

Managing climate-related stresses in southern Africa's agricultural sector

C NHEMACHENA, J CHAKWIZIRA AND M MASHIRI
 CSIR Built Environment
 PO Box 395, Pretoria, 0001, South Africa
 Email: cnhemachena@csir.co.za - www.csir.co.za

INTRODUCTION

Southern Africa is expected to experience further increases in temperatures and declining rainfall patterns as well as increased frequency of extreme climate events (such as droughts and floods) as a result of climate change. The predicted changes in climate will be detrimental to regional food and water security among other issues such as biodiversity loss and health-related issues. The livelihoods of local communities that heavily rely on food, water and other natural resources are most threatened by impacts of climate (Nhemachena, 2008). These local communities are usually poor and they are unlikely to be able to respond to the direct and indirect effects of climate change because of their limited financial, human and institutional capacity. Providing alternative adaptation options for farmers will make significant contributions in improving agricultural productivity and food security as well as help reduce poverty in the region. The objective is therefore to identify ways of helping farmers adapt to reduce these negative effects from climate-related stresses.



CHALLENGES OF CLIMATE CHANGE ON LOCAL LIVELIHOODS AND AGRICULTURE

The key issues facing southern Africa regarding climate change are its impacts on livelihoods, and the ability to reduce poverty and provide food and water security (DFID, 2006). Impacts of climate change on food and water resources will have devastating implications for development and livelihoods and are expected to worsen the challenges posed by climate change on development such as on poverty eradication (De Wit and Stankiewicz, 2006).

High levels of food and water stress will further worsen the vulnerability of the poor mainly in three ways: (a) increased insecurity of livelihoods; (b) increased health risks and (c) constrained economic opportunities (short and long term). The impacts of climate change on agriculture in southern Africa will have serious implications for national policies aimed at improving food security and reducing poverty in the region. It is therefore necessary to find ways of helping farmers adapt to reduce these negative effects from climate-related stresses.

ADAPTATION TO CLIMATE CHANGE

Adaptation to climate change refers to adjustments in management strategies to reduce risks or realise opportunities from actual or expected changes in climatic conditions (IPCC, 2001). Agricultural adaptations to climate change involve modifications of farm-level practices to ensure continued production (Wall and Smit, 2005). Adaptation occurs at the farm-level, which focuses on micro-analysis of farmer decision making, and national and regional levels or macro-level, which is concerned with agricultural production at national and regional scales and its relationships with domestic and international policy (Kandlinkar and Risbey, 2000). Micro-level analysis of adaptation focuses on tactical decisions farmers and local communities make in response to seasonal variations in climatic, economic and other factors. Farm-level decision making occurs over a very short time-period usually influenced by seasonal climatic variations, local agricultural cycle and other socio-economic factors. Some of these strategies are discussed below.

(a) Crop management practices

Local level adaptations that can help farmers in southern Africa involve two modifications in the production systems. These are increased diversification, which involves production activities that are drought tolerant and/or resistant to temperature stresses, as well as activities that take full advantage of the factors such as water and temperature conditions. Growing a number of different crops reduces the risk of complete crop failure as different crops are affected differently by climate events (Adger et al, 2003).

The second strategy is escaping sensitive growth stages through crop management practices that ensure critical crop growth stages do not coincide with very harsh climatic conditions such as mid-season droughts. Crop management practices that can be used include modifying length of the growing period and changing planting and harvesting dates. In addition, increasing household and food security at the small-holder and community level may require the appropriate development and application of dry harvesting technologies. This can assist in the harvesting, storing and availability of food year-round through seasoning of mangoes, sweet potatoes, tomatoes etc.

(b) Innovative approaches to water management and use in agriculture

Climate change is expected to adversely affect water resources through affecting rainfall patterns and distribution translating into serious impacts for agricultural production and other uses. A need therefore exists for innovative water management techniques for both agricultural use and economic development. Two important water management approaches have been documented in literature: (a) water supply management that involves developing new sources of water and groundwater, promotion of water harvesting and reuse of agricultural drainage; and (b) water demand management that involve incentives (e.g. through policies) and mechanisms (e.g. through institutions) as well as new technologies that promote efficient use of water (such as high-precision irrigation) and soil and water conservation (Innocencio, et al. 2003).

(c) Accessibility to climate and agricultural information

Information concerning climate change forecasting, adaptation options and other agricultural production activities remains an important factor affecting use of various adaptation measures for most farmers and local communities. Lack of and/or limitations in information (seasonal and long-term climate changes and adaptation options) increase high downside risks from failure associated with uptake of new technologies and adaptation measures (Kandlinkar and Risbey, 2000). Agricultural and other economic policies need to ensure easy availability and accessibility of useful climate (short and long term), adaptation options to help reduce the downside risks of failure that might be associated with new technologies and adaptation measures and help facilitate farmer uptake of adaptation measures.

(d) Strengthening local capacity

Successful adaptation efforts need to consider strengthening local institutions, active participation and involvement of those at risk, use of sector-based approaches and expansion of information, awareness and technical knowledge (IISD, 2007). Building local institutional capacity is key to facilitate and promote adaptation to climate change at the local level as well as promotion of action research to develop new varieties and cropping patterns to respond to climate risks. Building and strengthening social networks within communities help build the capacity of communities to work together and capitalise on local knowledge systems. Through local cooperation communities also have the capacity to try new innovations as they are able to spread the risk of new practices and technologies.

(e) Addressing other perceived barriers to adaptation

Resource limitations coupled with household characteristics and poor infrastructure impacts negatively on the ability of most rural communities to take up adaptation measures. With resource limitations, communities fail to meet transactions costs necessary to acquire the adaptation measures and at times communities cannot make beneficial use of the available information they might have (Kandlinkar and Risbey, 2000). Possible ways to improve the adaptive capacity of disadvantaged communities require access to resources, income generation activities, greater equity between genders and social groups and an increase in the capacity of the poor to participate in local politics and actions. This entails promoting many activities associated with sustainable development and policies that help reduce resource pressure, improve environmental risk management and increase the welfare of the poorest members of the society.



CONCLUSIONS

The study is based on synthesis of secondary information from various studies on climate change in the region. Ways to help farmers adapt to climate change include promoting diversification of livelihood options; enhancing innovations in farming systems; building social networks to help build capacity of communities to work together and capitalise on indigenous knowledge systems; and improving accessibility to resources such as credit, inputs and information (seasonal climate forecasts, agricultural production and management practices). Adaptation efforts need to pay particular attention to management of water and other natural activities, agricultural activities and the sources and generation of energy. Successful adaptation strategies need to consider improvement of information and methodologies, implementation of concrete adaptation activities, technology transfer and capacity building. National policies also need to support research and development that prepare the appropriate technologies to help farmers adapt to climate-related stresses.

The CSIR conducts research on identifying ways of helping farmers in southern Africa adapt to reduce negative effects of climate-related stresses.



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