

## **Good practices in agricultural adaptation: Findings from research in maize, wheat, vegetable and poultry farming systems in South Africa**

Climate change will have a profound effect on the agricultural sector in South Africa. Average annual temperatures across the country will continue to rise, especially in the interior. Rainfall patterns are more difficult to predict. Broadly speaking models show that the increased variability and occurrence of extreme events (floods and droughts) that are already being observed are likely to continue.

The aim of this research was to highlight agricultural practices from six countries across the continent (Burkina Faso, Cameroon, Ethiopia, South Africa, Togo and Zambia) that will continue to be sustainable in the face of a changing climate. In advance of the final, continent-wide, findings being released, we are able to share the results from South Africa. In South Africa the research was spread geographically across a number of commodities in different provinces – poultry farming in KwaZulu Natal; maize farming in the Free State and Eastern Cape; vegetable farming also in the Eastern Cape and wheat farming in the Western Cape – and a range of farmers - large and small scale, and commercial and development).

The following provides a brief summary of the adaptation practices identified as significant in the South African agricultural sector. It is interesting to note that while these practices are important adaptations to climate change they have, in many cases, been adopted for other reasons (especially for economic reasons). More detail about how, and why, they were chosen as the best six adaptation practices can be found in the full report<sup>1</sup>.

### **Diversification**

Diversification is an important adaptation practice that is common to farming of all four commodities. This category includes *diversifying farming activities* - for instance, diversifying into alternative cash crops or to more drought resistant crops, or from pure crop production to also raising livestock. Some farmers indicated that they have started *undertaking non-farming activities* to diversify their income sources. In addition, in the face of changing rainfall regimes, many crop farmers are *planting different seeds or cultivars* which are not only higher yielding but also have different lengths of growing season – early maturing cultivars can be planted late (after it has rained) but still be harvested at the optimal time.

### **Altered timing of farming stages**

Changing the timing of various stages in the farming process is common to both the crop and livestock farmers represented in this study. Altering the planting date for different crops is an adaptation that is unconsciously undertaken by small scale vegetable farmers and is mostly determined by the arrival of the first rain of the season, and subsequent rainfall during the season. Amongst maize farmers, the flexibility of planting (and therefore harvesting) dates allows farmers to adapt to a shifting climate, although there can be negative consequences caused by the shortening of the season (unless different cultivars – described above – are used). Poultry farmers also alter the timing of feeding chickens (and quantity of feed) as chickens do not like to eat when they are hot and will lay fewer eggs.

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<sup>1</sup> For the full report and more information on the project, see [www.kulima.com/agriculturaladaptation](http://www.kulima.com/agriculturaladaptation) or email [tracy@kulima.com](mailto:tracy@kulima.com)

### **Conservation farming**

There are a variety of different agricultural practices that together are classified as “conservation farming”. *Leaving fields fallow* is a practice used mainly by commercial farmers to allow the soil to recover or to allow moisture to accumulate. Small scale farmers in the Eastern Cape create *planting circles* to capture and store all available water for their crops. All farmers in the study practised *mulching* – leaving a layer of stubble on the field after harvesting in order to increase organic matter in the soil, increase the retention soil water and attract healthy organisms such as earthworms. *Crop rotation* is practised by both commercial and small scale farmers and, while not specifically an adaptation to climate change, it does improve the productivity of the soil. This results in greater income for farmers which, in turn, makes them less vulnerable to climate change. *Intercropping* results in a reduction in pests but it also has the added benefit of crops that have complementary water and nutrient requirements. This ensures more efficient use of limited resources. *Minimum tillage* is another key component of conservation agriculture which is undertaken by many of the commercial and small scale farmers interviewed. Soil is only minimally disturbed and is therefore able to retain moisture which is a good adaptation in areas where rainfall is expected to decline. Some poultry farmers are now *planting trees* to reduce direct sunshine on sheds, lower the temperature of the site and act as a disease barrier.

### **Mechanisation and new technologies**

Mechanisation (for example tractors, minimum tillage implements and harvesters) has the potential to increase yields and therefore the adaptive capacity of farmers but, while commercial farmers are already highly mechanised, this is not the case with small scale farmers. Modern poultry farmers also use a range of new technologies to adapt to higher temperatures. This can include controlled environment and climate-sensitive shed designs (for example with shades over windows); as well as cooling technologies such as spraying sheds with water.

### **Changing density of crops and livestock**

Changing the *density and distribution of plants* is one way in which maize farmers are able to adapt their crop to changing local conditions. Closely packed plants will create dense shade on exposed soil and thereby reduce evaporation. Conversely, wider spaced rows result in a reduced plant density which decreases the amount of water needed. *Reducing stock density* is practised by poultry farmers in order to reduce the incidences of heat stress and ensure appropriate resource availability (e.g. fodder).

### **Additions and supplements**

Poultry farmers give their chickens *supplements* to boost the birds’ immune systems and reduce the risk of heat mortalities. *Fertilisers* are used on crops at both the commercial and small scale level to increase yields and help farmers better adapt to shorter growing seasons caused by climate change. *Vermicast and compost* are used by a small number of farmers for the same reason.