

FARMING IN A CHANGING CLIMATE

FAO Subregional Office for Southern Africa - Resilience Hub



@FAORachelNandelinga

Zimbabwe farmers use drama to disseminate climate-smart agriculture messages

A scene of the drama being filmed. Farmers are using drama to disseminate climate-smart agriculture messages. The videos will soon be uploaded on the internet to reach wider audiences.

Mai Nhamo is visibly agitated by her husband - Baba Nhamo's sudden refusal to help on the farm. "I gave up farming", he blurts repeatedly. The reason behind his drastic decision is the very poor crop yields that the family has received over the last four years.

When Mai Nhamo shares her predicament with friends, they tell her that climate-related risks and declining soil fertility are affecting crop production in their area. To manage the risks, Mai Nhamo's friends use Integrated Soil Fertility Management (ISFM) and Conservation Agriculture (CA) techniques on their farms. These include the combined use of mineral fertilizers with locally available

organic resources such as woodland litter, livestock manure, crop residues and green manures that replenish lost soil nutrients and amend their soils for better water retention. They also practice mulching and crop rotations, intercropping, and mixed cropping. They plant nitrogen-fixing legumes in their maize fields to reduce the need for expensive top-dressing fertilizers. Mai Nhamo's friends have constructed contours in their fields to protect soil from water erosion.

They stagger planting dates (so that some crops receive rains at critical stages and reach maturity), weed their fields on time and use improved well-adapted, disease- and pest-tolerant germplasm.

Some of these strategies have been tested through scientific research, while others are adapted from traditional approaches that farmers have relied on for centuries. The techniques have enabled Mai Nhamo's friends to maximize the efficiency of nutrient and water use and improve their crop yields.

Back home, Mai Nhamo relays the same information to Baba Nhamo and he appreciates the reason behind the family's poor crop yields. Ultimately, he agrees to join the Learning Centre where the ISFM and CA techniques are jointly tested and applied by farmers, extension workers, researchers and scientists.



This story is relayed in a ten-minute drama acted by members of Tashinga Nherera Nutrition Farmers' group in Mbire district, Zimbabwe.

The group performs the drama during Learning Centre - related events and gatherings in the community.

Although climate change and its effects have taken root in most parts of Mbire district, there is a general lack of knowledge by the rural communities about its causes, effects, and mitigation and adaptation measures.

"We use drama because it ignites curiosity and excitement and can easily draw a crowd of people and capture their attention. We have found it to be an effective tool in communicating climate change-related information and encouraging dialogue", said Phinehas Aswell, who acts as Baba Nhamo in the drama.

Since the farmers create the drama themselves, it is culturally sensitive, appropriate and relevant to their community. They use the local language and add some humour and local cultural expressions.

Chiutsi Towanda, the Extension Worker from Mbire District appreciated the resourcefulness of the farmers. "Managing the climate-related risks requires concerted efforts of stakeholders. I am glad that the farmers are reaching out to more people with information through drama," he said.

Mbire district is semi-arid in nature and still frequently receives below-normal rainfall. The soils are predominantly sandy with a low organic carbon and inherently poor nutrient supply capacity. This, coupled with poor agricultural management practices during the past decades has led to a severe decline in productive capacity of the soil.

Changing weather patterns that manifest in the form of prolonged dry spells, droughts and/or floods have made prediction of cultivation seasons more difficult in the district. As a result, farmers are no longer able to follow their normal farming calendar.

These conditions are rendering land gradually more marginal for agriculture, which poses a major threat to the food security and livelihoods of smallholder farmers due to their heavy dependence on rain-fed agriculture and climate sensitive resources.

The key message in the drama is therefore timely and appropriate – **farming communities must cope with an uncertain future, which involves taking appropriate action and making the necessary and timely adjustments and changes to reduce the negative impacts of climate change on their agricultural livelihoods.**

The Learning Centre

This message is drawn from the farmers' knowledge, acquired through season-long experiential learning at Learning Centers. FAO's partners - the University of Zimbabwe and the Soil Fertility Consortium for Southern Africa (SOFECFA) have established and implemented Learning Centers in six wards (broad communities) in Mbire and Hwedza districts.

Learning Centres are platforms of farmers, government and private extension staff, scientists and researchers who come together to co-learn and jointly test practices, technologies and innovations against identified climate risks to crop production and post-harvest handling.

In Hwedza and Mbire districts, farmer prioritized practices and techniques that are based on ISFM and CA approaches were jointly tested and applied across over 20 Learning Centres.

In addition to improving soil fertility, these practices restore degraded

lands and reduce runoff, flooding and erosion risks in the event of heavy rains or drought.

The season-long practical learning and knowledge sharing takes place on a field selected from one of the participating volunteers or popularly selected farmers.

The knowledge gained from simple experiments, regular field observations and group analysis that they conduct on the farm enables participants to make their own locally specific decisions about crop management and post-harvest handling practices for their individual farms.

The Learning Centres also help farmers to self-organize where collective action is deemed necessary such as when tackling natural resource conservation and agricultural marketing issues.

One of the unique features of the Learning Centre is the fact that it integrates indigenous and scientific knowledge.

The students, extension staff, scientists and researchers get to learn from the experience of the farmers and to value them as much as their books.

For example, smallholder farmers have always applied alternative nutrient sources such as woodland litter and livestock manure to improve the fertility of the soil. But because these practices alone are no longer creating the desired impact, the Learning Centre promotes a combination of organic and inorganic fertilizers in order to increase productivity and food security, while maintaining long-term soil fertility.

Due to the soil and climate variability that exists between farms, the Learning Centre also emphasizes 'local adaptation and contextualization of the practices.'

"What works on one farm may not work on another", said Professor Mapfumo, from the Department of Soil Science and Agricultural Engineering of the University of Zimbabwe.

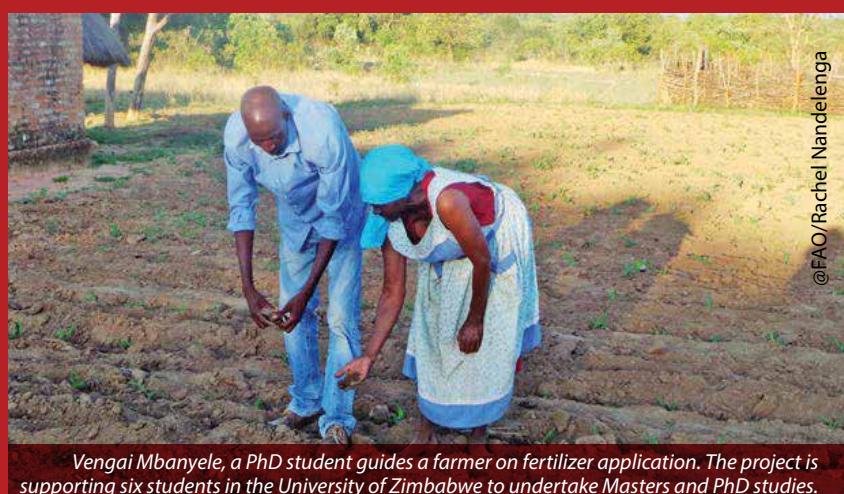
The Project

The Tashinga Nherera Nutrition Farmers' and 25 other groups in Mbire and Hwedza districts of Zimbabwe benefited from FAO's "**Supporting smallholder farmers in Southern Africa to better manage climate-related risks to crop production and post-harvest handling**" project funded by the European Commission. It is also implemented in Malawi, Madagascar and South Africa.

The University of Zimbabwe and SOFECFA implement the project in Zimbabwe, whose objectives are to:

1. Develop and promote smallholder farmer innovative techniques, methods and approaches to manage risks to crop production and post-harvest handling associated with drought, floods and cyclones.

2. Strengthen regional knowledge and institutional arrangements on risk management for crop production and post-harvest handling in areas prone to climatic hazards.



Vengai Mbanyele, a PhD student guides a farmer on fertilizer application. The project is supporting six students in the University of Zimbabwe to undertake Masters and PhD studies.

Contributing knowledge

The project is also contributing information and knowledge on climate risk management in crop production and post-harvest handling. It has supported Masters and PhD studies for six students at the University of Zimbabwe.

“Change with the changing climate”

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Cornelius Mashozhera reciting a poem. He encourages farmers to change their practices in order to cope with the changing climate.

Cornelius Mashozhera (34) makes quick steps to an open space where the rays of the hot midday sun fall directly on him. He makes back and forward movements as he recites a poem to an audience of about 50 people that has taken shelter on a wide veranda.

In his fervent performance, Cornelius uses the metaphor - “Not any more” to depict climate

variability and how it has influenced farming patterns in Hwedza district.

After dropping out of school due to lack of school fees, Cornelius resorted to farming. He grows maize, cowpeas and millet for food and income. Like many smallholder farmers in Zimbabwe, Cornelius has experienced first hand, the effects of climate change. “In 2013, my yields were so low, due to drought. I got less than a quarter of the expected harvest”, he said.

When he heard of the Learning Centre, Cornelius joined the group and even hosted it during last year’s farming season. He learned from the Learning Centre about ISFM and CA.

Using these approaches has enabled him to get better crop yields even during prolonged dry spells and drought. In the 2015 farming season, he harvested 1.2 tonnes of maize from his two-acre plot of land. Cornelius planted SIRDA 113, a short season drought tolerant maize variety.

“Most of the farmers who did not apply ISFM and CA practices got nothing”, he said.

Having seen how ISFM and CA reduce climatic risks, Cornelius is sharing the knowledge with other people in his community through poetry.

He recites the poems at events and gatherings. He has also recorded some of the poems on his phone and shares them through social media, especially WhatsApp.

Cornelius sums up motivates him in one quote - **“We develop and rise by lifting others”**, he says.

He is pleased with the outcome of his initiative. “Many people appreciate that they must change with climate change. I encourage them to visit my farm to learn more about the ISFM and CA practices”, he said.

Nancy Makwarimba said Cornelius inspired her when she was losing hope in farming. “I decided to join the Learning Centre to learn about the practices that he was talking about in the poems”, she said. Nancy is now a successful farmer who exports maize to Malawi and Mozambique.

"Not any more"

We used to plant on time
 Not any more
 We knew when the rains would fall
 Not any more
 The planting season used to start in October
 Not any more
 It shifted to November, then December
 Not any more
 We used to plant our crops at once
 Not any more
 We used to plant long maturing crops

Not any more
 We used to plant without applying fertilizers
 Not any more
 We used to grow only maize
 Not any more
 Now we stagger our planting
 We apply organic and inorganic fertilizers to the field
 We plant short maturity and drought tolerant crop varieties
 We have diversified into other crops and enterprises
 We mulch our fields
 We practice crop rotations
 It is because we can't tell when the rains come or when they stop
 We are experiencing climate change



The affirmation takes place during end-of-season Field Days that are part of the Learning Centre methodology. On such days, participants of the Learning Centre come together to present what they have learned to fellow farmers and stakeholders in their community.

The "Human University"

After winning three consecutive seasonal farmers' competitions, the prestigious title of "University" was bestowed upon Casper Gutu in 2015.

Gladys Mabhena, the Agricultural Extension Worker for Goneso Ward, Hwedza district, introduced the farmers' competition to identify, promote and celebrate excellence in the adoption of ISFM and CA practices.

Casper's performance was outstanding in all parameters, starting from planting, timely weeding, fertilizer application, mulching to crop rotation and diversification and post-harvest handling. His homestead was organized, with space allocated for storage of food and farm implements, livestock, cooking and for the family. He kept up to date records about his farm enterprises including on yields, dates for planting, weeding, harvesting, sales, income and expenditure.

"Participating in and winning the competition has enabled me to think strategically about my farming enterprises. I also learnt a lot from benchmarking myself

alongside other equally good peers. It is a valuable experience", said Casper.

Gladys says "introducing the competition was her own initiative , aimed at encouraging the farmers to adopt the climate risk reduction best practice on their farms".

The first-place winner is awarded the title of "University", the second runner up is awarded "College" and third runner up, "Institute".

Besides maintaining the high standards on their farms, holders of the prestigious titles like Casper also have a responsibility of sharing knowledge and training with other farmers in the community.

Casper is pleased with the recognition that comes with the title.

"I feel proud when people call me University. It means I am doing a good job", he said.

Tackling maize post-harvest losses in rural Zimbabwe



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Maize is the most widely grown staple food crop in Zimbabwe and is the principal source of calories, especially to the low-income groups who cannot afford other expensive food.

However, post-harvest losses remain a major concern to many smallholder farmers. The losses are estimated at 20- 30 percent and may be as high as 40 percent when pesticides fail due to lack of technical knowledge or due to changing climatic conditions or when new pests are present.

Most of the smallholder farmers use traditional storage facilities such as granaries and gunny or polypropylene bags that cannot guarantee protection against rodents and insect pests, especially the Larger Grain Borer, a devastating storage beetle which causes more than double the normal losses. The pest is also known to destroy all types of bags and any timber-based structures. Other drivers of postharvest losses are poor timing of harvest, moisture management, and threshing or shelling techniques.

Climate change is also resulting in altered weather dynamics and distribution of some insect pests such as the Larger Grain Borer, which is relatively new in many parts of Africa. Heavy rains result in poorly dried grain that is more susceptible to insects like weevils and to fungi, moulds and subsequent rotting during storage.

For smallholder farmers, post-harvest losses jeopardize their food security and livelihood.

In order to manage climate risks to post-harvest losses, the Learning Centres train farmers and provide a platform for knowledge-sharing on crop post-harvest management for reducing losses.

The platform also provides an opportunity for experiential co-learning and co-innovation through testing both scientific and indigenous knowledge. The researchers, government extension staff and scientists

Metal silos lock out insects or pests that may attempt to damage grains.

from the University of Zimbabwe and SOFECSA also provide extension and advisory services to the farmers.

The researchers and students continuously conduct adaptive research to match emerging post-harvest challenges and technologies in order to meet the local needs of smallholder farmers.

Participants of the Learning Centres also carry out season-long learning and testing of crop varieties that have desirable characteristics such as drought tolerance, early maturity, good taste, good nutritional quality, plus resistance to storage pests from the time of maturity until consumption from the granary. They use integrated crop management strategies and post-harvest practices that maximizes yield and maintain quality (including safety) of the crops, respectively.

Besides the conventional commercial pesticides, the Learning Centres promote chemical-free or reduced chemical pest management options such as the metal silos, hermetic bags, ZeroFly storage bags and local botanical pesticides.

"The post-harvest technologies are enabling farmers to store their crops safely, rather than lose them to pests or being forced to sell them off cheaply straight after harvest when prices are low.", said Professor Brighton Mvumi from the University of Zimbabwe.

"I have had a big problem of the Larger Grain Borer for many years. Two years ago, it destroyed half of my stored maize grain. I only got rid of it by using the newly introduced metal silo" said Anea Mupingaza a farmer in Hwedza district.

The metal silos completely lock out any insect or pest that may attempt to damage the grain and those that come with the grain die due to lack of oxygen.

"The challenge is now to make the technologies widely available to those who need them and can afford them, "said Professor Brighton Mvumi of the University of Zimbabwe.



A lady prepares maize meal. Maize is an important food crop in Zimbabwe



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For more information, please contact

Food and Agriculture Organization of the United Nations (FAO)

FAO Subregional Office for Southern Africa - Resilience Hub
11 Naivasha Road, Sunninghill, 2157 Johannesburg, South Africa
Tel: +27 (11) 517 1500
E-mail: FAO-REOSA@fao.org
www.fao.org