Land tenure insecurity, vulnerability to climate-induced disaster and opportunities for redress in southern Africa

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Land tenure is an important variable impacting on vulnerability to climate-related disaster. Land tenure insecurity is widespread in southern Africa and manifests itself in a number of ways that accentuate vulnerability to climate change impacts. Insecure tenure is seen to heighten vulnerability against growing demand for land for residential purposes and working space in urban areas while in the rural areas insecure tenure militates against diversified livelihoods and hinders investment in appropriate technologies and uptake of sound environmental management practices. Using the *focused synthesis* method, this article (1) maps the intersections between land tenure insecurity and vulnerability to climate-induced disaster in southern Africa; and (2) identifies the opportunities tenure reforms hold for vulnerability reduction in a region predicted to suffer widespread impacts from climate change. The paper contends that land tenure is a critical component of the milieu of factors – economic, social, cultural, institutional, political and even psychological – that are known to shape vulnerability and determine the environment that people live in. The study finds that land tenure reforms can help to reduce vulnerability and enhance community resilience to climate change. In this regard, the article outlines how tenure reforms can help build diverse household livelihoods, improve environmental management, particularly in the rural areas, and encourage investment in robust housing and safe neighbourhoods among the urban poor – all of which are integral to the region's response to climate change.

Introduction

Although often overlooked, land tenure is an important variable impacting on vulnerability to climate-related disaster. It sits alongside a gamut of social, economic, political and environmental aspects that make up the matrix of factors that mediate vulnerability. Vulnerability can occur either where land tenure is perceived to be insecure, or where insecure tenure results in the loss of land, especially when alternative livelihood and housing options are limited (Reale & Handmer 2011).

Using the *focused synthesis* method, this article (1) maps the intersections between land tenure insecurity and vulnerability to climate-induced disaster in southern Africa; and (2) identifies the opportunities tenure reforms hold for vulnerability reduction in a region that is predicted to suffer widespread impacts from climate change.

A note on the method

The methodological approach used was the *focused synthesis*. This qualitative method depends on already existing information to answer the questions on which the research effort is focused. Although focused synthesis has been compared to the traditional literature review, Banda (2003) contends that the two are distinct and one should not be confused for the other. Whereas a traditional literature review is based on published information, data for the focused synthesis is derived from the totality of information available to the researcher, including but not limited to published material, anecdotal stories, discussions with experts and stakeholders, the researcher's own past experience and unpublished material. Banda (2003) also argues that, unlike a literature review which seeks only to describe sets of research studies and identify gaps or areas needing more research, focused synthesis uses all available information sources to the extent that they directly contribute to the overall synthesis. Thus, in this paper I present a synthesis based upon a thorough review of relevant existing literature, notes from discussions with experts, unpublished literature 'floating' in my community of practice as well as my own experience working in the field of State of the Environment Reporting.

Hocking, Stacks and McDermott (2003:83) state that documents can be used to organise existing knowledge and to establish relationships between topics or concepts of interest. Thus, the review

of documented information provided the core upon which the analysis presented in this paper is based. The literature study for this paper consisted of a review of data held in books, journal articles, government and international reports and policy documents, conference proceedings and other research papers as could be found in available physical and electronic document repositories. While some documents were purposefully sought, other, ultimately very useful documents fortuitously found their way into the body of literature reviewed, arriving by way of mailing list distributions or in some cases identified through informal conversations with colleagues.

Vulnerability and land tenure insecurity: The intersections

Land tenure helps to anticipate an individual or group's vulnerability to hazard, particularly in the present era of growing climate variability and change. In southern Africa, we are seeing an increase in natural hazards, including wildfires, floods, cyclones and droughts, with the Intergovernmental Panel on Climate Change predicting an increase in frequency of climate-related hazards due to climate change (IPCC 2007). The 2007 IPCC Fourth Assessment Report indicates that southern Africa is expected to experience increased incidences of floods and more intense droughts as a result of warming temperatures. Cyclonic activity is also expected to become more intense, with larger peak wind speeds and heavier rains. Such hazards will often exacerbate insecure land tenure, exposing otherwise hidden vulnerabilities (Reale & Handmer 2011).

Vulnerability speaks of the characteristics of individuals and groups and the contexts they live in, which influence their ability to 'anticipate, cope with, resist and recover from the impact of a natural hazard' (Wisner *et al*. 2004:11). Vulnerability is not natural. It is the human dimension of disasters, the result of the whole range of economic, social, cultural, institutional, political and even psychological factors that shape people's lives, and create the environment that they live in (Twigg 2004). Within a community, individuals differ in vulnerability due to differences in gender, physical status, social ties, control over socio-economic resources, as well as the location of their dwellings. It is the weaker groups in society that suffer worst from disasters: the poor (especially), the very young and the very old, women, the disabled, and those who are marginalised (Elo, Palm & Vrolijks 1995). Generally, those who are already at an economic or social disadvantage tend to be more likely to suffer during disasters.

The underlying factors contributing to vulnerability are complex. The notion of vulnerability tells us that a disaster does not occur in a vacuum, but is part of a socioeconomic, political and environmental context (Bankoff 2001). Disasters uncover underlying vulnerabilities, which have social, political, economic and environmental origins, and land tenure is very much a part of this overarching context in which a disaster occurs.

Conversely, disasters can trigger tenure insecurity, or exacerbate existing insecurity. In addition to loss of life and the severe impacts on national economies, some of the most drastic effects of natural disasters on peoples' livelihoods, relate to disruption of land tenure systems and property loss. Access to land and security of tenure are very often eroded as a result of natural disasters, leaving people unable to access their land either for production or for housing purposes. Garibay *et al*. (2010) have isolated some of the mechanisms through which disaster would exacerbate insecurity of tenure. These include the total or partial destruction of physical evidence of property boundaries; the disappearance or death of people who have the memory of property boundaries; and the emergence or intensification of conflicts over land tenure that were already present but are heightened as a result of a disaster, such as conflicts over inheritance of land rights. Addressing land rights in resettled areas is often problematic where people have been relocated because of disaster, especially if there is lack of proper legislation to facilitate access to land to those who have lost it. Where property rights are unclear, land grabbing and abusive building practices can occur in resettlement areas, where there are no suitable norms to avoid it. Over and above these, the most prevalent way in which disaster often exacerbates tenure insecurity is through the destruction of land tenure records like land title deeds, cadastre maps, land registry records, identity cards, and insurance claims (Garibay *et al*. 2010).

Land tenure and tenure insecurity in southern Africa

A study by the Economic Commission for Africa (ECA 2003) shows that land tenure insecurity is still widespread in southern Africa and it manifests itself in a number of ways. It appears in minority groups in Botswana and Malawi; in unclear or overlapping land rights and insecurity of farm workers and farm labour tenants in South Africa; in overcrowding in the form of high population to land ratio in Lesotho, Malawi and South Africa; in land alienation into leasehold in Malawi, Mozambique and Zambia; and in inappropriate and exploitative administrative practices and limited women's land rights in most countries in the region.

The two principal forms of land tenure systems found in southern Africa are customary and statutory tenure. The customary land tenure system is governed by unwritten traditional rules and administered by traditional leaders. Active occupation or usage of a piece of land is the main evidence of ownership or an existing interest on the land. In customary tenure, access to land is contingent upon tribal or community membership controlled by the chief. Households have strong, exclusive residential rights, seasonally exclusive rights to arable land, and shared rights to grazing land and natural resources. Land is not alienable from the community trust (ECA 2003).

Statutory land tenure system is governed by modern law and supported by documentary evidence, such as a title deed or lease certificate, and administered by the government. Land

ownership under the statutory tenure system is often built on freehold or leasehold entitlements to the land and offers exclusive rights to the owner, which guarantee land tenure security. Land rights in freehold include the ability to sell the land, rent it to others and to use it as collateral for a mortgage, for example (ECA 2003).

Whereas the dominant form of land tenure system before colonisation was customary, today virtually all countries in the sub-region have a dual land tenure system in which the neat distinction between these customary and statutory models of land tenure is considerably blurred (Cotula, Toulmin & Hesse 2004). Land tenure is also often categorised as private, communal, open access or state. However, in practice, most forms of holdings are found to overlap within southern African societies, for example, in common grazing rights, private residential and agricultural holdings, and state ownership of forests.

Colonial land expropriation was extensive in South Africa, Namibia and Zimbabwe, where the minority settler white population held 85%, 50% and 38% of the agricultural land respectively. However, in Zimbabwe, the radicalisation of land reform has reduced white farmer owned land to less than 3% (Moyo & Nyoni 2007). In the countries which experienced extensive expropriation of land by settler colonial communities, tenure insecurity remains an acute problem. Repossession of alienated land by African citizens remains a central national objective and land acquisition for redistribution and restitution has been given priority. Unfortunately, tenure reform has been relegated in importance, with focus mainly directed towards simple redistribution of white farmer owned farms and resettlement of the landless indigenous black majority. So dominant is the imperative to repossess land that insufficient attention has been devoted to post-settlement planning and support. Thus, the livelihoods and the land rights of incoming settlers have too often remained insecure (Chagutah 2011).

The growing trend wherein southern African land tenure systems tend to promote the concentration of unequal landholdings have generated discriminatory and insecure tenure in the various existing land tenure regimes with widely variable use, exclusion, and transfer rights (Moyo 2004). In countries where customary land tenure systems are predominant, there is a tendency towards high population densities on degraded lands, largely around mountainous areas and scarce arable land. Furthermore, the tendency for the majority small-scale rural farmers to be largely concentrated in these marginal land areas, and to have the least access to water, infrastructure and investment finance, renders their land uses extremely vulnerable to climate and man-made hazards. Along with insecure tenure and lack of infrastructure, land use regulation in the rural areas is coercive rather than based on incentive and communities are thus not encouraged to invest in measures that reduce vulnerability.

An urban perspective

Contemporary research on land tenure in southern Africa predominantly focuses on tenure problems associated with rural agricultural land ownership and use, to the exclusion of urban land issues. This is because the agrarian question constitutes the primary concern of the discourse that circumscribes the broader land question in post-colonial southern Africa. However, urban areas are increasingly a critical site of struggle in the context of the drive to ensure sustainable development in an increasingly urbanising region and particularly in terms of growing demand for land for residential purposes, as well as for its use as working space (Moyo 2004).

Populations in southern African cities have grown at alarming rates since the 1960s, with current urbanisation rates reaching 30% and higher in some countries compared to less than 15% then (Moyo 2004). Urban fertility rates and rural to urban migration both continue to drive urbanisation, leading to expanding demands for access to urban and peri-urban land. Urban demand for land includes its requirement for residential purposes, for urban farming in the context of supplementing the basic food and income needs of the urban poor, and for working space for small-scale informal trade, 'backyard' industries and other services provided by the formally unemployed. Notably, tenure issues associated with informally settled communities have gained prominence against the background of increasing urbanisation and the associated mushrooming of informal settlements around southern African cities.

Tenure contestations are prevalent between the state, at central and local urban municipality level, customary authorities and leaders within and around urban areas, communities of families claiming indigenous rights to land and various social categories of urban and peri-urban residents, including informal settlers, as well as real estate developers and other elites involved in land speculation. Contested land claims are mediated through competing urban land tenure regimes, which in most cities are driven by a process of the conversion of urban land from customary land tenure regimes towards state (public) tenures and private property regimes (Moyo 2004). The demand for security of tenure in these urban areas is often expressed as a desire for freehold land rights, due to poor relations between tenants and private landlords, and tenants and different levels of the state (Marcus, Eales & Wildschut 1996).

The rural perspective

Although the promotion of specific forms of land administration systems has predominantly been for the promotion of formal statutory land titling and 'modernised' land administrative structures of land tenure systems, the majority of rural southern Africans obtain their land on the basis of customary rights rooted in notions of 'community' and kinship. Access to land also comes through derived rights, including a series of informal contractual relations (such as sharecropping) with those who hold primary rights (Moyo 2004).

The central land tenure problem in rural southern Africa revolves around struggles over the imposition of land

management institutions and rules, during colonial and in post-independence times, which have served to diminish access to land and security of tenure among a growing majority of citizens. Land tenure in rural southern Africa consists of the social relations established around the control and use of land, while land tenure systems and their sets of tenure relations are interwoven and related to other societal structures and institutions, including economic structures as well as family structures with their marriage and inheritance practices (Lastarria-Cornhiel 2002). The current land tenure complexities are based on administrative and resource rights systems imposed during the colonial period, and confounded by the emergence of rural markets as well as the commoditisation of natural resources. Colonialism in Africa defined land as a communal and customary possession (Mamdani 1996), and thus customary tenure was related to both personal relations (marriage, succession, movement) and access to productive resources (land).

In customary tenure regimes, the community chief or lineage head is generally considered the ultimate custodian of community land, but all households belonging to the community have recognised rights to this land and other natural resources. The degree of control and management that community leaders have over land and resources, and therefore the control that individuals hold, varies considerably across customary systems (Moyo 2001). Rights for individuals and families vary from discrete temporary uses such as gathering natural resources in communal forest, grazing on communal pastures, cultivating a specific field for one or several seasons to permanent control over a piece of land or other resource for cultivation and to pass it on to their heirs (Lastarria-Cornhiel 2002).

Shivji *et al*. (1998) note that contrary to indigenous tradition, Africans living in areas under customary systems or forms of land tenure have since colonial times tended to occupy lands by the permission of the state, which was, and in many instances continues to be the ultimate owner or the holder of title. Their occupation and use of land was controlled by criminal law and sanctions, while they had no legally entrenched rights, in contrast to the state as an owner. Among themselves, they were allowed to continue to relate to each other under the customary law that also governed their land relations and tenure but, whenever the state so desired, the permission to occupy and use land could be withdrawn by administrative fiat, including forced removals, and African lands appropriated without resort to law.

With slow post-independence reforms, this form of land governance framework has remained in place (although sometimes not presented or perceived as such) and tenure, particularly in rural areas, remains insecure and fragile. Furthermore, even after independence, land tenurial and distributional deprivations arising from the colonial era have yet to be fully incorporated in current democracy and governance discourses. In most countries, customary lands are essentially state land and cannot, for instance, be transferred through the market system (Moyo 2004).

Vulnerability to climate-induced disaster in southern Africa

All southern African countries are among the one hundred countries most vulnerable to climate change (Huq & Ayers 2007). According to the IPCC (2007), southern Africa has experienced a general drying from 1900 to 2005, with longer dry seasons and less certain rainfall. With average temperatures in southern Africa having risen by more than 0.5 degrees Celsius over the past 100 years, the *Southern Africa Environment Outlook* (2007) projects serious climate change impacts on the environment in the region.

Climate shocks are prominent in southern Africa, primarily being felt through repeated episodes of droughts and floods in the last two decades. Floods and droughts threaten lives and leave people insecure. Records show that southern Africa is prone to droughts, with at least two droughts occurring per decade. A drought often triggers serious water related imbalances, causing loss or damage to crops, shortage of water for people, livestock and wildlife, as well as famine and disease. As a result of droughts during the 1994 and 1995 season, the cereal harvest in southern Africa declined by 35 per cent compared to the previous season, with maize harvests declining by 42 per cent (Chagutah 2008).

Climate shocks erode long-term opportunities for human development, undermining productivity and eroding human capabilities. When climate disasters strike, the poor are often forced to sell productive assets, creating life-long cycles of disadvantage and locking vulnerable households into low human development traps (World Bank 2001). Climate change will thus worsen existing social and economic challenges, particularly for southern African communities who are dependent on resources that are acutely climate-sensitive.

Further, the resilience of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, its associated disturbances of cyclones, flooding, drought, wildfire, insects and ocean acidification, and other change drivers such as land use change, pollution and overexploitation of resources.

Urban tenure-related vulnerability to disaster

The rapid mushrooming of informal settlements around the major cities in southern Africa has led to increased urban vulnerability to climate-related disaster. Unplanned and rapid urbanisation, from which informal settlements originate, provides the conditions that turn natural events into disasters and also modify the physical environment, generating hazard and risk from flooding and fire (Pelling & Wisner 2009). It is usually poor and marginalised households living in informal settlements and low-cost housing built of inferior building materials that are most vulnerable to fires, severe weather events and seasonal flooding. Thousands of households in these areas suffer severe losses, resulting in significant development setbacks (DiMP 2008). Recurrence of hazards such as fire and

flooding erodes what little progress has been made to accumulate resources and savings, progressively increasing the vulnerability of informally settled households over time (Pelling & Wisner 2009). Often, the impacts of flooding are exacerbated by recurrent outbreaks of water-borne disease.

Poor people in informal urban settlements typically have higher levels of everyday risk, even without considering the impact of natural hazards (UN 2009). Residents in these areas encounter many stresses, including lack of a reliable income, drugs, alcoholism, prostitution, disease, crime, and domestic, physical, and sexual abuse. The interaction of these social conditions with recurring climate extremes and other environmental hazards presents a constant threat of disaster among the informally settled (DiMP 2008).

A recurring theme in solutions advocated for redressing the problem of vulnerability to disaster in informally settled areas in the region is the importance of systems of land tenure, and the need to grant appropriate forms of tenure to the urban poor. For poor households, low incomes and a lack of secure land tenure discourage residents from investing in improving the safety of their homes and their immediate surroundings (DiMP 2008).

Rural tenure-related vulnerability to disaster

Land tenure systems in place in most of rural southern Africa determine existing land use patterns, which themselves reflect environmental vulnerability. Land held under freehold tenure systems and by the state tends to be the least regulated while customary tenure systems, under which most of the indigenous people in the communal areas of southern Africa live, attract numerous coercive and top-down land-use regulations (Moyo 2004). Land use regulations in communal areas tend not only to determine which commodities are to be produced but also the timing and methods of production. In this respect, land use regulations themselves have been part of the problem of food insecurity at both national and household levels, given their promotion of so-called 'cash' (and export) crops over domestic food crops, in keeping macro-economic incentives and agricultural support services directed at promoting these land use patterns (Moyo 2004). Such processes have themselves exacerbated the scale and scope of environmental degradation and associated vulnerability caused by the huge demographic pressures on and increasing disinvestment in the vast tracts of rural lands governed by customary tenure systems in the region.

Pastoralism constitutes a major source of livelihood in rural areas, especially in drylands, for example, among the Basarwa in Botswana. Colonial policy with respect to rangelands in the region was based on their being seen as unoccupied. Thus, rangelands were expropriated for other uses, primarily agriculture and commercial ranching, backed by new concepts of land ownership. Controls on livestock movement and marketing were often imposed to protect the interests of settler farmers, while much pastoral land was also lost to wildlife reserves and game parks as a result of a strong conservationist lobby (Cotula *et al*. 2004). Although in isolated cases post-independence governments have engaged more substantively to try and 'modernise' the pastoral livestock economy, customary pastoral land rights have rarely been acknowledged, since there are often no clear marks of appropriation, in contrast to land that has been taken into farming. Moreover, governments and the donor-funded lobby have sought to control rangeland degradation through the regulation of livestock numbers and movement. For these reasons, tenure security remains unavailable to most pastoral communities in the region. This renders them vulnerable in times when their stock is decimated by disease or drought as they have limited access to land on which to carry out alternative livelihoods activities.

Tenure reform and opportunities for vulnerability reduction

Southern Africa currently experiences many multi-dimensional barriers to human, social and economic development precipitated by the prevailing land tenure regimes in the region. Tenure reform must address a range of problems arising from the settler colonisation and dispossession that marked the recent history of the region. Countries whose past was characterised by widespread settler colonisation, which include Namibia, South Africa and Zimbabwe, encounter more acute tenure problems, different from those found in other counties such as Botswana, Lesotho and Zambia, where there was no settler colonisation, and where, subsequent to independence, there has been a more flexible and gradualist approach with regard to the role of traditional authorities.

The dual, racially-based system of land rights introduced by colonial regimes continues to prevail in southern Africa. While laws involving arbitrary racial distinctions have been repealed in most parts of the region, land in the former reserves continues to be registered in the name of the state. Tenure reform must also grapple with overcrowding in the communal areas and overlapping land rights, as well as cases of exploitation by traditional leaders, officials and politicians.

Tenure reform is, in most cases, a complex and uncertain undertaking. The economic and other benefits flowing from it are difficult to predict, and the necessary administrative costs are therefore difficult to justify (Adams 2001). It invariably threatens powerful vested interests: land owners and commercial farmers on private land and traditional leaders or other structures in the communal areas. Yet, the costs of taking no action may be dire.

The introduction of an individualised formal title does not equate with tenure security and has in some cases made land access less secure. The introduction of individualised titles has been known to benefit powerful private interests, opening up opportunities for the concentration of land in the hands of political and other elites. Clover and Eriksen (2009) argue that with few safeguards for the non-formalised land rights of rural communities, a formal, market-based system

has often resulted in a shift power of relations so that the more powerful are able to take advantage of new forms of land registration.

In addition, tenure reforms which simply dole out title deeds have also proven problematic in informal settlements, where they have often led to the softest form of eviction yet. In many cases, simply giving out title deeds has created an increase in poverty by placing residents of informal settlements at the mercy of a voracious property market where property developers and other elites buy out residents from their newly secured property to resell or rent, leaving them to move to other less secure and more hazardous locations to set up new informal dwellings.

Enabling diversified livelihoods

Tenure reforms must ensure that landholders are able to pursue a diversified portfolio of livelihood activities while still holding secure title to their land. Generally, vulnerability occurs when landholders do not have a livelihood alternative that is not connected to that particular piece of land (Reale & Handmer 2011). Diversity in the sources of livelihoods is critical for increasing people's capacity to cope with and recover from severe climate shocks. Investment on strengthening mediating institutions and policies that enable diversification of livelihoods of the people in disaster prone areas can be an effective strategy for disaster risk reduction in the long run (Yodmani 2001).

Moyo (2004) notes that, in Malawi for example, fewer than half of rural household incomes are derived from farm production crops and livestock. According to Reardon (1997), between 30% and 50% of rural household income in sub-Saharan Africa is derived from non-farming sources and this figure can reach up to 80% – 90% in southern Africa. Thus, reform of residential tenure may be of critical importance for households whose alternative sources of livelihood are pursued outside a rural area but who return regularly.

At the same time, tenure reform in peri-urban areas becomes more important as populations migrate longer term to informal settlements, often found on communal land bordering major cities, where they live as they pursue productive, income generating, activities in the city. Land in peri-urban areas often also supports other livelihoods which would be lost if tenure is lost. For example, a homebased enterprise will be located on land, which, if lost, will force the proprietor to relocate. Even if relocation is possible, the business is likely to lose important clientele and employer and/or employee relationships (social capital), which may make starting afresh difficult (Reale & Handmer 2011).

The poorest rural households may not be involved in migratory labour and may benefit more from the reform of tenure arrangements for arable land and the commons in the village-homestead setting. For poor rural households, tenure reform can encourage increased production of agricultural goods; leasing, renting and sharing of crop land; sustainable management and use of natural resources for household food and fuel needs, medicinal plant needs, craft production, building; long-term investments in forest reserves, planting of trees around the house, establishment of village pharmacy, training of village health workers, education or functional literacy all of which are fall back resources which reduce long term vulnerability. Tenure reforms also encourage investment by community members in local economic development via small enterprises; participation in development projects jointly with private investors; and adoption of peaceful and legal means for resolving land related disputes rather than resort to land invasion and violence. (Yodmani 2001; Moyo 2004).

Improved environmental management

Land is central to the rural development and environmental challenges facing the southern Africa. As a principal source of natural capital and for earning a living, it is one of the most vital assets for millions of poor people in the region (Clover & Eriksen 2009). The lack of secure tenure has been associated with the unsustainable use and degradation of natural resources, which exacerbates climate impacts and often turns climate hazards into disaster. Helping communities develop structures that establish effective and secure tenure can enhance the sustainability of resource use, promote the overall efficiency of land use, prevent environmental degradation and pre-empt climate-related disaster. Evidence from elsewhere (Sotomayor 2008) indicates that lack of secure tenure and land ownership, among other factors, limit the capacity that communities have to properly manage their territories or seek long-term investment for the proper management of their environment and its resources. In other cases, farmers with uncertain land tenure have largely been unable to take up new innovations and technology – a common problem with tree planting in many parts of the tropics. Also, the land holdings often are too small and fragmented to make it compatible with this technology (Ramakrishnan 2008).

It should be noted, however, that a direct relationship between tenure insecurity and environmental degradation is disputed in some quarters, especially as it relates to rural farmers operating under customary tenure. A study by the Economic Commission for Africa in southern Africa (2003) states that although customary tenure is partly responsible for land degradation, the behaviour that leads to land degradation by smallholder farmers under customary tenure cannot be linked to their lack of tenure security. Instead, it is argued, environmental mismanagement has more to do with other reasons such as lack of knowledge of conservation practices, use of traditional agricultural production practices that are not sustainable, and lack of inputs such as labour.

Notwithstanding this, tenure reforms are essential in the southern African region to address issues of environmental management and climate-related disaster risk reduction. Tenure reforms can prevent exploitation of ecologically fragile areas such as hillsides, which leads to soil erosion and

watershed degradation and thus increases natural hazard risk. Selebalo (2001) notes that between 1980 and 2000 several issues of environmental management and disaster reduction motivated Lesotho's attempts to wrest land control from traditional leaders and introduce new types of tenure such as leaseholding.

Similarly, evidence from outside southern Africa shows that tenure reforms are integral to promoting improved environmental management and reducing the risk of environmental disaster (Messer 2003).

Investment in risk reduction in informal settlements

A huge number of informally settled people in the major urban centres of southern Africa live on the peripheries of cities, where they frequently settle in flood-prone, dry low-lying areas, close to rivers and streams – places local authorities consider inappropriate for human settlement (Bethke, Good & Thompson 1997). Communities living in these informal settlements are particularly vulnerable to climate-related hazards, whether these are due to the nature and location of the settlement itself, or from threats originating outside the settlement (Napier & Rubin 2002). Pelling (2007) notes that the risk emanates from increasing poverty and inequality, crowded living conditions and the siting of residential areas in places exposed to natural hazards as well as the modification of environments, which generates new hazards.

In cities, a range of factors influence people's priorities, resulting in low investment in planning security features, and consequently, substantially increasing vulnerability to the impacts of climate change. A critical factor is land pressure and tenure – if people fear that their house could be bulldozed by the authorities (as is the case in many informally settled communities in southern Africa cities), they will not invest in security measures (Wamsler n.d.). Secure tenure provides a tangible asset, a contractual agreement between the citizen and the State, demarcating ownership of a plot of land. It is a promise of permanent residence and a clear statement that the government will not evict residents without compensation and much negotiation. In the absence of secure tenure there may be no incentive to make improvements such as drainage and terracing which reduce the area's susceptibility to floods (Elo, Palm & Vrolijks 1995). However, with a formal address and title agreement, communities will naturally begin to build incremental, robust, structures because every investment is secure.

In this regard, lessons can be drawn from the Rio Flood Reconstruction and Prevention project which followed the February to March 1988 floods that left 298 people dead, 734 injured and 18.560 homeless in Rio de Janeiro. One of the strategies employed to prevent similar disasters happening in future was the provision of 11.000 families in the *favelas* (informal settlements) with unrestricted and unconditional title to land on minimally serviced plots (Munasinghe, Menezes & Preece n.d.).

A study (Field n.d.) on the correlation of residential investment in informally settled areas in Peru with tenure security reveals similar encouraging results for the enhancement of climate change-related risk reduction through tenure reforms in that region. Field (n.d.) examined the impact of a nationwide titling programme in Peru in which 1.2 million property titles were distributed to urban squatters on public land, focusing on the effect of increased tenure security on the rate of residential investment. Results of the study indicate that strengthening tenure security through property formalisation in urban squatter settlements has a very positive effect on investment. Increased security of tenure was shown to be associated with a 68% increase in the rate of housing renovation within only four years of receiving a title. Significantly, the study also revealed a considerable increase in renovations financed through personal finances and in total investment among non-borrowing households.

Conclusion

If left unchecked, land tenure insecurity will intersect with prevailing socio-economic, political and environmental challenges to accentuate the vulnerability of societies in southern Africa to future climate change impacts. Vulnerability is not natural; it is a product of the whole range of economic, social, cultural, institutional, political and even psychological factors that shape people's lives, and create the environment they live in. Land tenure is a critical component of this milieu of mediating factors and reforms are necessary to realign tenure regimes with existing development challenges, among which is the urgent need to respond to the debilitating effects of climate change on socio-economic development in southern Africa. Land tenure reforms can help to reduce vulnerability and enhance community resilience to climate change. In this regard, this article has outlined how tenure reforms can help build diverse household livelihoods, improve environmental management, particularly in the rural areas, and encourage investment in robust housing and safe neighbourhoods among the urban poor – all of which are integral to the region's response to climate change.

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