

Nkayi Agricultural Recovery Programme, Zimbabwe



Canadian Coalition on
Climate Change
& Development

The Nkayi District in western Zimbabwe has suffered chronic food insecurity problems as a result of recurrent and persistent droughts since 2002.

Christian Care, a Zimbabwean development agency supported by the Canadian Foodgrains Bank, has just completed a three-year project in the Nkayi District to increase food security by promoting conservation agriculture.

Yields on fields farmed by conservation methods have increased significantly year on year, far outperforming conventionally farmed fields, while requiring fewer chemical inputs and less capital investment.

Conservation agriculture can help smallholder farmers in drought-prone areas reduce vulnerability, adapt to climate change and improve their food security.

Country Context

Sub-Saharan Africa, including Zimbabwe, is particularly vulnerable to climate change and climate variability. High temperatures and low, highly variable, precipitation already reduce yields in the region. Increased heat stress from high temperatures and drought related to climate change will make farmers even more vulnerable to disaster, increased poverty and food insecurity.

The Intergovernmental Panel on Climate Change (IPCC) projects increased climate-related hardship for African farmers. Its Fourth Assessment Report in 2007 estimated that food production from rain-fed agriculture in Africa—the dominant method—could decline by 50 percent by 2020, with smallholder farmers especially vulnerable.



Photo Credit: CFGB

Maize fields in Nkayi District managed using conservation farming techniques consistently out-yield conventionally managed fields by conserving moisture and improving soil fertility.

A 2007 World Bank study found that net farm revenues in Zimbabwe are affected negatively by increases in temperature and positively by increases in precipitation.¹ Another study demonstrated that the onset of the critical rainy season was being getting later in Zimbabwe, during the period 1979-2001.²

Maize is particularly vulnerable to climate change as it does not yield well under arid conditions. Prolonged high temperatures and periods of drought are expected to severely reduce maize production in many parts of Zimbabwe and South Africa. Estimates of yield losses are 22 percent for maize in southern Africa.³

These projected yield losses pose serious risks. Although agriculture in Zimbabwe only contributes 19 percent of the gross domestic product, over 70 percent of Zimbabweans depend on agriculture for their livelihoods. A decline in production will severely impact the subsistence and social security of people.⁴



1 Mano, R. and Nhemachena, C. (2007) Assessment of the Economic Impacts of Climate Change on Agriculture in Zimbabwe: a Ricardian Approach (World Bank Policy Research Working Paper 4292)

2 Tadross, M.A., Hewitson, B.C., and Usman, M.T. (2005) 'The inter-annual Variability of the Onset of the Maize Growing Season over South Africa and Zimbabwe' in Journal of Climate, 18 (16): 3356-3372

3 Collier, P., Conway, G. and Venables, T. (2008) 'Climate Change and Africa' in Oxford Review of Economic Policy 24 (2): 337-353.

4 Venema, H.D. and Cisse, M. (eds) (2004) Seeing the Light: Adapting to Climate Change with Decentralizing Renewable Energy in Developing Countries (Winnipeg: International Institute for Sustainable Development)

The Problem

The rural communities in the Nkayi District in Matabeleland North province rely on dry-land subsistence crop farming and cattle rearing on communal lands for their food and livelihood. Maize is the main food crop and the key to food security.

Food insecurity, however, is a chronic problem in the district. The low rainfall associated with climate change contributes to and increases vulnerability to hunger. Other reasons for food insecurity include sandy soils, lack of inputs (seed, draft power, fertilizers) and high poverty levels (see Further Challenges to Farmers, page 4).

Even in a high yield year, maize production is rarely sufficient to meet the food requirements for the entire year. Many farmers plant less than 1 hectare, and can produce about 0.5 metric tonnes/hectare (t/ha). A family of five, however, will require about 0.6 t/ha per year. Global Acute Malnutrition for the Nkayi District fluctuates between 6 and 9 percent, with children, the elderly and those living with HIV/AIDS among the most severely affected.

Crop yields in 2003-2006 were below average, with excessive rain in one year and drought in other years.

The Project

Christian Care, a Zimbabwean development agency supported by the Canadian Foodgrains Bank (through its member agency, United Church of Canada), completed a three-year project (2006-2009) in five wards of the Nkayi District to assist vulnerable households to recover from perennial food insecurity and develop self-sustaining capacities to provide for their food, seeds, nutrition and health needs.

Christian Care has worked with communities in the region since the early 1990s and well understands the complex stresses on farmers in Nkayi.

Participants in the Nkayi Agricultural Recovery Programme were trained in conservation agriculture techniques, and will in turn train others in the techniques. Christian Care also developed an open pollinated varieties (OPV) seed production system within the region. OPV seeds are not hybrid and can be reused in subsequent years.

Conservation agriculture has proven to be an excellent adaptive solution to drought-prone areas in southern Africa (see next page).

On the Ground

The Nkayi Agricultural Recovery Programme began with 50 farmers in five wards in its first year. By its third year, 500 farmers participated in the project, including 336 women (67 percent).

For the first year, Christian Care gave priority for admission into the program to farmers who were



Photo Credit: CFGB

A farmer in Nkayi District shows off her heavily mulched field, with established planting stations. The field is set for planting as soon as the rains begin.

influential and well networked in the community, and thus could assist in inspiring and generating immediate interest in the community. In the second and third year, Christian Care targeted more vulnerable farmers.

The participants learned the techniques of conservation agriculture through farmer training sessions and demonstrations. Those techniques include:

- Preparing evenly spaced permanent planting stations (basins) in their fields with a hoe rather than ploughing the whole field
- Adding manure to each station and covering it with a thin layer of soil, concentrating the nutrients in the root zone
- Covering the field with a layer of mulch to trap moisture, reduce soil erosion, prevent weed growth and add organic matter to the soil.

When the rainy season began, the farmers planted OPV maize seeds. In the third year, 20 farmers (from the original 50) were also targeted for a legume trial, so that they could start to rotate cowpeas with their maize.

All farmers participating in the programme practised seed multiplication. They committed to donate at least 50 kg per year toward a community seed bank, so the seed could be distributed to other vulnerable farmers in the next season.

Participants have also been encouraged to spread the word about conservation agriculture through farmer exchanges. As well, farmers have organized themselves into clubs to assist each other in the fields, offer advice and share experiences.

Yield comparisons indicate that conservation farming techniques outperform conventionally farmed fields even in non-drought years.

Christian Care has encountered some challenges in implementing the project. In 2008/2009, it had difficulty securing appropriate seed and fertilizer on local markets and had to import them, causing delays. Most inputs did not arrive on time, and thus were stored for the next year. Instead, most conservation farmers relied on organic fertilizer and seed from the seed bank for their crop production while others utilized seed from alternative sources. This has reaffirmed the importance of the community seed bank.

Conservation agriculture requires some social change. Farmers in Nkayi had traditionally ploughed to fight weeds and control pests, but conservation agriculture's advice is to leave the soil undisturbed. Farmers understood that more use of chemicals is good, but conservation agriculture in this setting is less focussed on chemical inputs.

Despite these challenges, the project has been enormously successful. In the best cases, farmer yields have been 20 times that of their conventionally farmed fields. Though intended primarily as a response to drought, yield comparisons indicate that conservation farming techniques outperform conventionally farmed fields even in non-drought years.



Photo: Carol Thiessen, CFGB

Essie Mpofu shows the layer of mulch, about six inches deep, which serves to conserve moisture. The Mpofu family is steadily increasing the size of their fields farmed with conservation methods.

CONSERVATION AGRICULTURE

Conservation agriculture aims to achieve sustainable and profitable agriculture through key intertwined management practices:

- Minimal soil disturbance through reduced or no tillage
- Use of cover crops, mulch and crop residues
- Diversified crop rotations
- Timely weeding and land preparation

According to the UN's Food and Agriculture Organization (FAO), conservation agriculture holds tremendous potential for all sizes of farms and agro-ecological systems, but is especially suited for smallholder farmers, especially those facing acute labour shortages.

Conservation agriculture reduces soil erosion and improves soil water retention and nutrient recycling. Thus, it improves productivity and resilience, contributing to food security and climate change adaptation.



Photo Credit: CFGB

Conservation agriculture can be practiced by both men and women; more than two-thirds of the farmers in the program are women.



"I see a lot of improvement on the soil that is under conservation farming. The soil has humus as compared to the soil where I grow maize under conventional farming which is annually affected by erosion. My family is happy with the yields and the quality of crops. Our challenge however will be to completely leave conventional farming and put all our land under conservation farming... each year we will continue to increase our land under conservation farming and enjoy the benefit of good yields and improved soil fertility."

— Essie Mpfu, lead farmer
(Malandu West ward, Nkayi district)

LESSONS LEARNED

- The Nkayi Agricultural Recovery Programme is illustrative of how conservation agriculture can help farmers in drought-prone areas reduce vulnerability, adapt to climate change and improve their food security.
- Farmers in Nkayi were not concerned with climate change mitigation, but it should be noted that conservation agriculture practices lead to increased storage of carbon in the soil, and thus also help to mitigate climate change.
- Conservation agriculture and seed multiplication projects are guided by principles and practices which have to be closely adhered to in order to produce high yields and viable seeds. These projects should be implemented over multiple years.
- The use of community seed banks are valuable tools in lowering disaster risk while also fostering social responsibility.
- Conservation agriculture is highly adaptable to many ecological zones, especially where soil erosion and moisture stress are critical.

Impacts/Results

The project's initial goal was to triple maize yields through the use of conservation agriculture. However, the results have been even more impressive. In 2008/2009, average maize harvest on farms following conservation farming techniques was 6.5 t/ha, compared to 0.5 t/ha on conventional plots, as surveyed by Christian Care. This was an exceptional year due to the good rains, but in the farm trials carried out in Nkayi, conservation agriculture has shown the capacity to yield the equivalent of 5 to 6 t/ha in most years. This capacity is attributed to improved farm management and increased soil fertility.

The program has also promoted community social responsibility through the community seed bank. By July 2009, farmers had already donated 4.8 tonnes of maize seed for the year which will benefit about 428 vulnerable farmers in the next season.

According to a farmer survey, 94 percent of the farmers want to expand their conservation farming plots in the coming year. There is also widespread interest and take-up from other community members. Besides the direct beneficiaries, a further 1456 households in the district have begun to incorporate conservation agricultural techniques into their farming practices.

Conservation agriculture has empowered women and other vulnerable populations. Traditionally, a woman relying on conventional practices would lack the necessary capital for oxen, and would need to wait for a man with a team of oxen to plough her field, often meaning she would miss the optimal window of opportunity for planting. Conservation agriculture only requires a hoe, so can be practised by women as well as men.

Conservation agriculture also allows those who lack physical strength—including women and those who suffer from HIV/AIDS—to spread their labour over a longer time period. They can begin preparing their fields in April/May and be ready to plant at the optimal time in November when the rains begin.

FURTHER CHALLENGES TO FARMERS

Farmers in Zimbabwe deal not only with the recurrent drought problem, but an ongoing slate of challenges.

Zimbabwe has suffered from hyperinflation since 2007. In early 2009, the Zimbabwean dollar ceased circulating, and has been replaced by the US dollar as the primary domestic currency. Commodities are now more widely available in local markets but they are unaffordable for many people.

Seed provision is a further critical problem for farmers in the Nkayi District. Until recently, the Zimbabwean government supported hybrid maize varieties. As a result, open pollinated varieties (OPV) were removed from the market. However, lack of foreign currency has crippled the government's ability to produce or import enough hybrid seeds, leading to steep prices for the seeds. There is now a government move back to OPV seeds, but their availability is still problematic.

The agriculture sector in Zimbabwe is further stressed by the very high incidence of HIV/AIDS (15.3%) in the country. Amidst severe food shortages and a declining health service sector, the HIV/AIDS pandemic has further increased the vulnerabilities of the farming population. Those who remain healthy sacrifice needed time in the fields caring for ill family members, while money that might have been spent on inputs is instead spent on paying for medical treatment.