

# **Agrarian land use decision making in the light of global change and climate change.**

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The South African government has since independence taken steps to redress land rights for communities that were dispossessed of such rights as a result of past discriminatory laws and practices during apartheid. A great deal of work has been done and is still being done to document the massive and well-orchestrated land dispossessions in many parts of South Africa and how land in restitution areas is being used and some of the challenges beneficiaries of the land restitution programme have to deal with (Hall, 2003, CSIR, 2005; Wegerif et al, 2005; CASE, 2006; Tilley and Nkzane, 2007; and Lahiff, 2008). Some of the challenges include lack of financial resources, poor post settlement support from government agencies and inappropriate or inadequate planning as communities fail to implement the Land Use and Development Plans (Lahiff, 2008). This paper is informed by two projects; the first project is complete and it sought to develop a tool for decision makers in the Makhado restitution areas in Limpopo Province to help land beneficiaries to achieve integrated and coordinated agrarian land use decision making. The second project is ongoing and it seeks to build local resilience to climate change by providing people at local government and community level with climate change information that can be used to inform planning and decision making.

## ***Makhado Municipality***

Makhado Municipality is located in the northern part of Limpopo Province and has a total population of about 515 514 (StatsSA, 2012). The majority of the population lives in rural areas that form part of the former homelands of Gazankulu and Venda that are the least developed sections of the province. 37.1% of the provincial population is unemployed while 52% of households are headed by women. The Limpopo province prides itself as the natural resources treasure chest of South Africa and the economy of the province is based on natural resource based activities such as agriculture, tourism, trade and mining. Natural resource based activities such as agriculture are key to the livelihoods of the communities in the province with over a million people engaging in small scale agriculture small to secure food. There are two land tenure types that exist side by side in this municipality, that is communal and restitution land and this research focussed on the latter. In Makhado the agrarian sector is the third largest employer employing about 15250 people with fruit production, forestry, livestock, maize and game farming as the main activities. However there are

potential opportunities in fresh produce markets, nut processing and packaging, wood for construction industry, organic farming and dairy processing (Makhado IDP).

Although earmarked for agriculture most of the restitution land in Makhado and surrounding areas is currently being used for spontaneous settlements, planned settlements, communal grazing, group projects, individual farming, and leasing, while some remains unused. The natural environment has become more vulnerable to modifications exerted on them as a result of human activities. Global change and climate change have increased the pressure on biodiversity as a larger proportion of the South African economy in both urban and rural communities directly depend on biodiversity for their livelihoods through agriculture, fishing, and forestry. This is evidenced by the changes in cover and use of the land surface and marine resources and there has been a remarked increase in demand for natural resources. Research shows that about 18% of South Africa's land has been transformed or degraded (Department of Science and Technology, 2009). Rural landscapes have to integrate biodiversity conservation with sustainable livelihoods in order for them to be sustainable and multifunctional. Failure to integrate the different agrarian land uses has often led to the detriment of the natural environment through land degradation and biodiversity decline. This can be exacerbated by climate variability and extreme weather events which have been seen in recent years whereby the province has been affected by disasters such as cyclone Eline, floods, veld fires, heat waves and droughts that have negatively affected the natural resources and the livelihoods that depend upon them.

### *Development of a decision support tool*

For landscapes to provide a range of goods and services and to meet different user's objectives on a sustained basis there is need for planning and management initiatives to accommodate people and their needs in an integrated and coordinated manner (Nortje et al., 2012). Stakeholder engagement at district and local municipal level indicated that decision making in many parts of the restitution area is ad hoc, and there is no common vision and guidelines to ensure decisions contribute to a common goal. In the context of addressing livelihood needs and maintaining environmental integrity, all relevant stakeholders need to be aware of land use decisions that are taken by the different localities around them as this has impacts on the environment and on them. An overview from the provincial level highlights problems at local and community level which include poverty, agricultural practices that are not compatible with the available natural resources such as water, erosion and siltation, unsustainable agricultural practices, land degradation and loss of biodiversity among others. Inadequate collective strategic thinking and planning is also highlighted as one of the problems. These are well documented in various provincial and municipal documents. Decision

making on communal and restitution land did not take these problems into account nor consider the local situation in the context of the 'big picture.' Decisions taken could be inadvertently exacerbating these problems and this could result in failure to meet the multiple objectives that land users have in the long term.

The study engaged in a transdisciplinary process to develop a decision support tool to help communities to make agrarian land use decisions that consider all affected and interested stakeholders (coordinated) and considers the impacts of the decision on the social ecological system (integrated). Development of the decision support tool was done with communities and their leaders using the Appreciative Inquiry model between 2010 -2013. One of the ingredients required to achieve sustainable multi-functional landscapes is to understand and influence decision-making and the appreciative inquiry model was used to get a better understanding of this using tools such as ;

- Hierarchy tree was used to identify and rank decision makers
- Anecdote circle were used to identify tools and guidelines used to guide decisions and land use and the challenges with coordination and integration (consideration of social economic and environmental factors).
- Dotmocracy allowed stakeholders to share their knowledge and use of other planning and decision support tools with colours ranging from I know this tool and I use it to I have never heard of the tool.
- Zopp system influenced the development of the decision support tool as stakeholders illustrated how they would make land use decisions in an ideal world and their expectations from a decision support tool wrt presentation and content.

The Integrated and Coordinated Decision Support tool (ICAD) was developed as a community level decision support tool to help address the challenge of fragmented and uncoordinated decision-making in the use and management of land in rural areas, particularly in restitution areas. It is anticipated that the use of this decision support tool can also help communities identify and integrate climate change adaptation options into their planning and decision making at a community and household level to ensure the sustainability of agriculture, biodiversity and food security.

### ***Building climate change resilience in restitution areas***

The Long Term Adaptation Scenarios indicate that it is plausible for temperatures across southern Africa to increase in the future. The Limpopo province in particular is projected to have temperature increases of between 1.5-3°C that could affect livestock, crop and fruit production, food and water

security. It is also generally projected to have increased rainfall variability from year to year which can result in longer dry periods and more intense rainfall events affecting agricultural productivity especially subsistence agriculture (Schneider et al., 2007). Other global change trends of concern Limpopo include increased occurrence of veld fires that destroy biodiversity and other livelihood assets, a large number of people from neighbouring countries who come to the province in pursuit of economic opportunities. There is an absence of sustained economic growth and job creation, which are essential to reduce poverty and improve living conditions. Limpopo also has weakness in governance and accountability procedures as well as service delivery backlogs for services such as housing, water and sanitation.

Rural landscapes in South Africa face the huge challenge of balancing food production and biodiversity protection as humans continuously modify the environment leaving it more susceptible to extreme weather events. Hence rural landscapes also have to incorporate climate change adaptation while taking cognisance of biodiversity conservation and sustainability of the diverse livelihoods in order for them to be sustainable and multifunctional. Adaptation to climate change refers to the changes in bio-physical, social and/or economic systems in response to an actual or expected climatic impact and its effect (Mukheibir and Ziervogel, 2006). The current project seeks to build the resilience of communities in restitution areas by engaging with them to get a better understanding of the local risks and vulnerable areas and sectors; factors that enhance or reduce coping capacity; assets available and those needed to build resilience from the projected changes in the future.

It is anticipated that climate information from the South African Risk and Vulnerability Atlas (SARVA) will help communities and local governments make informed decisions on risk management and adaptation to prevent climate extremes from becoming disasters. SARVA is a tool that can be used to plan for resilience as it provides information current and potential risk “hotspots” that aids resilience and intervention planning at landscape level. It is one of the projects under the Department of Science and Technology Global Change Grand Challenge 10 year plan flagship initiative which seeks to improve scientific understanding of global changes, develop technologies and innovations to respond to global changes and strengthen science-policy-practice interface. Climate change information on SARVA is diverse as it includes spatial and non-spatial data; biophysical as well as economic and social themes with maps showing biodiversity status, migration patterns, veld fire risk and regional economic activity (gross value added). *Double loop learning approach* will be used in this study to give stakeholders an opportunity to work together and assess how community and organisational norms, policies and practices that may hinder or enhance

effective uptake and integration of climate information at local level which in turn obstructs them from attaining their shared vision of sustainable and multi-functional agrarian landscapes. Research on climate change impacts and adaptation has been done mostly at national level through the National Response and National Communication. This information is too broad and is not very effective for municipal or community level adaptation. Hence a local level co-learning process can help with uptake of climate change information and the development of adaptation initiatives aimed at building resilience towards climate change related risks.

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