Siviwe Shwababa - Andries Jordaan - Ágoston Restás

CASE STUDY OF MANAGING DROUGHT DISASTER - PERCEPTIONS, RESPONSES AND VIEWS ON DROUGHT IMPACT AMONGST LAND REFORM BENEFICIARIES IN EASTERN CAPE PROVINCE, SOUTH AFRICA

Abstract

The Department of Rural Development and Land Reform (DRDLR)'s land distribution programme seeks to provide the poor and the previously disadvantaged population with land to improve their livelihoods, and also use the land for establishing farming enterprises, this endeavour has consequently led to the realisation of Land Reform beneficiaries. These beneficiaries are faced with various trade-offs and constraints as drought exposes them greater risk and renders some of their current practices unworkable. Method**:** The Participatory Learning Approach (PLA) method was used to assess land reform beneficiary's perceptions, responses and views on the local impact of drought in Joe Gqabi district. Results**:** drought significantly affect the beneficiaries' livelihoods and changes in the local climate has compelled most of them to implement a variety of coping strategies in order to withstand the impact of drought.

Key words: Drought, Vulnerability, Land reform farmers, Recapitalisation, Drought impact mitigation.

ESETTANULMÁNY AZ ASZÁLY KATASZTRÓFÁK KEZELÉSÉRŐL - AZ ASZÁLLYAL KAPCSOLATOS NÉZETEK, ANNAK HATÁSAI ÉS KEZELÉSE A DÉL-AFRIKAI KÖZTÁRSASÁG KELETI TARTOMÁNYAIBAN

Absztrakt

A Dél-afrikai Köztársaságban komoly problémát jelent a szárazság. Ennek okán a dél-afrikai Vidékfejlesztési és Területrendezési Minisztérium (DRDLR) egy földosztási program keretén belül próbálja a hátrányos helyzetű lakosság megélhetését javítani. Ennek egyik módja a lakosság földtulajdonának növelése. A kedvezményezett lakosság azonban különböző korlátozásokkal szembesül, ennek folytán pedig a szárazság még nagyobb kockázatot jelent számukra. A cikk a program hibáit igyekszik bemutatni a kedvezményezett lakosság szemszögéből. Módszerek: A cikk alapjául a kedvezményezett lakosság véleményének Joe Gqabi kerületben történő felmérése szolgált. Eredmények: A cikk alapján megfogalmazható, hogy az aszály jelentős mértékben befolyásolja még azok életét is, akik az állami kedvezményekben részesültek. Emiatt a helyi éghajlatváltozás arra kényszerítette a lakosságot, hogy olykor a rendszerrel szembeszegülő magatartást tanúsítsanak annak érdekében, hogy képesek legyenek csökkenteni az aszály negatív következményeit.

Kulcsszavak: szárazság, sebezhetőség, földreform, feltőkésítés, aszály enyhítése

INTRODUCTION

In South Africa specifically, land reform has a significant bearing on food security and agriculture’s contribution to Gross Domestic Product (GDP). The objective of the land reform programme is to transfer 30% of agricultural land to black ownership by 2014 (deferred to 2025) to ensure more equitable access to land by historically disadvantaged people and to increase their participation in agricultural activities. [1]The main the strategic

objective of the Department is to ensure that all land reform farms are 100% productive by the year 2015/2016 and to also rekindle the class of black commercial farmers which was destroyed by the Natives Land Act of 1913. [2]

DROUGHT IMPACTS

Drought is a significant feature in the South African climate, and every so often has devastating impacts [3] describes drought as a condition of climatic dryness that is severe enough to reduce soil moisture and water levels below the minimum necessary for sustaining plant, animal, and economic systems. Drought can also be defined as a deficiency of precipitation, which when extended over a season or longer period of time, is insufficient to meet demands. This may result in economic, social, and environmental impacts it should be considered a normal, recurrent feature of climate [4]

According to [5] drought has long term and short term effects on human health. Drought contribute not only to water and food shortages and often famine, but also to energy shortages that occur as rivers dry up, and to civil strife, often as a result of competition for resources, forcing mass migrations. These effects are intensified by problems of gender inequity, lack of basic infrastructure in these areas, and rapid environmental degradation, all of which have direct and indirect detrimental effects on human health.

Benson and Clay indicate that drought is when the rainfall is below average. In such cases farmers will not only experience a loss of income caused by a lower production but they will also have more than their usual expenses to supplement their water supplies and to buy fodder for their livestock. This means drought has a direct impact on economic production. [6] The 1990/91 drought in Zimbabwe resulted in that country's GDP to drop by 11 percent. [7] Therefore, drought prevention together with mitigation measures is important to promote economic and social development in Africa. Further state that numerous sub-Saharan African (SSA) economies are predominately vulnerable to the effects of drought due to the significance of rain fed- agricultural and livestock production in Gross Domestic Product (GDP), limited infrastructure, and the low levels of per capita income. Food insecurity is one of the most crucial impacts resulting from drought. [7] The inability to feed oneself during a

drought is of great concern for governments around the world. Much of the chronic and acute hunger in the world is connected to highly variable rainfall, peaking during drought periods. [8]

The heavy reliance of the South African rural economy on food production renders the population vulnerable to drought impacts of crop failure and decreased income. [9] Rural communities feel the impact of the HIV/AIDS epidemic through the increasing number of AIDS orphans and child/women headed households. [10]In southern Africa women are the primary producers for local consumption and the traditional caregivers when family members fall ill. Land often lies untended when HIV/AIDS related illnesses strike a family member [10] Extended family members are also affected as they care for AIDS orphans when they already have limited income and food supplies.

A healthy and balanced diet is essential for people living with HIV/AIDS in order to continue tending to crops. Food shortages associated with the impact of drought can contribute to weakening their immune systems and further accelerate the onset of illness and even death. [10] The drought can use in Europe wide forest fires with complicated logistic problems, which can only solved with special firefighting methods [11] [12] and with well-regulated laws on the protection of major accidents and hazards. [13] It is very important at the hazardous activities as well. [14]

JUSTIFICATION AND CONTEXSTUALISATION OF THE STUDY

There is a serious knowledge gap in the South African literature which articulates the plea of land reform beneficiaries with respect to harsh weather patterns, drought vulnerability, drought impact, coping and adaptation capacities towards drought and the risk these pose to their production system. The farmers' weekly of 01 November 2013 reported the impacts of drought as follows:

"The drought in the Eastern Cape is now so critical that the main challenge for farmers is to try to keep as many breeding animals alive to prevent a drop in breeding herds. This was according to Eastern Cape Red Meat Producer's Organisation chairperson Dr Pieter Prinsloo, who said that according to many farmers, the situation was comparable to the drought of 1933 which brought farmers to their knees.

According to SA Weather Services rainfall below the 20 year average was expected over large parts of the region until at least the beginning of autumn next year". An understanding of farmers' perceptions, responses and views to the impact of drought is critical for addressing coping and adaptation strategies. Farmer's past responses to events such as droughts can also provide some indication of how they might cope and adapt to future drought incidents.

Study area

Figure 1 Map reflecting Eastern Cape District Municipalities

Source: Department of Rural Development and Land Reform, 2013

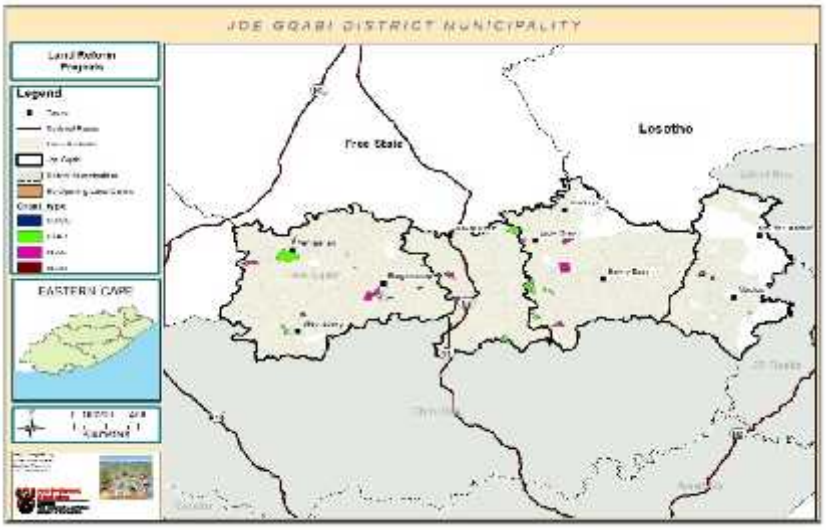

Figure 2 Land Reform Farms in Joe Gqabi District

Source: Department of Rural Development & Land Reform, 2013

Aim

The aim of the study was to use a variety of participatory learning approaches to understand how drought has affected the land reform farmers within the Joe Gqabi district and to further gain insight into their perceptions, responses and views of drought impact on their farming operations. Through understanding their perceptions, responses and views on drought, it is envisaged that one may be able to formulate a model which can help them cope and adapt better to both current and future drought incidents.

The three main objectives of the study were to:

1. Access the local impact of drought and related stressors on the land reform farmer's farming operations.
2. Determine how changes in rainfall patterns have impacted on their farms and livelihood.
3. To assess their ability to adapt and cope with current and future drought incidents

Ranking of stressors

The second activity involved a stressor ranking activity whereby the Group listed stressors which affected them in their farms and rated stressors or challenges that they experienced according to their severity. Examples of these could be unemployment, HIV/AIDS, water scarcity, flooding of crops and many other common issues that surround these vulnerable farmers. This exercise helped to easily identify the greatest vulnerabilities of the land reform farmers and to better understand the perception of drought as a stressor or risk to the people within their farming community. The method of ranking differed between groups as some ranked stressors from 1-5, 1 being the least threatening and 5 being the most threatening and others identified main stressors but agreed on the main three.

RESULTS AND DISCUSSION

Unemployment, HIV/AIDS, crime, hotter weather and a lack of water were mentioned as the most severe stressors increasing vulnerability amongst farmers. Teenage pregnancy, livestock death and lack of service delivery were further mentioned as stressors on local livelihoods(Table 1). Table 2 ranks the top three stressors that are increasing vulnerability amongst the farmers. A reduction in precipitation levels was ranked as the highest stressors followed by unemployment and a lack of money. Farmers indicated that the shortage of capital has been a major barrier to farming on a more commercial scale as was done before the reclamation of the farm. On a household level the failure of home gardens has created a shortage of food which cannot be substituted by bought goods because of low household income.

Table 1: Perceived stressors ranked according to those causing highest vulnerability

Stressors	**Rank**
HIV/AIDS	**5**
Scarcity of water	**5**
Crime	**5**
Lack of health care	**5**
Unemployment	**5**
Lack of service delivery	**5**
Hotter weather	**5**
Decreased crop yield	**5**
Teenage pregnancy	**4**
Livestock death	**4**
Lack of transport	**3**
Access to cattle dip	**1**

Table 2: The top three stressors ranked according to the farmers' ability to cope with them

Stressors	Rank
Reduced precipitation	5
Unemployment	2
Money	3

Areas most affected by heavy rains included the gravel roads and homesteads. Heavy water flows were said to have forced water into houses damaging the houses and items within them. Times of drought affected both the water levels in the dams and the health of the crops. The dams on the property are not large and are susceptible to drought, and are the only source of water for the fields. The heavy reliance on these fields for food and income make reduced rainfall one of the major stressors perceived by farmers (Table 3). During times of drought water tanks are heavily relied on. The local municipality is responsible for refilling the water tanks, however this service was perceived to be ineffective and unreliable.

A healthy environment was deemed important in enhancing the livelihoods of the farmers. The presence of large alien trees was highlighted as a driver of water shortages as they were seen to use up too much water. A weed which flourished in grass areas was killing grass, reducing grazing and affecting the appearance of the land. Other weeds had taken over abandoned field areas. The lack of a management plan for veld fires was highlighted as critical and urgently needed. The vulnerability of the farmer's properties to veld fires was clearly expressed. The presence of a management plan for veld fires would decrease the vulnerability of land reform farms to veld fires and as such better secure the livelihoods of the farmers.

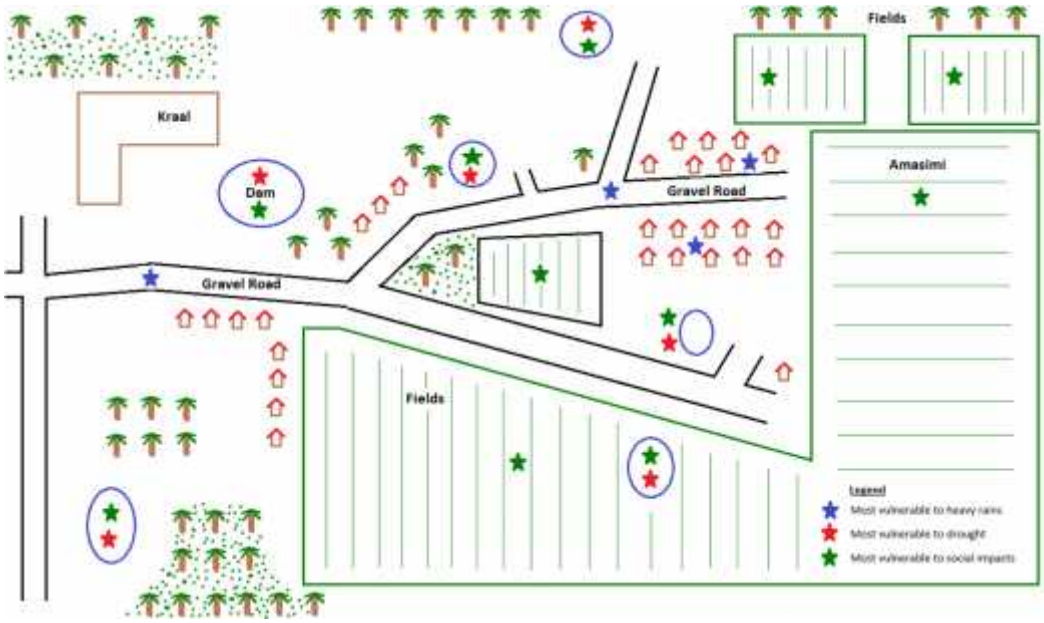

Figure 3: Map illustrating the vulnerabilities of land reform farmers in Joe Gqabi district

Are changes in the rainfall patterns/ climate perceived as being part of a larger drought trend?

According to participants, precipitation and dam water levels were consistently high from1960 to 2000. Cows provided enough milk for subsistence use, dams were full and crop productivity was high. A general warming trend was identified between 2000 and 2014 and resulted in the drying up of dams and the death of many livestock (Table 3). As a result of the perceived drier climate the farm shifted away from cultivating beans, maize and wheat to mostly pineapples. A tornado occurred in 2005 which resulted in the destruction of numerous households. The constant decline in precipitation has led to farmers fetching water from dams to water food crops and livestock. Those who do not live close to a water source have few options and are more susceptible to reduced crop yields as a result.

Table 3: Perceptions of changing weather patterns from 1960 to 2014

Year	Characteristics/Disaster
1960	Heavy rain in July/June
1970	Thunderstorms kill 2 community member Floods and Heavy rains.
1970-2000.	Dams always full and never worried about water
1970-1980	Tuberculosis (TB) affected entire community
1977-2000	Cows produced enough milk- Never had to buy milk
1980	Rainfall dependent- Crops yield 100%
1992-1993	Flooding and heavy rains
1993-1994	Drought-Dams dry up, death of livestock
1996	Heavy rains kill four cows
2000-2014	Low level of dams, worry about water Need to buy milk as cows don't produce due to drought and little feed High levels of HIV/AIDS
2005	Tornado destroyed households
2005-2014	Reduction in crop yield- dependent on external water sources
2008-2014	Major drought- Many livestock died
2012	Flooding.
2013 & 2014	Too little rain. Need to fetch water from dams- Maize died All different seasons in one day- weather becoming highly unpredictable
2014	Only sweet potato and beans survived so will plant more next year

During 2008 to 2014 land reform farmers within the Joe Gqabi district experienced severe drought which killed several livestock coincided with the lowest average rainfall experienced.

How have farmers coped with drought and climatic stressors, and how will they cope into the future?

From the identified stressors, farmers mentioned certain coping mechanisms that are used to

Mitigate the impact of such stressors. The main coping strategies in the face of increasing vulnerability and drought were through the substitution of crops with drought resistant varieties, the use of rain water tanks and drums to collect water, the sale of livestock and other crops for cash income, the use of medicinal plants and construction of home gardens for subsistence use. The farmers also mentioned conserving game and earning income from hunting fees as well as reliance on social grants.

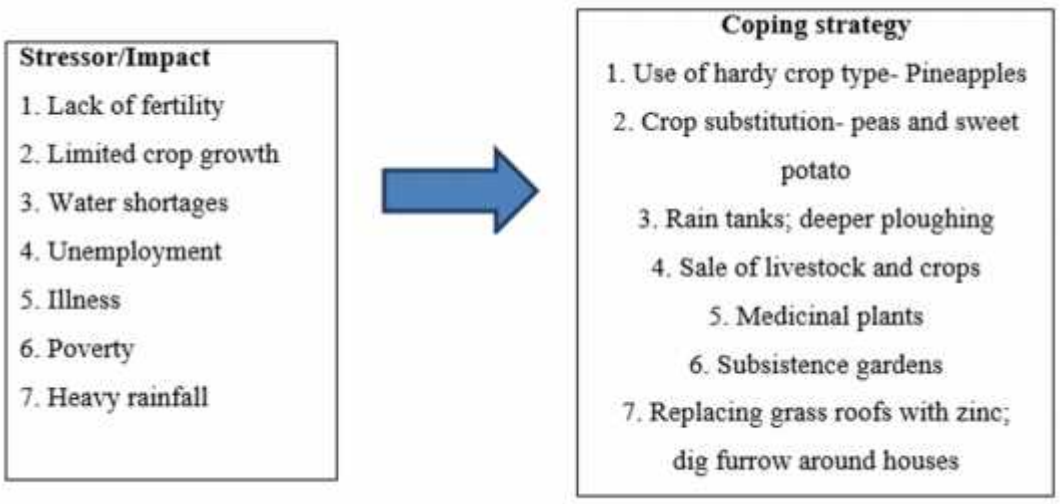

Figure 4: Stressors and the coping strategy

The land reform farmers in the Joe Gqabi district have a high dependency on agriculture consequently significant impacts of rainfall variability have been experienced in the area, extreme weather events, such as droughts, veld fires and floods, have increased the farmer's vulnerability to the impacts of drought. Consequently, there is increasing food and water scarcity with the district, increasing the vulnerability levels of the farmer's livelihoods. The high variability in rainfall patterns presents a major challenge to successful farming.

The result of these natural occurrences are negatively impacting local livelihoods as crop yields are failing and livestock have died, meaning that their current low level of income and grants are unable to compensate for their loss of livestock and crops. The recapitalisation funding from the Department of rural development and land reform remains insufficient in covering their coping capacities against drought and their income from the welfare grants is

not enough for sending their children to school as well as provide basic house hold necessities. Farmers have learnt to deal, to some extent, with these stressors through the use of various coping strategies. Local knowledge and shared experiences were identified as necessities, for example, that sweet potato has high survival rates during the drought period. Next year many more land reform farmers in the Joe Gqabi district are planning to plant sweet potato in their farms and household gardens.

Should the farmers able to adapt successfully to drought and its impact, their farms will thrive, generate more income and become more drought resilient. Continuous government support, drought management plans, coping and adaptation knowledge remain the vital instruments needed to support the land reform farmers in their farming enterprises.

ACKNOWLEDGEMENTS

The author would like to thank the Water Research Commission of South Africa for funding the research project, the Erasums programme from the National University of Public Service Dr A Jordaan for academic support and guidance, Mr Ntshudu and Ms Mtati for assisting in facilitating the PLA session, the officials (project officers) from the recapitalisation unit in the Department of Rural Development and Land reform.

REFERENCES

[1] Xingwana, L. 2008. Challenges and Opportunities for Land and Agrarian Reform: towards 2025. Speech delivered at the Agri-Consultation, Protea Ranch Hotel, Polokwane, 30 July 2008.

[2] RSA (Republic of South Africa).2013. Department of Rural Development State Land Lease and Disposal Policy (2013:13). Pretoria: Government.

[3] Van Zyl, K., 2006: *A Study on a Disaster Risk Management Plan for the South African Agricultural Sector*, Assigned by Agri SA, NAFU SA and TAU SA, Funded by Total SA, Pretoria

[4] Jordaan, A.J. (2012). Drought Risk Reduction in the Northern Cape. PhD Thesis, University of the Free State, Bloemfontein.

[5] Ole-MoiYoi,O.K.(2013). Short and the long term effects of drought on Human health. UNISDR.Geneva: Switzerland.

[6] Benson, C. & Clay, E., 1998, 'The Impact of drought on Sub-Saharan African economies: A preliminary examination', World Bank Technical Paper No. 401, World Bank, Washington, D.C.

[7] Vicente-Serrano S.M., Begueria, S. Gimeno, L. Eklundh, L. Giuliani, G. Weston, D., Kenawy, A.E. Lopez-Moreno, J.I., Nieto, R., Ayenew T., Konte, D., Ardo J. & Pegram, G.S. 2012. *Challenges for drought mitigation in Africa:* The potential use of geospatial data and drought information systems. Applied Geography 34: 471-486.

[8] Austin, W.D., 2008, 'Drought in South Africa: Lessons lost and/or learnt from 1990 to 2005', MSc dissertation (Unpublished), Faculty of Science, University of Witwatersrand, Johannesburg, viewed 13 July 2015 from http:// wiredspace.wits.ac.za/bitstream/handle/10539/5991/MSc%20WD%20AUSTIN. pdf?sequence=1)

[9] UNDP. (2004). Reducing disaster risk: A Challenge for Development. Bureau for Crisis Prevention and Recovery. New York: S Swift co.

[10] Lambrechts, K. and Barry, G., 2003: *Why is southern Africa hungry? The roots of southern Africa's food crisis,* A Christian Aid policy briefing.

[11] Bodnar, L.: Logistic problems of fighting forest fires based on case studies from Hungary. In: Proceedings of the 8 th International Scientific Conference Wood and Fire Safety. Strbske Pleso, Slovakia 2016.05.08- 2016.05.12. Zilina: EDIS Zilina University Publishers 2016. pp.23-32. ISBN: 978-80-554-1201-6

[12] Bodnar L: The efficiency of the aerial firefighting in Hungary using outside tank technology. In: Међународна Научна Конференција Безбедносни Инжењеринг. Novi Sad, Szerbia, 2016.10.05-2016.10.07. Novi Sad: University of Novi Sad, Faculty of Technical Sciences, 2016. pp. 187-194.

[13] Kátai-Urbán L, Sibalinné Fekete K, Vass Gy: Hungarian regulation on the protection of major accidents hazards; Journal of environmental protection, Safety, Education and management. IV. (2016), 8 pp. 83-86.

[14] Kátai-Urbán I, Vass Gy: Hazardous Activities in Hungary - in terms of Industrial Safety,. Academic and Applied Research in Military Science 13 (2014), 1 pp. 141-154.

Siviwe Shwababa

Corresponding author, PhD candidate

Disaster Risk Science, University of Free State Bloemfontein South Africa.

Email: shwababasz@gmail.com

ORCID: 0000-00023749-023x

Andries Jordaan

Director, Disaster Management Training and Education Centre for Africa Faculty of Natural and Agricultural Sciences University of the Free State, South Africa

Email: jordaana@ufs.ac.za

ORCID: 0000-0002-5169-7851

Ágoston Restás

Head of Department, Department of Fire Protection and Rescue Control, Institute of Disaster Management, National University of Public Service, Budapest, Hungary,

Email: Restas.Agoston@uni-nke.hu

ORCID: 0000-0003-4886-0117

A kézirat benyújtása: 2017.04.28.

A kézirat elfogadása: 2017.06.06.