



CEPHaS

Conservation Agriculture Perspectives



CEPHaS is interested in a broad perspective on conservation agriculture, in the context of the farming system, the constraints farmers face and the ways in which they are adapting to climate change. For this reason we have engaged with a range of partners, and in this series, *CEPHaS Conservation Agriculture Perspectives*, we invite them to respond to some questions.

Kasisi Agricultural Training Centre (KATC) was founded by the Jesuit Province of Zambia and Malawi, and undertakes research, training, extension and advocacy to promote sustainable organic agriculture. KATC has been a partner of the CEPHaS project since its inception. Daniel Kalala, pictured above, is research coordinator at KATC, and he answered our questions.

1. What are the main ways in which you have seen smallholder farmers adapting to climate change in southern and central Africa in recent years?

There are many ways in which small-scale farmers are adapting to climate change effects in Zambia:

- Selecting and growing short maturing crops and crop varieties
- Revisiting some of the neglected crops that are drought tolerant such as cow peas, millets and sorghum
- Most farmers are now planting all crops almost at the same time with the very first rains. Traditionally, there are crops that were planted with the first rains such as maize, soya-beans, sunflower, etc. Other crops such as beans, sweet potatoes, cowpeas, etc. could be planted later in the season, but with the uncertainties regarding the rainfall patterns, farmers are now growing most crops at the same time with the very first rains
- In the past farmers were advised not to plant with the very first rains as there were high chances of 'false start' of the rainy season. So farmers could only plant after the 15th of November. But these days, most farmers risk planting with the very first rains. Dry-planting is another practice that is increasingly being adopted by most farmers i.e. farmers plant in the dry season towards the beginning of the rainy season to take advantage of the very first rains
- In Zambezi flood plains where the predominant crop is rice, farmers have started growing their crops deeper in the flood plains especially when they expect that the rainfall will be below average. This is to take advantage of the moisture in the flood plains during periods when the water in the periphery of the flood plains is drying up
- Most farmers near water bodies (streams, dams, rivers, etc.) are now engaging in irrigated farming especially during the dry season. Farmers are increasingly demanding irrigation facilities from government

2. In what sets of circumstances (biophysical, socio-economic etc) are conservation agriculture practices most likely to be beneficial to rural communities, and in what circumstances are they least likely to be useful?

From our experience, conservation agriculture (CA) practices in Zambia have been very beneficial in the drier agro-ecological regions of the country (AERs) which normally experience rainfall deficit. It should, however, be noted that even in these two AERs, CA is only beneficial during years of below average rainfall. In years when the amount of rainfall is above average, CA practices such as conservation basins and riplines tend to be detrimental as they lead to water logging and poor crop yield. Our recommendation in the recent past has been that farmers need to be alert when they grow their crops in CA structures such as basins and riplines so that when there

is too much rainfall, they can quickly ridge-up the crop to avoid losses. In the AER with highest rainfall (AER III) CA practices such as basins, riplines and dibble planting have not worked well. Poor drainage has always been a problem with the CA structures in this AER. So, the ridges (maximum soil disturbance) have proved to be superior to the CA practices there as the ridges enhance drainage. Some institutions have been promoting permanent ridges as a sustainable alternative to reduce the recurrent maximum soil disturbance in AER III, but these have not been very successful because the ridges are normally flattened by water during the course of the rainy season such that farmers have no choice but to keep making fresh ridges every season. In AER IIb in the west of Zambia CA has usually not succeeded because this region is dominated by the Kalahari sand and the basins or riplines normally collapse immediately after they are made because of the looseness of the soil.

3. What components of conservation agriculture systems are most problematic from the perspective of farmers?

The making of basins has always been criticized by farmers for being too laborious. Probably this explains the limited adoption of this practice. Basins are normally made by hand and this has proved to be a problem especially in female-headed households with limited labour. For farmers who rely on riplines using animal draught power, the complaint has been more about weed control. Some promoters of CA have addressed this by introducing the use of herbicides. A recent Participatory Rural Appraisal that KATC conducted in partnership with UNZA, however revealed that farmers blame herbicides for low soil fertility and also the fact that, with herbicides, farmers are not able to interplant their crops. Weed management has also been a problem even for farmers who use conservation basins. Interplanting with cover crops has been promoted by KATC and other institutions that are opposed to the use of herbicides.

4. What do you think are the main research questions that need to be addressed to support food security in sub-Saharan Africa under climate change?

- It is argued by most developmental organizations that traditional crops and crop varieties that have undergone decades of natural selection are better placed to withstand climate change effects than hybrids and exotic seeds. There is need to substantiate this with some studies especially also taking into account the common opinion that traditional seeds are low-yielding
- Whereas it is a known fact that biodiversity is key to reduce the chances of total crop failure, in Zambia, there is still a lot work to be done regarding the development of value chains for crops other than maize. There is still need for research on potential value chains for other crops
- Research on water conservation practices for high rainfall areas such as planting on flat land with some drainage structures (trenches) is needed. Additionally, more research on climate change coping strategies has been for instances of rainfall deficit. More need to be done on coping strategies in times of too much rainfall and floods e.g. harvesting of water for use during dry spells



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