghana, Bangladesh and the Caribbean. *Marine Policy*, 25, pp. 365–376.

Bogale, A., M. Taeb and M. Endo 2006. Land ownership and conflicts over the use of resources: Implication for household vulnerability in eastern Ethiopia. *Ecological Economics*, 58, pp. 134–145.

Brocklesby, M.A. and E. Hinshelwood 2001. *Poverty and the environment: What the poor say: An assessment of poverty-environment linkages in participatory poverty assessments*. Swansea, UK, Centre for Development Studies, University of Wales.

Chambers, R. and G. Conway 1992. Sustainable rural livelihoods: Practical concepts for the 21st century. *Institute of Development Studies Discussion Paper* No. 296. Sussex, Institute of Development Studies.

Cross, C. and D. Hornby 2002. Opportunities and obstacles to women's land access in South Africa: A research report for the Promoting Women's Access to Land Programme. Johannesburg, the National Land Committee and the Department of Land Affairs, in association with the Centre for Rural Legal Studies and the Centre for Applied Legal Studies at the University of the Witwatersrand..

Dasgupta, S., U. Deichmann, C. Meisner and D. Wheeler 2005. Where is the poverty-environment nexus? Evidence from Cambodia, Lao PDR and Vietnam. *World Development*, 33 (4), pp. 617–638.

Frank, C. 2005. Costing crime: What value is there for policy making? *SA Crime Quarterly*, 11, pp. 33–36.

Fred-Mensah, B.K. 2003. Looking up to the victims: Land scarcity and women's role in food provisioning in the Ghana-Togo Border Area. *Research Review*, 19 (2), pp. 35–48.

Garcia-Moreno, C. 1998. *Gender-based violence: An impediment to sexual and reproductive health*. London, International Planned Parenthood Federation.

Kuo, F.E. and W.C. Sullivan 2001. Aggression and violence in the inner city: Effects of environment via mental fatigue. *Environment and Behaviour*, 33 (4), pp. 543–571.

Linn, E., N. Stein, J. Young and S. David 1996. Bitter lessons for all. In: Siegel, D. L. ed. *Sexual harassment: Research and resources*. New York, The National Council for Research on Women.

Mackenzie, M. 2009. The international politics of rape, sex and the family in Sierra Leone. Institute for Security Studies Paper 203. Available from: <http://www.issafrica.org/uploads/P203.PDF> [Accessed 24 February 2010].

Mkhabela, T. 2006. Impact of land tenure systems on land conflicts: Swaziland – a country case study. *Africanus*, 36 (1), pp. 58–74.

Morrell, R. 2002. A calm after the storm? Beyond schooling as violence. *Educational Review*, 54 (1), pp. 37–46.

Nadesan, K. 2000. Victims of violence: An Asian scenario. *Journal of Forensic Medicine*, 7, pp. 192–200.

Ogra, M.V. 2008. Human-wildlife conflict and gender in protected area borderlands: A case study of the costs, perceptions, and vulnerabilities from Uttarakhand (Uttaranchal), India. *Geoforum*, 39, pp. 1408–1422.

Pain, R.H. 1991. Space, sexual violence and social control: Integrating geographical and feminist analyses of women's fear of crime. *Progress in Human Geography,* 15 (4), pp. 417–431.

Perry, E.C. 2002. Females' environmental perceptions of violence and danger in secondary schools: Case studies from the Durban Metropolitan Area, M.A. dissertation submitted to the Environment and Development Programme, University of Durban-Westville, Durban.

Pillay, A. 2009. Truth seeking and gender: The Liberian experience. *African Journal on Conflict Resolution*, 9 (2), pp. 91–99.

Rao, N. 2006. Land rights, gender inequality and household food security: Exploring the conceptual links in the case of India. *Food Policy*, 31 (2), pp. 180–193.

Rude, D. 1999. Reasonable men and provocative women: An analysis of gendered domestic homicide in Zambia. *Journal of Southern African Studies*, 25 (1), pp. 7–27.

Simiyu, R.R. 2008. Militarisation of resource conflicts: The case of land-based conflict in the Mount Elgon region of Western Kenya. Monograph 152, Institute for Security Studies, Pretoria.

Smiley, M. and A.D. Roux 2005. *Measuring sources of stress in the environment, Research Network on Socio-economic Status and Health*, John D. and Catherine T. MacArthur Foundation, Washington, DC. Available from: <http://www.macses.ucsf.edu/research/Social%20Environment/notebook/stress%20survey.htm> [Accessed 4 December 2006].

United Nations 1995. *Platform for Action and the Beijing Declaration, Fourth World Conference on Women, Beijing, China.* New York, United Nations.

Veuthey, S. and J. Gerber 2009. Logging conflicts in Southern Cameroon: A feminist ecological economics perspective. *Ecological Economics.* Article in press.

Wijeyaratne, W. 2009. Women in peace processes: Lessons from the Democratic Republic of the Congo and Uganda. *Conflict Trends*, 3, pp. 34–41.

World Health Organisation 2002. *World Report on Violence and Health.* Geneva, World Health Organisation.

Environmental conflicts in the South Durban Basin: Integrating residents' perceptions and concerns resulting from air pollution

*Jyoti Jaggernath**

Abstract

With a complex mix of large scale industries and major transport networks, the South Durban Basin (SDB) residential area has been subjected to a considerable amount of environmental impacts and conflicts. A major concern in the area is the effects of air pollution on human health and ecology that are caused by the emissions of unacceptable levels of toxins, chemical waste and a large content of sulphur dioxide, which are characteristic of industrial processes and activities. Perceptions regarding environmental conflicts in the area were recorded by eliciting residents' concerns. Fieldwork in the form of questionnaires was undertaken. These were administered to 200 households in Merebank and Wentworth in the SDB to determine residents' knowledge, perceptions and concerns about industrial activities and potential impacts. This paper therefore explores residents' perceptions of environmental impacts and highlights the key issues which contribute to community conflicts – including those conflicts related to government, employment, race and community health.

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Introduction

The Durban Metro Council stipulates that the South Durban Basin (SDB) is environmentally degraded, and experiences high levels of air pollution and waste disposal problems, and that the problems are additionally compounded by the loss of important natural resources (KMT Enterprises 2004). The SDB was a thriving market garden area until 1938, after which the Durban City Council decided that the area be developed into an industrial zone with the Black residential area providing the workforce (Peek 2002). According to Peek (2002), the SDB is seen as an industrial hub which fences two major petrochemical refineries, several hazardous waste dumps, fibre plants, the Mondi paper mill, hazardous chemical storage facilities, a major airport and more than 150 industries which are dependent on crude oil. Once separated along racial lines, as a result of discrimination policies of the past (Sivest 2004), the SDB has a total residential population of approximately 400 000 (Council for Scientific and Industrial Research 2002). Prior to the draining of the area for industrial development and the airport construction, the area was swampy land at or near sea level. Poverty in the SDB is relatively high with 52% of the adult population not economically active and 79% of those who are economically active earning less than R15 000 per annum (SRK Consulting 2004). The area is susceptible to low cost housing and informal settlements that develop around industrial areas such as those surrounding Clairwood and the airport (Sivest 2004).

Scott and Ridsdale (1997) assert that the SDB is a locality where the status of the social environment is a product of the interaction between individual and group capacities and macro-scale economic, political and cultural aspects. These Black residential areas of the apartheid era were traditionally situated in close proximity to, adjacent to and sometimes in industrial zones. Consequent to this situation, the quality of life of the people has been severely impacted upon due to frequent environmental problems that result from industrial activities in these areas. These communities have been forced to endure and continue to endure socio-economic and environmental conditions that impact negatively on their health and wellbeing.

Due to the close proximity of the residential area, which lies adjacent to the industrial area, the residents of Merebank are discontented about environmental pollution. The three large plants located in Merebank are an Engen refinery,

a Mondi paper mill and a Sasol fibres plant. The Mondi and Sasol factories are both located next to the Umlaas canal which runs between Merebank and the airport. Heavy industry and residential development are located in close proximity to each other in the SDB. Air quality in the South Durban Industrial Basin is a complex issue due to the concentration of industries found in the area. These range in complexity from boilers to much more complex industrial processes (Sivest 2004). Air quality in this area is characterised by meteorological conditions that may either assist or retard air pollution dispersion. As a result of the high levels of pollution emitted by industries in the area, residents in the community are subject to extreme levels of environmental stress and health issues (KMT Enterprises 2004). Globally, pollution in the South Basin is viewed to be one of the highest. Bisset (1995, cited in Matooane and Diab 2001) pointed out that in a report ranking all South African air pollution monitoring stations four of the most polluted are present in the SDB. Other serious environmental problems in the SDB are heavy transport invasions of residential roads, accidents caused by trucks, noise pollution and the illegal dumping of hazardous wastes in the area (Wiley et al. 2002). Since the residents are one of the key stakeholders, this article focuses on their perceptions of the problem.

Air quality conflicts

Concerns about health and environment among communities in the SDB and the increased demand and expansion of industry have resulted in many serious disputes and conflicts between residents and industry (Van der Merwe 2004). Underlying such conflicts were disagreements between communities and industries, based on perceptions and concerns regarding the undesirable distribution of consequent costs, so that most of the cost often had to be borne by the communities (Ozawa 1996). Furthermore, conflicts arise because of the absence of sound political control and in order to prevent further bad decisions in the future. Ozawa (1996) postulates that environmental disputes and conflicts arise not only from residents' perceptions and concerns about potential undesirable consequences of proposed developments and upgrades of industry, but also from a perceived disregard of the legal rights of individuals and groups, which are institutionalised in national legislation. According to Engelbrecht and Van der Walt (2007), responses to the negative impacts of air pollution have often been delayed due to social, political and economic factors. However,

people's awareness, their interpretation of the impacts of air pollution and their willingness to endure a certain degree of air pollution have gradually altered.

According to Peek (2002), conflict between industries and local communities arose when Mondi purchased land from the Durban Council during the apartheid era, and began its operations without consulting surrounding communities. Wiley et al. (2002) indicate that there are inadequate measures in place to mitigate poor operational practices in industries that have resulted and continue to result in oil spills and industrial accidents in the SDB. This has led to distrust of Mondi among community members. This article therefore investigates residents' perceptions and concerns in the SDB in an effort to understand the attitudes of residents towards longstanding environmental conflicts in the area.

Environmental racism

Race is seen as an important variable that shapes residents' perceptions of environmental hazards (Guhathakurta and Wichert 1998; Mix and Shriver 2007). Lopez (2002) theorises that racial tensions can be attributed to the disproportionate risk of exposure to environmental stressors endured by Blacks. The distribution of environmental risks and hazards and their disproportionate distribution and impacts on low-income groups, racial minorities, and other marginalised groups have been the focal point for environmental justice research in recent years (Grineski et al. 2007). Environmental justice has been defined by the Environmental Protection Agency (EPA 1998) as the equal treatment and participation in decision making of all people regardless of their race, colour, nationality or income status. Bullard and Johnson (2000) state that the equal treatment of all people maintains that no group of people, including racial, ethnic or socio-economic groups, should be subjected to a disproportionate share of the negative environmental impacts resulting from industrial, municipal and commercial operations. Morello-Frosch (2002) indicates that socio-economic and political forces unavoidably create a situation in which overlapping pollution plumes, emitted by various sources into our air, soil, food and water pose a range of health risks to diverse surrounding communities. Bullard and Johnson (2000) postulate that industries and governments have often exploited the economic vulnerability of Black communities with their unsound and hazardous operations.

Environmental struggles in South Africa emerged in light of the longstanding legacy of apartheid politics and spatial planning discourse and practice (Durning 1990). Durning (1990) further states that apartheid, despite being an example of political injustice, was also the most reprehensible example of environmental injustice. Apartheid's zoning policies and its racialised separate development philosophy forced Black South Africans to be placed in overcrowded Bantustans/Homelands and townships that were located downwind or downstream from industrial complexes (Kalan undated). As a result, communities of colour in South Africa are unequally exposed to industrial pollution and socio-economic deprivation, since many individuals are forced to live and work in hazardous industries due to their poverty status. The South African Constitution (Section 24) states that all people irrespective of their race, colour or ethnic differences has the right to an environment that is not harmful to their health or well-being and to have the environment protected not only for the benefit of the present generation but also for future generations, which can be achieved through reasonable legislative and other measures that help prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (Department of Environmental Affairs and Tourism 2005). However, these rights have been ignored by most industries, if not all, and pollution continues to infringe on the environmental rights of poor Black populations. Environmental assessments should consider evaluating the impact of segregation on health. Furthermore, environmental factors should be included in research on race disparities in health, since the bulk of segregated Blacks are generally situated in close proximity to hazardous industries (Lopez 2002).

Methodology

Survey questionnaires were used to retrieve data (based on individual perceptions, concerns and issues) pertaining to environmental pollution and conflicts in the sampled community. Questions were designed to elicit socio-demographic information (age, sex, ethnic background, length of residence in the area, job location, education, home ownership, etc.), knowledge and perceptions of polluting industries and environmental health conditions in the household, as well as evaluations of environmental issues and concerns that are

experienced by the respondents based on their awareness of industries' present development status and upgrades in the study area.

A systematic sampling approach was used to select households. Systematic sampling is one in which selection is made at regular intervals. A systematic sample of 200 households adjacent to the Mondi paper mill and the Engen oil refinery were interviewed. The focus was placed on households that were situated closest to Mondi and Engen. Every tenth household was interviewed – starting with a household that was deemed to be closest to the industries and then moving further away. The interviews were conducted during four consecutive weeks in 2009. The interviews were carried out on a face-to-face basis.

Results

Characteristics of the sample population

Sixty one percent of the respondents were female and 39% were male. A possible reason for these figures is that interviews were carried out mainly during the day when it was more likely that the male population was at work. Eighty one percent of the respondents were younger than 50 years old. Sixty five percent were of the Indian historical racial category and 35% were Coloured. This is due to the fact that apartheid planning had separated individuals among racial lines and the areas under study were historically designated for Indians and Coloureds. The results indicate that the racial composition of the area has not changed significantly after the apartheid era. Fifty five percent of the respondents had a total yearly income below R50 000 per household, while 44% of the respondents had a total yearly income that is above R50 000. One respondent indicated that he/she earns less than R1 000. This indicates that low to middle income households are found in the area.

The majority of respondents surveyed resided in close proximity to industries situated in the area (an intended consequence of the sampling strategy employed), with 86% estimated to be located less than 2 km away. Fourteen percent of respondents indicated that they were not sure, however, and they estimated the distance from their household to Mondi to be between 2 and 5 km. This trend in responses suggests that industries are situated in close proximity to residential areas, thus resulting in numerous impacts on individuals and households.

Residents' perceptions on environmental impacts

Eighty five percent of households surveyed indicated that industries cause environmental instability, and 75% stated that industrial activities pose a threat to the health and safety of the community and those that are employed at the mill. A further 75% anticipated an increase in pollution levels in the area, 69% felt that the environment will degrade further, while 23% feared the increased devaluation of property with the increase in the use of land for industrial purposes. Twenty six percent of the respondents anticipated increases in job opportunities at the industries, while 2% felt that industries contributed to the overall upgrade of the community. Seventy two percent of the respondents did not indicate any positive impacts resulting from industries in the area. Clearly, more negative aspects are linked to the industries in the area than positive attributes. Additionally, most of the respondents associate the industries in the area with negative environmental and economic impacts.

Table 1: Problems associated with industries in the area (n=200)

TYPE OF ENVIRONMENTAL PROBLEM EXPERIENCED (Multiple responses)	**In %**
Air Pollution	96
Soil Pollution	6
Water Pollution	11
Noise Pollution	4
Land degradation	17
DESCRIPTION OF AIR POLLUTION PROBLEM EXPERIENCED (Multiple responses)	**In %**
Toxic/Pungent odour prevalent in the air	44
Black smoke visible in the air	27
White vapours visible in the air	22
Black ash particles visible in the air	29

The above table indicates that in relation to environmental problems experienced in the area, almost all (96%) of the sampled population asserted that their primary concern was air quality, since air pollution is characteristic of most if not all industrial processes. This is indicative of the pervasive nature of poor air quality perceptions in the community. Other environmental problems identified related to land degradation (17%), water pollution (11%), soil pollution (6%) and noise pollution (4%). It is important to note that many of the environmental problems identified are interrelated. For example, the noise, water and soil pollution referred to are generally in relation to the industrial activities in the area which are also the main air polluting sources. Specific examples provided by the respondents refer to the Mondi mill and Engen oil refinery creating visual intrusions, and state that rivers, streams and the canal joining Treasure beach are being polluted by the effluents discharged from these industries. With regard to the description of the air pollution problems experienced, 44% of the respondents described the pollution prevalent in the air as having a toxic or pungent odour, while 29% said that black ash particles were visible in the atmosphere. Black smoke is visible to 27% of the respondents, with a further 22% indicating that white vapours from the steam generated at Mondi are visible both during the day and at night. It is important to note that industrial air pollution is not only emitted from industrial processes and activities at the industry, but also occur as a result of the heavy industrial vehicles that are used to transport raw materials to and from industries. A study on the impact of forced reduction in traffic volumes on urban air pollution carried out by Yuval et al. (2007) showed that reduced traffic volumes from industrial vehicles resulted in lowered levels of nitrogen dioxide, hydrocarbons and particulate matter.

A key concern with regard to health considerations is air quality linked to industrial development in close proximity to or within residential areas. There are many health problems or conditions that are prevalent in the area. Significant percentages of respondents indicated that a member or members of the household suffered from asthmatic bronchitis (47%), allergies (44%), hay fever (26%), eczema (23%) or wheezing (9%). A possible reason for this trend may be the concentration of heavy industries in close proximity to the residential area, emitting toxic gases or compounds of heavy metals that are characteristic

of industries in the SDB. Health impacts resulting from industrial pollutants on people have serious consequences for the quality of life and livelihood options at the individual and household levels. Evidence revealed in epidemiological studies indicate that chemical compounds emitted from industrial processes have numerous adverse impacts on the respiratory system (Brunekreef and Holgate 2002; Grineski et al. 2007; Kampa and Castanas 2007; McGranahan and Murray 2003). Respondents indicated that the main causes that may have led to the specified health condition or problem are from industrial smoke (58%) and dust from industrial activities (29%). The remaining 13% of respondents felt that the main cause of the health condition/problem was pets, pollen, trees, fresh-cut grass, physical activity, colds/flu, stress, certain types of food, change in weather, or sprays of strong smells such as colognes, perfumes or detergents.

Table 2: Challenges facing the community (n=200)

KEY COMMUNITY CHALLENGES (Multiple responses)	**In %**
Environmental pollution	73
Health problems and high medical bills	17
Crime/drug abuse/violence	73
Poverty and unemployment	73
Devaluation of property	3
Concentration of industries close to residential area	3
Lack of proper infrastructure and government funding	9

Challenges facing the community (Table 2) proved to be largely due to environmental pollution (73%), poverty and unemployment (73%), and crime, drug abuse and violence in the community (73%). Seventeen percent of the respondents were faced with the challenge of high medical bills, while 9% found a lack of proper infrastructure and government funding in the community. Three percent identified the concentration of industries close to residential areas, while a further 3% feared devaluation of properties in the area as a result of the

expansion of industries. The trend in responses gives a clear indication that the challenges facing the community are associated with industries. This implies that community members are discontent with the concentration of heavy industries in close proximity to their households.

The importance of air pollution problems identified by the respondents was reinforced when questions were raised pertaining to the sources of conflicts in the area. Most respondents (78%) stated that unresolved air quality issues were the main sources of conflicts and tensions. Other sources of conflicts identified include lack of jobs (53%), crime (34%) and social problems linked to alcohol and drug abuse. Clearly, air pollution is regarded as a key source of conflict in the area. Respondents identified the main types of air pollution/quality conflicts in the area as disagreements between local government and the community (64%), disagreements within the community (68%), and disagreements between industries and communities regarding land use for additional developments and upgrades (71%). Some of the respondents also stated that the conflicts have from time to time also resulted in protest actions such as community demonstrations and shut-ins. Furthermore, the environmental conflicts had deteriorated into outright violent altercations, primarily between community members involved in the protest action and the police. Most of the respondents (81%) agree that air quality issues in the community have remained unresolved for decades, despite several attempts to address the problems faced by the community. They attribute this situation to the government being unable to remove the industries from the area and generally failing to address community concerns.

In a global context, government has been criticised for failing to effectively regulate and control the activities of environmentally hazardous industries in racially segregated areas (Van der Merwe 2004). Mix and Shriver (2007) state that residents' perceptions of government and corporate culpability vary widely. Depending on the severity of the environmental hazard, residents' perceptions of environmental hazards involve a combination of psychological, physical, scientific, and attitudinal factors that have been shaped by previous apartheid policies. This indicates that it is difficult to manage and redress environmental problems in communities where industries have a long history and are well established. In the SDB this is a major consideration since it is often argued that

it will be too costly to remove the industries from the area and that it will be inappropriate to move them away from close proximity to the Durban port and other related industries.

Communication and information sharing are central to minimising conflicts in the first instance and addressing them if they already exist. This study shows that despite the close proximity of the sampled households to the industries, very few residents are informed of developments. Specifically, 79% of the respondents indicated that they are often unaware of industrial upgrades and only 21% indicated that they are made aware when industries propose any upgrades. Of those respondents that are made aware of proposed industrial upgrades, 14% became aware of the project through information brochures; 12% had attended public meetings; 11% were informed by their friends, family members or neighbours; and only 2% of respondents were made aware by newspapers (multiple sources were cited). Communication, information sharing and negotiation can occur with public consultation, which facilitates better decision making by the organisations and industries (Van der Merwe 2004).

Farina (1995, cited in Van der Merwe 2004) defines participation as a process in which stakeholders influence and share control over development initiatives, decisions and resources that affect them. Of concern was also the extent to which community members participated in public meetings which is the key manner in which communities engage with the public and private sectors in South Africa. Public participation is also seen as a key mechanism for resolving conflicts. Ninety one percent of respondents indicated that they did not attend public meetings that were held in respect to industries and air pollution issues, while 9% indicated that a member of the household did attend these meetings. Of the 91% of respondents that did not attend public meetings, 85% claimed that they were not informed about the meetings, 9% were informed about public meetings but were not interested, and 6% were unavailable when the public meetings were held. Of the 9% of respondents who attended public meetings, 4% rated the public meetings as having been satisfactory and 5% indicated that public meetings were unsatisfactory (poor). Those respondents who asserted that the public meetings were satisfactory or unsatisfactory stated that not enough information was displayed at these meetings and that outcomes of public

meetings were poor, since they were not satisfied with the impact assessments being carried out and were not thoroughly informed about potential impacts that projects may have on the community. There was also a high level of consensus that meetings and interventions thus far were a waste of time since very little is being done in the community to address the problems they experience in relation to air pollution. This implies that respondents are generally confused about the effectiveness of these public meetings and attempts to address problems thus far, which suggests that the meetings were not thoroughly planned with regard to allaying people's concerns and fears, nor did they make decisions that were clear. Public participation is required in most environmental impact assessments; but the involvement of communities is often regarded as being procedural and thus including the public effectively in environmental decision making is often overlooked (Shepherd and Bowler 1997). This certainly appears to be the case in the SDB.

Previous research indicates that residents are established in the area and will resist any attempts to move out (Scott and Ridsdale 1997). However, this research shows that a significant proportion of the residents (78%) would move out of the SDB if they were adequately compensated and homes were found close to their places of work – thus moving them away from the environmental problems and conflicts.

The following suggestions were put forward by respondents to help address the perceptions and concerns raised in relation to negative impacts that create conflicts between residents and industries:

- It is abundantly clear that there is a definite need for greater and stronger degrees of communication between industries in the area and the community. Therefore, residents assert that more attention needs to be directed towards making the community understand the benefits and adverse impacts of the development and upgrades of industries. It is also of significant importance that the community is involved in decision-making processes with regard to proposed upgrading and expansion projects and that their views and opinions are taken into account.

- In creating stronger community awareness of activities, developments and upgrades of industries, residents suggested that it is imperative to strengthen awareness campaigns by disseminating information via flyers/pamphlets, newsletters, brochures, poster boards and media broadcast advertisements rather than relying on public meetings. In terms of the latter, it was also regarded as important that the public is well informed of these meetings. It is also possible to inform individuals and households adequately about conflicting industrial activities through electing road representatives who would carry the information directly to the community members.
- Members of the community are also unaware of the government's interaction with local councils and suggest that the representatives of these bodies identify themselves and work with the community in resolving issues and concerns. The government should therefore be an integral part of all decision-making processes associated with industries and residents, and thereby cascade relevant information to members of the community.
- Residents indicated that the vast majority of the community is poor and is affected by health problems that may be a direct result of the pollution associated with industries. Therefore, they suggested that industries address these health issues as a matter of urgency by working closely with health care practitioners to address health related concerns and gradually allay the people's fears. The health and safety of the community should be a priority.
- To avoid conflict between residents and industries about employment opportunities, residents assert that industries deliver on the buy-in promises made of creating more employment opportunities for the local community. Community members should be given first preference in any employment opportunity available in industries in the area, instead of individuals from other regions or provinces.
- It was also suggested that industries place more emphasis on community projects that focus on the care, conservation and protection of the surrounding environment. Projects should also include the provision of paper to schools that are financially incapable of purchasing reams of paper for printing, drawing, etc., as well as assistance with the upgrading of facilities in the community, as the entire community will benefit from this effort.

Conclusion

It is not surprising that environmental conflicts in the SDB are prevalent. Most industries are not interested in the perceptions of the community and often their pleas, issues and concerns go unheard or unanswered. A large number of respondents indicated that they did not attend public meetings, as they were not thoroughly informed about these meetings. An important study finding was that a significant proportion of the respondents would like to move out of the study area if the opportunity arose. This trend in responses was due to numerous reasons, but it was evident that members of the community are trying to escape the hassles of living in close proximity to several industries, since respondents' eagerness to move is clearly related to the negative environmental impacts that are associated with industries in the SDB.

There is need for research to examine the key aspects further. In particular, unemployment in the area requires research to unpack why in such a major industrial zone high levels persist. Furthermore, although beyond the scope of this article, the legal framework needs to be investigated. One respondent stated that although there are laws that limit pollution and other industrial activities in the area, the industries prefer to pay the penalties rather than adhere to these regulations. This suggests that currently the legal framework is inadequate.

It is important to foster more effective communication between industry and the community. It is also of importance that the community is involved in decision-making processes and that their views and opinions are taken into account. Strengthening communication could be vital to bridging the gap between industry and the local community. Mix and Shriver (2007) assert that the results from research conducted in communities in conflict can feed into public and social policies that better address community and industry perceptions and concerns.

Sources

Brunekreef, B. and S.T. Holgate 2002. Air pollution and health. *The Lancet*, 360, pp. 1233–1242.

Bullard, R.D. and G.S. Johnson 2000. Environmental justice: Grassroots activism and its impact on public policy decision-making. *Journal of Social Science*, 56, pp. 555–578.

Council for Scientific and Industrial Research 2002. *Scoping report: Precipitated calcium carbonate plant of Mondi, Merebank, Durban, KwaZulu-Natal*. Report Number DD97/01/C.

Department of Environmental Affairs and Tourism of South Africa 2005. Air Quality Act (No. 39 of 2004). Available from: <http://soer.deat.gov.za/themes.aspx?m=133>.

Durning, A.B. 1990. Apartheid's environmental toll. Available from: <http://fast.antenna.nl/wise/387–8/apart.html>. [Accessed 10 February 2010]

Engelbrecht, J.C. and K. van der Walt 2007. A generic air quality management plan for municipalities. *Clean Air Journal*, 16 (1), pp. 5–15.

EPA (Environmental Protection Agency) 1998. Final guidance for incorporating environmental justice concerns in EPA's NEPA (National Environmental Policy Act) compliance analyses. Available from: <http://www.epa.gov/region1/ej/pdfs/ej_guidance_nepa_epa0498.pdf> [Accessed 8 September 2010]

Grineski, S., B. Bolin and C. Boone 2007. Criteria air pollution and marginalised populations: Environmental inequity in Metropolitan Phoenix, Arizona State University. *Social Science Quarterly*, 88 (2), pp. 535–554.

Guhathakurta, S. and M. Wichert 1998. Who pays for growth in the City of Phoenix: An equity-based perspective on suburbanization. *Urban Affairs Review*, 33, pp. 813–838.

Kalan, H. undated. The deadly fumes of environmental injustice in South Africa. Available from: <http://www.afsc.org/pwork/0599/0514.htm>.

Kampa, M. and E. Castanas 2007. Human health effects of air pollution. Laboratory of Experimental Endocrinology, University of Crete, School of Medicine, Greece.

KMT 2004. Social impact assessment of the proposed upgrade of Mondi Paper, Merebank, Durban. Report prepared by KMT.

Lopez, R. 2002. Segregation and Black/White differences in exposure to air toxics in 1990. *Health Perspective*, 110 (2), pp. 289–295.

Matooane, L. and R.D. Diab 2001. Air pollution carrying capacity in the South Durban Industrial Basin. *South African Journal of Science*, 97, pp. 450–453.

McGranahan, G. and F. Murray 2003. *Air pollution and health in rapidly developing countries*. London, Earthscan Publications.

Mix, T.L. and T.E. Shriver 2007. Neighbours, nuisances and noxious releases: Community conflict and environmental hazards in the Atomic City. *The Social Science Journal*, 44, pp. 630–644.

Morello-Frosch, R.A. 2002. Discrimination and the political economy of environmental inequality. *Environment and Planning C: Government and Policy*, 20, pp. 477–496.

Ozawa, C.P. 1996. Science in environmental conflicts. *Sociological Perspectives*, 39 (2), pp. 219–230.

Peek, S. 2002. *Mondi waste management and the struggle of the South Durban Community Environmental Alliance*. Cape Town, University of Cape Town Press.

Scott, D. and R. Ridsdale 1997. *A social assessment of Southern Durban.* Durban, Department of Geographical and Environmental Sciences, University of Natal.

Shepherd, A. and C. Bowler 1997. Beyond the requirements: Improving public participation in EIA. *Journal of Environmental Planning and Management*, 40 (6), pp. 725–738.

Sivest 2004. *Subdivision and rezoning of Durban airport, Number 14263 for a Fuel Storage Facility.* Draft Scoping Report, March 2004.

SRK Consulting 2004. Social impact assessment: The proposed upgrade of Mondi Paper, Merebank, Durban, KwaZulu-Natal.

Van der Merwe, M. 2004. Health is a neglected priority in environmental impact assessments. Proceedings of the 8th World Congress on Environmental Health, South Africa, ISBN 0-9584663-7-8

Wiley, D., C. Root and S. Peek 2002. Contesting the urban industrial environment in South Durban in a period of democratisation and globalisation. Pietermaritzburg, University of Natal Press.

Yuval, A., B. Flicstein and D.M. Broday 2007. The impact of a forced reduction in traffic volumes on urban air pollution. Atmospheric Environment, 42, pp. 428–440.