

Unjust burden

How smallholder farmers in Africa are adapting to climate change to improve their food security



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Introduction

Over the last two decades, 200 million people across the world have been lifted out of hunger. But as climate change brings more frequent and severe weather shocks such as droughts and floods, and makes rainfall patterns less predictable, these gains are under threat, especially among Africa's smallholder farmers.

Agriculture is the continent's biggest employer. But mean temperatures are expected to rise faster in Africa than the global average, decreasing crop yields and deepening poverty.

IRIN has conducted a reporting project with support from the Open Society Foundations to outline the challenges that global warming is triggering, and to explore what local communities are doing to adapt and reduce their vulnerability.

The project covers four countries – Kenya, Nigeria, Senegal, and Zimbabwe – with the goal of sharing lessons learned so that small-scale farmers everywhere can be better supported as their challenges multiply. It provides a platform for policy discussion, and for the voices of those men and women on the front lines of climate change to be heard.

This e-book contains all the articles produced under the project. It is divided into three sections:

The first, the field reporting, is itself divided into three parts: one on climate-related problems and threats, such as desertification in Nigeria, soil salination in Senegal, and the lack of technical support available to smallholder farmers in Zimbabwe; the second on the range of responses and solutions adopted by farmers and governments in the four countries; the third providing an in-depth look at how livestock-raising communities in the Kenyan county of Turkana are facing up to one of the worst droughts in living memory.

In the second section, three fact files outline key information about how adaptation finance works; the relationship between climate change, food security and adaptation; and the specific climate challenges faced by pastoralist communities.

In the third and final section, we provide an advocacy platform for two guest experts. These commentary pieces call respectively for a greater role for women in strengthening resilience to climate change, and for a wider adoption of agroforestry as a mitigation strategy.

Reportage

Part one: Climate threats



Photo: Wikimedia Commons

African economies are highly dependent on agriculture, a sector predominantly made up of small plots of land and which engages a large majority of working-age citizens. Because such a tiny percentage of such farms are irrigated, agriculture in Africa is highly dependent on rainfall.

As well as raising average temperatures, climate change has made rainy seasons shorter and less predictable, making it harder for farmers to know when to sow their fields. It has also increased the frequency of weather shocks such as droughts and floods, which hit African farmers, and their yields, particularly hard. Smallholder farmers make a negligible contribution to carbon emissions but climate change is making it ever harder for them to produce enough food for their families and to earn an income.

In the following reports, farmers explain how they have been impacted by the effects of climate change.

Nigerian farmers can't fight desertification alone

By Linus Unah in Gandi



Degraded farmland in northern Nigeria. Photo: Linus Unah/IRIN

WHEN ABBAS GANDI LOST a large portion of his crops to the combined ravages of desertification and drought a few years ago, he was so disillusioned he considered abandoning his 10-hectare farmland.

“It came as a shock; very terrible year. Instead of getting at least 200 bags of yield, I got between 25 to 30 bags,” the 68-year-old farmer said, beads of sweat running off his weathered forehead. “I would have stopped farming if I hadn’t been used to winning and losing.”

The father of 13 lives in the village of Gandi in northwestern Nigeria’s Sokoto State, close to the Sahara desert. The mean annual rainfall here is less than 600 millimetres compared to over 3,500 millimetres along the coast in the south.

Eleven states in the north, including Sokoto, are threatened with desertification, the process by which dryland ecosystems are continually degraded by the removal of tree and plant cover, mostly by human activity. In northern Nigeria, desertification threatens the livelihoods of some 40 million people.

These 11 states account for about 35 percent of the country’s total land area and are key areas of livestock

rearing and agricultural production, such as beans, soya beans, millet, sorghum, tomatoes, melons, peppers, and onions.

Farmers are taking a range of piecemeal steps to combat desertification, but for the fight against this devastating process to be waged effectively, experts say the government has to develop a more integrated and comprehensive approach to the management of land and water.

What exactly is the problem?

Professor Emmanuel Oladipo, who advises Nigeria's Federal Ministry of Environment on climate change issues, explained how desertification is being fuelled by poor land use, unsustainable grazing practices, deforestation, and the consumption pressures associated with a booming population.

"The direct causes of desertification and arid land degradation stem mostly from drastic reduction or destruction of the perennial plant cover, particularly trees, and simplification of the vegetation structure," Oladipo told IRIN.

"Soil surface not protected by permanent vegetation becomes subject to: erosion by water and wind; crusting by raindrop splash and trampling by animals; salinization by evaporation; and water logging in topographic depressions since water is no longer extracted by permanent vegetation."

Farmers in the north are taking steps to adapt to desertification and more frequent droughts – planting trees to provide shade and windbreaks, using diesel-powered pumps for irrigation, and sowing hardier crops such as beans – but such measures aren't nearly equivalent to the enormous scale of the crisis.

Nigeria has an annual deforestation rate of about 3.5 percent, meaning an average yearly loss of between 350,000 and 400,000 hectares of forest cover. Official figures say Africa's largest nation loses over 10.5 billion naira (\$34.3 million) every year to environmental challenges such as deforestation, drought, and desertification, but wider unofficial ones put the annual cost in the billions of dollars.

What is being done?

Five years ago, Nigeria developed a National Strategic Action Plan for desertification and drought, but just like its Drought and Desertification Policy and its Drought Preparedness Plan, a lack of funding and political will has held back progress.

The bulk of the government's counter-desertification work is implemented through the National Agency for the Great Green Wall, an ambitious plan launched in 2007 to plant a 15-kilometre wide swathe of trees along 8,000 kilometres of the southern edge of the Sahara. More than 20 countries in the Sahel are involved, and some \$8 billion has been mobilised for the initiative.

Since Nigeria started implementing the initiative in 2013, the agency claims a long list of successes, including the planting of five million assorted forest and fruit tree seedlings, as well as hundreds of hectares of shelterbelts and community woods and orchards.



Abbas Gandi almost gave up farming because of losses to desertification. Photo: Linus Unah/IRIN

However, reporting from the individual states involved gives an equally long list of problems and indicates a general lack of enthusiasm. And, according to local newspaper the Guardian, the agency received less than one fifth of the 1.05 billion naira (\$3.4 million) approved for operations this year.

For Murtala Adogi Mohammed, a PhD researcher looking at the impact of climate change in northwestern Kastina State, the deeper problem is that farmers themselves aren't being given enough say in the design, implementation, and monitoring of the work.

“Government-designed tree planting projects without the input of the local farmers and key rural stakeholders are not sustainable,” he said. “To ensure stewardship, ownership and sustainability – rural dwellers buy-in is very important.”

The result is that Nigeria has invested hundreds of millions of dollars in afforestation and reforestation programmes over the last few decades without effectively tackling desertification.

Ologun Freeman, an associate director at the Federal Ministry of Environment, told IRIN that the 2012 Presidential Initiative on Afforestation, in which millions of seedlings were planted, “was not really successful as the government could not really track down the seedlings [all the way] to the field where they are supposed to be planted”.

Many of the government’s efforts to tackle desertification in northern Nigeria are not “sustainable”, said Olagunju Temidayo Ebenezer, a climate change researcher at the University of Ibadan. Ebenezer blamed the lack of monitoring and continuity, inconsistent government policies, and the diversion of money from environmental management funds.

What needs to be done?

Experts say the government needs to address the underlying enablers of deforestation such as a lack of policy support, weak regulations, and rural poverty. Most of all, the trend towards an increasingly unsustainable dependence on land for food production, medicine, fuel, fodder, and building materials, must stop.

The soaring demand for fuelwood overrides any concerns about advancing desertification in the north. Fuelwood and charcoal account for about 50 percent of national primary energy consumption, with rural communities burning up over 32 million cubic metres of fuelwood yearly.

Mohammed believes providing “economic incentives” such as social capital loans, microcredit schemes, and subsidies for agricultural machinery would reduce poverty and thereby release this growing pressure on arid lands.

“Government should also improve the state of social amenities such as rural electricity, which would serve as an alternative to fuelwood as a source of local energy,” he said.

Beyond planting trees, Nigeria has to develop more efficient ways to reverse desertification and drought, said Oladipo, who participated in the drafting of the 2012 action plan.

“It requires a comprehensive and integrated approach to the management of the land, biodiversity, and water resources of the affected areas in northern Nigeria for the sustainable livelihoods of the people in the region,” he explained.

Perhaps the best clues for how to succeed in the future lie in the action plan itself. It conceded that Nigeria’s approach to reversing desertification had been “generally inconsistent, uncoordinated, piecemeal, sectoral and consists of single set remedial and ad hoc measures” without “serious attempts to have a comprehensive and integrated national framework.”

The foreign invader costing African farmers \$3 billion

By Vulindlela Mpofu in Harare



Fall armyworm is identified by the four black dots on the abdomen. Photo: MUExtension417

MY BROTHER IS A ZIMBABWEAN farmer who has done pretty well for himself, but is now a worried man.

Last season he lost a significant amount of his maize crop to a single, voracious pest, and he fears for the worst when the new growing season begins in November.

Fall armyworm, or FAW, is new to Africa but has made an immediate impact. The caterpillar, originally from Latin America, was first detected in Nigeria in January 2016. By January 2017 it had reached South Africa – spreading officially to 24 countries within a year on a lightening journey down the continent.

It's a ravenous feeder, with an appetite for more than 80 plant species – including maize, wheat, rice, sorghum, millet, and cotton. If left untreated, it can cause crop losses of up to 50 percent, munching its way through a hectare within 72 hours.

A foreign invader

My brother, Siphon Mpofu, like virtually all farmers in southwestern Zimbabwe, grows maize, and in the last few years has added drought-tolerant sorghum and millet in response to the country's drying climate.

He received his land from the government under its land reform programme that subdivided and redistributed

fertile commercial farms to landless subsistence producers. He has seen his yields steadily improve and has been able to expand his farm, investing in new buildings and equipment.



Sipho Mpfu (foreground) inspects his maize. Photo: Foster Dongozi/IRIN

Over the years, like other farmers in Mashonaland West Province, Mpfu would get occasional outbreaks of African armyworm, which marched over from East Africa several decades ago.

It's a cousin to the FAW, almost as rapacious, with a particular fondness for maize. But having been around for many years, farmers now know how to deal with it.

Last year Mpfu encountered FAW for the first time. He assumed it was the usual armyworm (the difference is in the markings) and tackled them with the recommended tried-and-tested pesticides. To his dismay, they didn't work.

Fortunately, the government was quick to recognise the new threat and recommended alternative pesticides. "That saved many farmers from certain ruin," said Mpfu.

But he still lost about 20 percent of his maize crop. "There was a significant percentage [of armyworm] which

was not affected by the pesticides,” he said, possibly because heavy rains prevented follow-up applications, or the caterpillars had burrowed deep into the plant.

Impact on Africa

According to the Centre for Agriculture and Biosciences International, Africa stands to lose \$3 billion worth of maize this coming year as a result of FAW.

This will be a dramatic setback for small-scale family farmers who grow the bulk of Africa’s maize. With limited access to inputs and services, they also receive low prices for the maize they do sell – and need all the support they can get to combat FAW.

David Phiri, the UN Food and Agriculture Organization's coordinator for southern Africa, expressed his deep concern over “the emergence, intensity, and spread of the pest”.

As a moth, they are good flyers – averaging about 100 kilometres a night. They also multiply at a prodigious rate, with a female laying around 2,000 eggs in her 10-day caterpillar lifespan.

Climate change may also be an ally. Drought, followed by lots of rain – as southern Africa experienced last year after an especially strong string of El Niño seasons – seems to give them a boost.

“FAW has come to stay and it must be managed,” said Phiri. But farmers and agricultural extension officers in Africa are still learning how to identify the pest and understand its biology and ecology in order to manage it.

Mpofu has done his own research and is not optimistic. “I am worried by several issues,” he said. “The first one is that it is difficult to eliminate FAW, even using the recommended pesticides.”

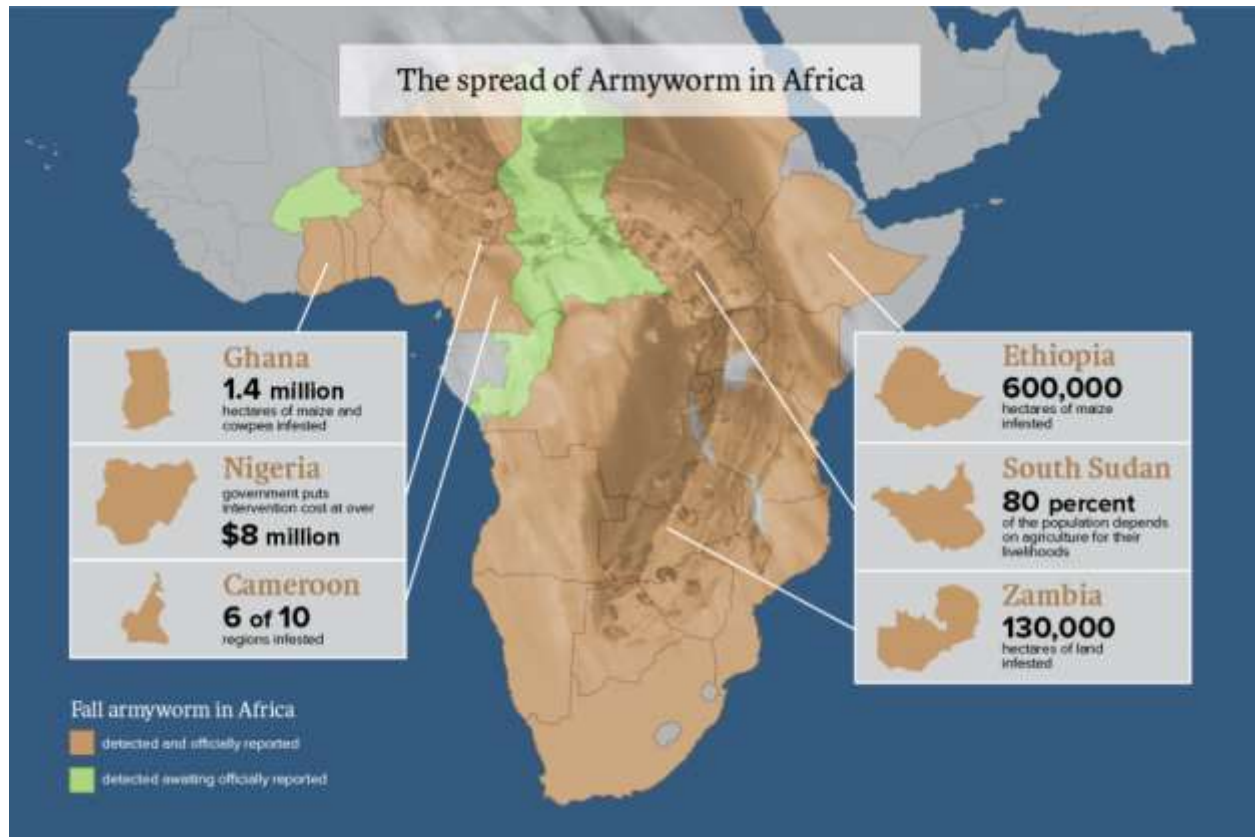
Response

The best chance to destroy the caterpillars with regular contact insecticide is when they are young, between day three and day six of their four-week lifecycle. But even then, hiding on the underside of maize leaves, they can be difficult to reach.

Older and larger caterpillars are harder still to kill. They bore into the stem or tassels at the top of the maize, which protects them from the chemical spray – and also kills the plant.

Brazil spends as much as \$600 million annually to try and contain FAW. “Africa cannot afford that,” said Mpofu, which is another reason for his pessimism.

Nigeria has costed its FAW response at \$8 million, much more than most countries. Zambia, with 130,000 hectares of land affected last year is spending \$3 million, and Uganda \$1.2 million.



It's not yet known which insecticides are the most effective against the strain of FAW now present in Africa – testing and development doesn't happen overnight. The disconcerting experience from Latin America is that FAW develops resistance.

In Brazil, genetically modified maize that release Bt toxins is used to combat FAW. While this is an option in South Africa, where GM crops are accepted, it poses a problem for much of the rest of Africa, which opposes their introduction.

Moreover, FAW may be evolving the genetic ability to disarm that particular chemical weapon.

So, the advice from the FAO, in a series of strategy meetings held across the continent earlier this year, was that the use of chemical insecticides in Africa must be kept to a minimum to prevent a build-up of resistance, and to avoid poisoning the environment.

What then to do?

An FAO consultative meeting in Nairobi in April found no silver bullet. Instead, with FAW so new to Africa, it focused on strengthening systems, cooperation, and gathering data on the pest.

The new framework consists of: sustainable management, including surveillance and early warning; impact

assessments; communication and awareness; and much-needed coordination.

“The first step to an effective Integrated Pest Management strategy is to survey and monitor pest movements, assess yield loss levels and to compile data using remote sensing equipment at the field level,” said Gabriel Rugalema, FAO representative in Kenya.

The onus is on farmers to scout for early signs of the pest. They are also advised to plough deeply to bring young pupae to the surface, sow early to avoid the period of heavy infestation later in the season, and to burn all crop residue to reduce food and shelter for the caterpillar.

Biopesticides based on FAW’s natural enemies such as viruses, fungi, and bacteria would be a safer alternative to traditional chemical approaches. Botanical insecticides such as neem can also be effective.

But although FAO has pledged to help fast-track their introduction and local production, biopesticide research, registration, and commercialisation are both costly and time-consuming, according to armyworm expert Kenneth Wilson.

FAW has been sighted in Zimbabwe’s irrigated winter maize crop – which runs from June to August – despite the fact the caterpillar hates the cold. That means a difficult season almost certainly lies ahead for Mpofu and his fellow farmers.

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Senegalese farmers battle a major climate change threat: salt

By Cissokho Lassana in Dioffior



Rice farmers in Senegal. Photo: Cissokho Lassana/IRIN

CLIMATE CHANGE MAKES LIFE harder for Senegalese farmers in many different ways: shorter rainy seasons, more frequent and longer dry spells and droughts, a lower water table, floods, coastal erosion, destruction of mangroves, and disruption of fish stocks. But most pernicious of all is the salinization of soil across large tracts of coastal and riverine farmland.

In the village of Dioffior, some 150 kilometres southeast of the Senegalese capital, Dakar, residents have mounted a protracted battle against salt: an enemy that contaminates their land, decimates their crops and, as agriculture is the mainstay of the region's economy, drives up poverty and food insecurity.

Rising sea levels brought about by climate change have greatly increased the salt content of the nearby Sine River. In the vast Sine-Saloum delta, between 700,000 and one million hectares of land have been affected over the last 30 years. The Fatick region, where Dioffior is located, and which is the birthplace of President Macky Sall, has suffered more than most.

"For decades in Sine-Saloum, the soil, which used to be known for its quality and productivity, has been badly damaged by climate change, which has led to the salinization of the waterways of the delta," explained Seydou

Cissé, who works at Senegal's National Institute of Pedology (the study of soils).

Other problems

Unfortunately, soil salinization is just one of several harmful effects of climate change in Senegal.

In a thesis for his master's degree in climate change and sustainable development, Charles Pierre Sarr, who now works for Senegal's environment ministry, noted reduced rainfall and rising temperatures around Dioffior and predicted further decreases of rainfall of 5.4 percent and 12 percent by 2025 and 2050 respectively.

Senegal is "perpetually confronted with the adverse effects of climate change because of its 700-kilometre coastline which is impacted by the rising level of the sea, with the corollary of coastal erosion, the saline intrusion on farmland, the salinization of water resources and the destruction of infrastructure," Sarr wrote. "Because agriculture is primarily rain-fed, climate change risks compromising efforts to fight poverty and efforts to reach food self-sufficiency."



Rice plantation in Dioffior. Photo: Cissokho Lassana/IRIN

Dioffior residents say the rice fields around the village were abandoned some 30 years ago. Since then, locals have worked tirelessly, carrying endless baskets of sand and rock to build dykes that turn lost fields into arable land again. The dykes keep the salty river water at bay and protect bodies of fresh water.

Among those involved are some 200 women, members of an association called Sakh Diam, (“sow peace” in the Wolof language) who have recovered more than 100 hectares of land. They have their eyes set on a much larger area: in 2015 the local authorities allocated them 1,000 salty hectares of farmland.

Sakh Diam has won financial support for its endeavours not only from the government of Senegal but also from those of Belgium and Japan.

“These rice paddies used to be tans,” Marie Sega Sarr, the group’s president, told IRIN as she worked away in her paddy, using the Wolof word for salty land.

“Nothing grew here until the Support Project for Small Local Irrigation (PAPIL) started. The anti-salt dyke you can see over there is Baboulaye 1. Where we are now is Baboulaye 2. There is another one at [the nearby commune of] Djawanda. In all, there are nine dykes around Dioffior built to combat the salinization of our agricultural land.”

PAPIL was set up in the early 2000s by Senegal’s government, with help from partners such as the African Development Bank (AfDB) and the Islamic Development Bank.

PAPIL ran until 2015 and has been replaced by the Multinational Programme for Resilience to Food and Nutritional Insecurity in the Sahel region. The many objectives of the programme include reclaiming thousands more hectares of salinised land in the Fatick region by 2020.

“Our grandparents used to cultivate here and fed themselves from their crops,” said Marie. “Between the arrival of the salty waters and the irrigation project, we had trouble feeding ourselves. Agriculture is our main activity. We were forced into unemployment.”

Sakh Diam wants it work to rejuvenate the region, allowing the community to provide for itself once again.

“We helped gather sand and rocks to build the dykes you can see. That’s been going on for six years. You can see for yourself that wild grass is growing here,” Marie said. “If we get enough rain, we hope we can harvest on this area so as to feed our families as our ancestors did.”

More support needed

Sakh Diam’s secretary general Omar Faye told IRIN: “It is paying off, beginning to show results. We have started to reuse this land to grow rice. Right here, some 80 hectares have been reclaimed.”

In the greater Dioffior area, “we harvested 30,500 tonnes of rice in 2015”, he added.

After growing rice, Marie said the villagers plan to diversify into market gardening, growing potatoes, and peppers. “Last year, poor rains scuppered our plans for market gardens,” she said. “But we still hope we can

grow vegetables here.”

In all, almost 60 anti-salt dykes have been built across four regions of Senegal, allowing some 7,000 hectares of once-toxic land to be farmed.

According to the AfDB, this has led to “improved food insecurity, diversified economic activity, higher incomes, less isolated regions, better protected and regenerated ecosystems and stronger communities.”

All the more reason to keep going with such projects, urged Abdoulaye Thiam of the African Collective for Research, Action and Training, an NGO that works on land management issues in Dioffior.

“The battle against salinised land requires a lot of money and long-term programming,” he told IRIN. “What’s also needed is to mobilise the spirit of citizenship and more systematic support from the state, especially of local associations.”

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Climate change? What climate change? Nigerian farmers not being reached on awareness

By Mohammad Ibrahim in Godai



Godai village, in Nigeria's northwestern Kaduna state. Photo Mohammad Ibrahim/IRIN

EVERYONE'S HEARD OF CLIMATE CHANGE, right? Global warming, stranded polar bears, droughts, floods, and pestilence – a terrifying prospect imprinted on all our minds.

Actually, no. In some of the most vulnerable parts of the world, many communities on the front lines of climate change may well not be aware of how their environments are being altered, and the threat that poses to future livelihoods.

That lack of awareness makes adapting to the risks by switching to new, climate-smart agricultural methods all the harder.

Godai village in Nigeria's northwestern state of Kaduna is already witnessing reduced rains, with the farmers lamenting poorer rice, maize, and vegetable harvests.

The long-term forecast is for still dryer conditions across the north, with the potential decline in yields for rain-fed agriculture as high as 50 percent.

Nigeria as a whole is classified as one of the 10 most vulnerable countries in the world, according to a 2015 climate change index by the global risk analytics company Verisk Maplecroft.

Climate what?

But despite the looming threat, six out of 10 farmers interviewed in Godai by IRIN said they “knew nothing” about climate change.

They all noted that the rains had reduced; half said there had been an increase in pests; and an equal number mentioned a problem of soil degradation. But deforestation rather than climate change was the most commonly mentioned culprit.

Maharazu Ibrahim, who grows maize and vegetables on a five-hectare plot, offered a typical comment: “I know nothing about [climate change], but we are witnessing strange weather.”

Most of the farmers were figuring out their own coping strategies. Ahmed Isa, like several of his colleagues, has planted mango and cashew nut trees on his land “to save the soil”. Others were using more animal dung on their fields, or digging water channels.

There was little expectation of government aid, but “we do need enlightenment,” said Nasiru Adamu, who farms an eight-hectare plot.

In theory, the government provides an agricultural advice service, staffed by a network of trained officers. But the farmers told IRIN that, in reality, it is badly underfunded and there is little support for rural communities.

“The few extension workers that are available we understand lack full knowledge about climate change,” said Yahaya Ahmed of the Developmental Association for Renewable Energy, a Kaduna-based NGO.

A lack of transport, even simple motorbikes, also limits their effectiveness.

But as is the case in much of rural Nigeria, each of Godai’s farmers owns a radio. They told IRIN that radio broadcasts and traditional leaders were their main sources of information.

Getting the message out

The farmers had clearly received the message on deforestation, so why had so few of them heard about climate change?

“When I was working with Radio France International, we introduced a magazine programme in Hausa [the language of the north] on climate change and it went a long way to educate local farmers on climate change adaptation,” said Atayi Babs of the Climate and Sustainable Development Network of Nigeria.

“But there are millions of Hausa-speaking people that are not listening to RFI, so we [must] use local radio and television stations, and even pidgin-English [Nigeria’s unofficial lingua franca] to educate farmers.”

According to Ahmed: “Radio journalists don’t visit remote communities to interview [farmers] directly. Mostly, the information aired about climate change on radio is from written articles, which are translated, and the people don’t understand a bit of it.”

Effective advocacy campaigns need to be designed with the input of the communities they are trying to influence, said Sam Ogallah of the Pan-African Climate Justice Alliance, a regional lobby group. If “[campaigns] are not targeted to the needs of the end users,” they don’t work, he added.

Nigeria recognises climate change as a strategic priority: It has adopted a Nigeria Climate Change Policy Response and Strategy; there is a National Adaptation Strategy and Plan of Action on Climate Change; the Ministry of Environment has a dedicated Department of Climate Change; and there are plans for a climate change trust fund.

All laudable steps, but Ogallah said there is a disconnect between the bureaucratic paper shuffling in Abuja and real climate action in places like Godai.

“Nigeria has several climate change policies and plans,” he told IRIN, “[but] still doesn’t have a climate change Act or Bill to guide climate actions in the country.”

The government needs to take the lead, he added, because civil society doesn’t have the resources to run multi-year projects, and the private sector will only step in to help if there is a strong signal of intent from the authorities.

“We need advocacy programmes. We need awareness programmes,” said Babs, the ex-radio journalist. “Just because you live in a rural community, you shouldn’t be left behind; not only in climate change awareness, but in every aspect of life.”

§§§

Agriculture a hard sell for Zimbabwe's youth

By Tawanda Majoni in Mazowe



Photo: Jaspreet Kindra/IRIN

LAIZA MUKUTE'S 14-HECTARE PLOT is a pale shadow of what it was 10 years ago.

The Mukute family – 43-year-old Laiza, her husband, and three sons – obtained the plot in 2001 under a land reform programme that saw thousands of commercial white farmers evicted and their land allocated to black Zimbabweans.

Laiza's husband was killed by lightning in 2007. Her sons have all moved to the capital to eke out a living as street vendors, leaving their mother only with their younger, teen-age sister. Like many young Zimbabweans, they see no future for themselves in the troubled sector.

Agriculture in Zimbabwe has long suffered from meagre state investment, poor training, and limited access to farming equipment and credit – not to mention the effects of climate change in a region that has repeatedly been struck by devastating droughts and floods.

About 60 percent of Zimbabwe's population of 16 million is under the age of 24.

"My sons won't hear anything about farming. They would rather be in the city even though life is also tough for them there," Mukute told IRIN at her farm in rural Mazowe, some 60 kilometres northeast of Harare.

This youth disillusionment is a phenomenon that extends well beyond the borders of Zimbabwe, according to Peter Wobst, who works on rural poverty reduction at the UN's Food and Agriculture Organization.

"Africa's rural youth face particular barriers to accessing productive employment: young women and men tend to encounter challenges in accessing adequate knowledge, information, and education," Wobst told IRIN.

"They have insufficient access to land, inputs, financial services, markets, and, ultimately, limited involvement in policy dialogue."

This is despite the fact that the almost 200 million people in Africa aged between 15 and 24, as the FAO puts it, represent "a large potential reservoir for the growth of the agriculture sector".

Different aspirations

Mukute is barely making ends meet. She can't afford to replace her dilapidated ox-drawn cart and has sold off most of her livestock.

Only her 15-year-old daughter, Elizabeth, helps her in the fields, "Who knows, she may also join her brothers one day and leave me too struggle on my own," she said.

These are well-founded fears.

"I can't remain stuck here farming because it comes with hard labour," Elizabeth told IRIN. "If I pass my O-level [exams] next year, my mother and my brothers will have to find money for me to go for A-levels and, after that, university. I want to be a lawyer and I will employ someone to come and help my mother with work on the plot."

Whereas the larger Mukute family used to grow maize, groundnuts, and tobacco on the full 10 hectares, now only two hectares are under cultivation.

Food security at stake

Many families in Mazowe and rural areas across Zimbabwe have seen a similar exodus of younger members to cities, gold and diamond mining areas, and other countries.

Wonder Chabikwa, head of the Zimbabwe Commercial Farmers' Union, said the future of farming and food security in the country will depend on the commitment of young people to working the resettled land.

“Most of the youths seem not to have a conviction for farming, and the majority of those that will remain to till the land will do so because they have limited options,” he told IRIN.

This sentiment is echoed on the website of the Zimbabwe Farmers’ Union, a separate association, which recognises that “the future of agriculture lies in the hands of the youths, and therefore there is [an] urgent need to unleash their potential and energy in that direction.”

To this end, for the past five years, ZFU has organised a Youth Agripreneurship Summit, which brings hundreds of young farmers together to acquire leadership skills, network with key players in the sector, and learn about new technology.

One school of thought is that there might be more interest from young people if they could be encouraged to drive through commercialisation in the sector that would help address the low productivity issues.

But Chabikwa warned of the dangers of placing too much emphasis on the types of farming that generate the greatest profits, such as tobacco, even if that crop has dramatically improved the living standards of many resettled farmers.

“Inevitably, youths would always be enticed by farming that brings money through cash, but this is at the expense of food crops like maize. If the youths would rush into tobacco farming and horticulture, food security suffers,” he told IRIN.

Challenges

A survey of the aspirations of school children in two of Zimbabwe’s provinces conducted in March 2017 found that while some respondents mentioned agriculture, they “didn’t emphasise just any old farming, but they had a clear focus on intensive irrigated agriculture, notably horticulture, but also tobacco” – both “seen as a route to accumulation (of wealth) and future prosperity”.

Cited obstacles to realising these aspirations included lack of farming skills and access to land.

In Mukute’s neighbourhood, the latter is a common concern.

Johnson Hozheri, 34, farms on 1.5 hectares given to him by his father when he married and couldn’t find another farm to settle on.

“My father gave the four of us (three brothers and a sister) plots on this farm on which we were resettled as a family 18 years ago. The plots are too small for meaningful farming, but do we have a choice? We are already congested,” Hozheri told IRIN.

To supplement their income, the brothers pan for gold along the Mazowe River during the dry season. They also cross the border to South Africa, Botswana, and Zambia to buy various goods for resale among the rural farmers or in nearby towns.

“We always come back home because life is tough in the towns or in other countries,” Hozheri said. “Young people from smaller families have been luckier because there is more to share, but disputes over who is entitled to the land in the event of the death of the parents are common in this community. There are several cases where the farms ended up derelict because of the disputes.”

To redress such problems, independent member of parliament Temba Mliswa, also a farmer, is urging the government to speed up a promised audit to identify unused resettled land and make it available for young farmers squeezed into plots allocated to their parents.

He said the government must also prioritise the training of young people in agriculture.

A recent report by the parliamentary committee on lands and agriculture identified major shortcomings among the country’s tertiary educational institutions, exacerbated by shoestring budgets and obsolete or inadequate training materials and equipment.

(Additional reporting by Sally Nyakanyaga)

§§§

A way of life under threat in Kenya as Lake Turkana shrinks

By Benedict Moran in Layeni



Layeni, on the shore of Lake Turkana. Photo: Benedict Moran/IRIN

THE LAST NATIVE SPEAKER of the Elmolo language reportedly died sometime in the 1970s. By then, only a few hundred Elmolo remained, eking out a living on Kenya's southern waters of Lake Turkana as they always had, drinking its brackish waters and fishing for catfish, tilapia, and Nile perch.

Thanks to intermarriage with other tribes and adopting the Samburu language, the number of Elmolo has today increased to a few thousand. But their long-term survival remains far from certain, thanks to a new threat.

Lake Turkana is the largest desert lake in the world and has existed in some form for nearly four million years. Ancient hominids, like the contemporaries of Turkana Boy – the nearly complete skeleton of homo erectus discovered in nearby Nariokotome – fished and lived along its shores.

Now, the lake itself, along with the populations that depend on it, are increasingly vulnerable.

Nearly 90 percent of its freshwater inflow comes from the Omo River across the border in Ethiopia. Last year, the government in Addis Ababa unveiled Africa's tallest hydroelectric dam and announced plans to build a series of water-hungry plantations along the Omo.

Nearly 30,000 hectares have already been cleared in the Lower Omo for sugar plantation. Those projects

threaten to strangle Turkana's water supply, and have the potential to devastate the livelihoods of nearly 300,000 people in Kenya who rely on the lake for food. Because of this – and the largely manmade nature of the potential crisis – Lake Turkana is now being referred to as an East African Aral Sea.

Communities like the Elmolo are already experiencing changes. Since 2015, Lake Turkana's waters have dropped by 1.5 meters, according to satellite data collected by the US Department of Agriculture and published this year by Human Rights Watch.

A recent study by the Kenya Marine and Fisheries Research Institute (KMFRI) showed declining catches, both due to changes in water levels and overfishing.

For the Elmolo and others who depend on these waters, that means less fish to bring home to their families.

"Sometimes you get one perch, and after two or three months, you get another," said Lpindirah Lengutuk, a 32-year-old Elmolo fisherman who spent most of his life on the lake's jade waters. "The fish have moved. We don't know what has taken the fish."

The situation is only expected to get worse.

Grounded fleets and brewing violence

Should water inflow of Lake Turkana reduce to below that lost by evaporation, its sensitive ecosystem could be changed permanently, scientists say. In the worst-case scenario, the lake could be divided into two lakes, with a smaller section breaking off and eventually becoming a lifeless, salty pool of algae.

"The salinity of the lake would likely increase to the level that it cannot support freshwater organisms that live in the lake," said John Malala, a senior research officer at KMFRI. "Many productive areas will definitely be lost."

Shifting rainfall patterns due to climate change and cyclical drought are making the situation even worse. This year, much of Kenya, including the areas that straddle Lake Turkana, is experiencing a devastating drought, prompting the national government to declare a national disaster.

In Turkana County, more than 60 percent of wells are dry, according to the country's National Disaster Management Authority. Thousands of dead livestock litter roadsides.

In such extreme periods, many pastoralists, like the Turkana people, traditionally rely on the lake not just for food, but to make enough money to replenish their livestock once the rains return.

Now, even that insurance may disappear. "The buffer against the drought was fishing," said Felix Horne, a researcher for Human Rights Watch. "When that's gone, there will be a big problem."



Lpindirah Lengutuk has spent most of his life fishing on Lake Turkana. Photo: Benedict Moran/IRIN

On the lake's western shores is the bustling fishing town of Kalokol, named after the Turkana name of the lake, an'am Ka'alokol, or sea of many fish. Its residents are among the country's poorest citizens: The poverty rate is almost 90 percent, according to data from the 2013 Kenya Bureau of Statistics, and the lake is one of the few sources of employment.

For decades, fish hauled out and dried here made their way to markets across Africa, including as far as the Democratic Republic of the Congo. Today, dozens of boats sit idle on the shoreline, some with their bottoms rotted out, weeds growing through the wood planks.

According to Human Rights Watch, the waters here have receded as much as 1.7 kilometres since late 2014.

Standing on a dry lakebed of cracked mud, Philip Ekuwom Tioko, a Turkana fisherman, explained that the repercussions of a dried-out lake go beyond jobs and food.

Much of this area is relatively lawless and still goes largely unpatrolled by Kenyan police. Hundreds of pastoralists are armed, both to defend against and engage in the age-old tradition of cattle raiding.

As jobs on the lake become scarce and cattle succumb to the drought, it is almost inevitable that violence between the Dassanech, the Samburu, and the Turkana will increase. “Nothing good will come out of the drying of the lake,” Tioko said.

Power-hungry?

The Ethiopian government has pushed back against opposition to the dam. On its official blog, the Ministry of Foreign Affairs stated that the Omo River projects took “great care to take any possible impact on Lake Turkana into consideration”. It cited numerous environmental studies made in the area, including ones by the World Bank and the United Nations Environment Programme.

It further wrote that any reduction of water flow into Turkana caused by the filling of the Gibe III dam would fall within natural fluctuations of the lake, and that there is “no causal link between the current drop in water levels and developments in Ethiopia”.

But activists and scientists say environmental impact assessments were presented only after the Gibe III dam’s construction commenced.

There had been no prior consideration of impacts on the downstream populations in both Ethiopia and Kenya, according to Sean Avery, an independent Kenya-based hydrologist who has studied the region for years and wrote a major report on the Ethiopian projects.

“If you put a dam in and empty the river, you cut off the umbilical cord sustaining the downstream ecosystem and populations,” he said.

“They eventually did study the environmental impact within Ethiopia, but there were no consultations beyond the border in Kenya, and instead they stated that area ‘to be scarcely inhabited’, and hence no big deal.”

Many here are quick to blame Kenyan government officials, who they say seem more interested in getting cheap electricity – the country is reported to get up to 500MW of additional power from the Gibe III dam – than worrying about the plight of their country’s poorest.

“The Kenyan government cannot claim they didn’t know about the dangers of this project,” said Ekai Nabeny, a climate change activist and researcher for Kenya’s speaker of parliament.

Nabeny says Kenyan opposition to the dam largely dried up once the electricity agreement was approved.

Needs two to talk

One major obstacle is the lack of a bilateral accord between the two countries to govern trans-boundary water, without which it is difficult, given the political sensitivity of water in this arid region, to address grievances about Lake Turkana.



A Dassanich man prepares for a coming-of-age ceremony held once every three years. Photo: Benedict Moran/IRIN

One of the most recent agreements is a 1979 memorandum of understanding, signed between Kenya and what was then the Provisional Military Government of Socialist Ethiopia. It established a joint technical committee to coordinate research and establish joint goals regarding water resources on the border, but stopped short of creating an official mechanism to manage the lake.

The United Nations Environment Programme is facilitating talks between the Kenyan and Ethiopian governments, with the aim of developing an arrangement that takes into consideration both Ethiopia's need for development and the concerns of local communities living along the Omo.

But the process is politically sensitive, time-consuming, and underfunded.

With teams already halfway through a four-year process, the Kenyan and Ethiopian governments have yet to make any major commitments, according to a number of officials involved in the talks. Kenyan officials say the slow pace is not their doing.

“Kenya is willing to move faster, but you cannot move alone,” said an official from Kenya’s Ministry of Environment, Water & Natural Resources. (An email sent to a spokesperson for the Ethiopian government went unanswered).

The next step will be the launch of a peer-reviewed environmental study of the region.

Meanwhile, more projects are in the works in Ethiopia. A Gibe IV dam has funding, but construction has not yet started. A Gibe V dam may be on the horizon as well. Scientists in Kenya like Malala are trying to shift to building resilience and preparing communities for the worst. But his outlook is bleak.

“The people here, if the lake goes down... how will they survive?” he asked. “That’s the question we can all ask. It’s not going to be possible.”

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Flood-ridden Nigeria farmers need more help adapting to climate change

By Linus Unah in Oko-Amakom



Toru-Orua in Sagbama local government area of Bayelsa state. Photo: Emmanuel Gbemudu/IRIN

OKECHUKWU ONWUMA STILL REMEMBERS the painful day heavy floods destroyed his small farm in southern Nigeria's Delta State.

"It was in November 2012, and the flood didn't spare anything in this community," the 45-year-old said, hunched over a small heap of yam on his farm, near Oko-Amakom. "Farmers cried bitterly, and nobody helped us," he said. "The water covered our farmlands and homes, and displaced thousands of people."

Flooding is a recurrent problem in Nigeria, particularly in the southern states where the Benue and Niger rivers converge.

In 2012, unprecedented levels of flooding affected 30 of the country's 36 states, causing damage estimated by

the government at \$16.9 billion. Rivers overflowed their banks, washing away farmland, settlements, and crucial infrastructure. By mid-October, at least 431 people were dead and 1.3 million displaced from their homes.

“The flood destroyed our entire farmland and submerged my cassava, yam, maize and peanut crops,” 80-year-old Alice Daniel told IRIN at her farm, which is nearly two kilometres away from the Niger River.

Three years later, in 2015, floods in Cross River State displaced more than 1,200 families and destroyed 4,500 farms in some southern coastal communities. In the north of the country, 53 people died and more than 100,000 were displaced that year by floods.

Vulnerable coast

Flash floods, which can remove topsoil and reduce fertility, are particularly common in the south during the May-to-September rainy season. But rising sea levels that risk bringing salt water onto arable land have become a perennial problem, and climate change means farmers in coastal areas are at greater risk than ever.

A 2014 study by the non-profit Nigerian Environmental Study Action Team (NEST) reported that sea-level rise and repeated ocean surges in southern Nigeria would worsen the problems of coastal erosion and flooding in the Niger Delta region, and warned that crops were threatened – the main food crops in the south are cassava, yam, plantain, maize, and sorghum.

According to the government’s submission to the UN Framework Convention on Climate Change, “Nigeria’s coastline is already undergoing pronounced morphological changes as a result of natural extreme events, such as sea surges and tidal waves.”

Due to global warming, it is anticipated that sea levels will rise between 50 centimetres and one metre this century. At the lower end of that spectrum, the Nigerian government predicts 35 percent of the highly productive Niger Delta will be lost. At the upper end, that rises to 75 percent by 2100.

“The Niger Delta could lose over 15,000 square kilometres of land by the year 2100 with a one-metre rise in sea level,” according to the Community Research and Development Centre, an environmental non-profit based in southern Edo State.

‘Huge’ impact

Anthonia Ifeyinwa Achike, a professor of agricultural economics and former director of the African Climate Change Adaptation Initiative at the University of Nigeria, Nsukka, described the impact of climate change on smallholder farmers in southern Nigeria as “huge”.



Five years ago farmer Okechukwu Onwuma lost everything to devastating floods. Photo: Linus Unah/IRIN

Among its effects, she listed: “the destruction of crops, livestock, houses, farm building and equipment, a reduction in output, build-up of diseases and infections, contamination of water, death, sickness, increase in costs of farm activities, and psychological trauma.”

If no action is taken in Nigeria to tackle the effects of climate change on the agricultural sector, “productivity could decline between 10 [and] 25 percent by 2080,” according to the government document.

“Since we now know that the flash flood comes around September every year, we try to begin planting improved varieties at least by January and harvest between August and the first week of September,” Onwuma said.

Farmers like Onwuma are determined not to let this “business-as-usual” scenario come to pass. Many have resorted to adaptation strategies such as varying the time of year they sow, sowing more deeply in the soil, and using fast-maturing varieties of crops as well as cover crops such as melon to help conserve soil moisture. In so doing, they increase their food security.

Daniel reiterated the point, adding: “Since we started planting and harvesting in line with the climate conditions, farmers don’t suffer much losses anymore.”



Alice Daniel's crop losses have reduced since she adapted to changing climate conditions. Photo: Linus Unah/IRIN

Where's the help?

Yet there are significant challenges. According to a NEST study, Building Nigeria's Response to Climate Change, less than two percent of farming in Nigeria uses irrigation.

"The kind of agriculture commonly practised in southern Nigeria is rain-fed," CREDC Executive Director Etiosa Uyigue told IRIN. "The success of farmers depends on their ability to predict the rain – that is when the rain begins and when it ends. The change in the pattern of rainfall makes it difficult for them to predict the rain, and this can affect their farming."

Uyigue said efforts to strengthen farmers' adaptation to climate-related disasters so as to reduce their vulnerability should involve "continuous training on farming methods that can be adapted for these circumstances."

"Again, government can do more on extension services by giving farmers the needed information at the right time. Such information can include early warning on impending disasters."

The fear is that climate change will undermine food security in Nigeria – forecast to overtake the United States as the planet's third most populous nation by 2050 – especially as climate shocks such as flooding can hinder

access to local markets. In extreme cases, a 2011 NEST study reported, malnutrition could become common among children and force rural farmers to move to cities.

While the government's submission to the UNFCCC does detail a range of adaptation initiatives, Achike suggested they have yet to translate into effective action.

"Though there have been several government policies and programmes to boost agricultural production, including policies on climate change, all of these seem not to be effective enough because of policy inconsistency, lack of political will to do what is right, [and] the awarding of climate change contracts to political associates who don't do it or do it poorly. In addition, the government prefers to use people who are not experts on the issue," she told IRIN.

The money problem

Despite widespread acceptance that something needs to be done, and urgently, Nigeria still struggles to dedicate anything like enough funds to addressing climate change.

A committee in Nigeria's House of Representatives recently described the current budget of 8.1 billion naira (\$26.5 million) allocated to fight climate change as "inadequate". The figure falls chronically short of the \$140 billion a World Bank expert said was needed. Nigeria's environment ministry announced in March that it would issue a \$20-billion bond to raise funds to tackle the negative effects of climate change.

But sometimes even the money that is ostensibly being made available goes astray.

For example, an investigation by the International Centre for Investigative Reporting in Abuja revealed how millions of naira meant for affected communities have been misappropriated from an Ecological Fund set up to tackle a range of environmental problems such as floods, droughts, oil spills, and landslides.

The Federal High Court is currently trying a former governor of central Plateau State for allegedly diverting 1.162 billion naira (\$3.8 million) of Ecological Fund money.

Last week, Nigeria's 36 state governors set up a committee to audit the fund's \$110-million kitty. Most states say they have not received any allocation from the fund since President Muhammadu Buhari was sworn in May 2015.

"When the floods ravaged our crops in 2012, a lot of money was allocated, but none of it got to farmers," said Onwuma in Delta State. "We only got foods and other relief items, but nothing was said about our submerged crops and destroyed farmlands."

He added that what he and his fellow farmers needed most was more timely information on climate change

through extension services and mass media.

“The floods will continue to come every September, but planting correctly would always help us to remain safe. However, we are worried that more serious rainfall might cause a change in the normal pattern of flooding, and we might suffer again.”

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Resettled Zimbabwe farmers left high and dry

By Tawanda Majoni in Harare



Zimbabwean farmers learning from each other. Photo: Swathi Sridharan/ICRIAT

TEN YEARS AGO, FORMER bricklayer Samuel Musengi was allocated a nine-hectare plot to cultivate in Zimbabwe as part of an accelerated phase of land reform that saw tens of thousands of black families resettled on what were once vast, mostly white-owned commercial farms.

It's not going so well for him; nor for many others.

Increasingly unpredictable weather and a lack of government support has made it all but impossible for Zimbabwe's resettled farmers to achieve anything like the full potential of their plots.

Even the government's weather forecasts are unreliable, according to 42-year-old Musengi, who grows maize and beans and raises a few head of livestock in Wedza, some 90 kilometres southeast of Harare.

“These people (the weather forecasters) get it wrong about when the rains will come most of the time. That makes it difficult to prepare our fields. If the Met Department cannot correctly tell when it will rain, what do you expect from simple farmers like me?” Musengi told IRIN.

But it’s getting harder too for forecasters.

Extreme weather shocks are occurring with rising frequency in Zimbabwe, “with a flood year immediately following a drought year”, according to a 2015 study by Konrad-Adenauer-Stiftung and the Harare-based Research and Advocacy Unit.

In addition to more floods and droughts, the report predicted that the onsets and ends of rainy seasons would continue to change and be interrupted by more frequent and longer dry spells, and that the distribution of rainfall across the country would also become more and more erratic – bad news indeed for Zimbabwean agriculture, which is mainly rain-fed.

In the absence of accurate official forecasts, Musengi and scores of other resettled smallholder farmers in the Wedza area have turned in desperation to self-styled “prophets”.

But they too are of little help.

“The angels have advised the prophets not to predict the rains,” said Musengi. “Only God knows when it will rain. Other farmers go to traditional healers who carry out rainmaking ceremonies, but it is difficult to tell if the rains that come are due to those rituals.”

For want of a pump

By rights, rain shouldn’t be an issue for Musengi and the 20 other smallholders now living on the farm: It has a borehole deep enough to supply water for year-round irrigation.

But the pump is broken and there’s no money to replace it.

It is common for resettled farmers to have to share infrastructure, but during the violence and chaos of President Robert Mugabe’s fast-track land reform programme in the early 2000s, much vital equipment was vandalised or looted, leading to disputes over who should meet the costs of repairs.

“Because of the droughts, we have not been able to produce enough,” said Musengi, who in recent years has seen fellow farmers lose cattle to disease, thirst, and lack of pasture. “I have been getting less than a tonne of maize from my field every year, meaning that I cannot sell anything and get money for inputs and other household needs.”

Eddie Cross, an economist, farming expert, and opposition Movement for Democratic Change lawmaker, estimates that smallholder farmers should be producing some 10 tonnes of maize per hectare in a good year.

One stated aim of land reform was to give subsistence farmers who had long toiled on low-quality soils in communally-owned areas – as well as junior civil servants, war veterans, pensioners, and businesspeople – access to more productive land so as to contribute to Zimbabwe's food basket. More than 140,000 people benefitted from the scheme, with an average plot size of 12 hectares.

However, in practice, many have been left to fend for themselves, with little support to face up to the growing effects of climate change.

“The fast track land reform programme could have gone a long way in addressing the climate adaptation and resilience needs of smallholder commercial and other resettled farmers, but unfortunately this opportunity may have been missed,” Leonard Unganai, a climate expert working with Oxfam, told IRIN. “This is so simply because that was not an explicit policy objective of the programme.”

Cycle of insecurity

While those resettled have the right to live on and work the soil of their farms, they were not given title deeds, even those who farm on a commercial rather than subsistence basis. Ownership of all rural land in Zimbabwe acquired under the fast track land reform programme is now vested in the state. Many resettled farmers have been issued 99-year leases, but these can be revoked at any time if the government says the land has not been used productively.

They “have no security of tenure, no ability to borrow money against their land holdings, and no way of selling their assets if they want to move or change to another activity,” said Unganai. “Secure land tenure is definitely important to encourage adaptation and resilience-building investments on the land. One hopes the government addresses this gap as a matter of urgency.”

Cross explained how this sense of insecurity means the farmers have no motivation to invest in and develop their plots. “They can be removed from their farms at the whim of the minister at any time for any reason or no reason at all,” he said. “Their vulnerability is total.”

Without sizeable investments, farmers are unable to cope with the repeated droughts and floods. They hardly have any means to fall back on for their own subsistence and to pay for the preparation of the land for the next season. This has created a vicious cycle of food insecurity.

The ruling Zanu PF party concedes there is more to be done to help resettled farmers.



Many farmers feel left to their own devices. Photo: Swathi Sridharan/ICRIAT

Christopher Chitindi, an MP who heads the parliamentary committee on lands and agriculture told IRIN the "government must urgently look at ways to ensure that the land given to resettled farmers is bankable, and the best to achieve that is to make land rights transferable from one person to another and from one generation to the other, which is not the case at the moment.

"It must also speed up the process of coming up with the new land policy to address existent tenure rights gaps and to specifically address the needs of resettled farmers in the context of climate change," he added.

Restive times

Ongoing land invasions and the forced displacement of resettled farmers make matters worse. These have been sporadic of late, but factional wars within the ruling party complicate the situation and have become more frequent as different camps jostle to succeed Mugabe, now 93.

Mwazviona Gora, 58, of Goromonzi district in Mashonaland East Province, some 50 kilometres southeast of Harare, is a veteran of the war of liberation that brought Zimbabwe independence from Britain in 1980.

Gora participated in the invasion of white farms at the turn of this century. He received 90 hectares in 2003 and has since been farming maize, groundnuts, and vegetables, together with scores of goats and chickens.

“They (militias from Mugabe’s ruling ZANU-PF party) say I am thankless and now claim that the farm actually belongs to one of their godfathers,” he told IRIN. “I have hardly done any farming this year and these boys are stealing my livestock. They have also taken away my generator and irrigation pipes and won’t let me use the small dam for irrigation.”

Gora had enough problems even before his plot was invaded. Like many other farmers, banks have been turning him away because his farm is considered state land. This means he has no collateral security and can’t insure his crops against droughts, veld fires, and floods.

He hopes to convince established agricultural companies to contract him to grow seed potato, as the luckiest smallholders in his area have done. These firms provide expert help that boosts skills and productivity and gives farmers the opportunity to diversify from maize, which has proved particularly vulnerable to extreme weather events.

Where’s the help?

Such support is sorely needed in a country where the agriculture sector, despite accounting for some 60 percent of the labour force and 20 percent of GDP, gets only around five percent of the national budget. This is about half the proportion set out in the Comprehensive Africa Agriculture Development Programme drawn up at an African Union summit in 2003.

The government’s National Climate Change Response Strategy notes that the impacts of climate change “pose a serious risk to food security and adaptive capacity”, but it barely mentions the needs of resettled farmers.

“Generally, resettled and non-resettled farmers now know that there is climate change, through experience and sporadic awareness campaigns by development partners,” said Wonder Chabikwa, president of the Zimbabwe Commercial Farmers’ Union. “The problem is that they still don’t know what exactly to do to adequately respond to the challenges of climate change.

“Even [government] agricultural extension workers seem to be confused too. This is worsened by the fact that, unlike in the past, they are no longer accessible to farmers. They must be on the ground, teaching farmers on the best methods to till their land, what crop varieties to adopt, and how to deal with crop and livestock diseases.”

Chabikwa suggested the government should set up a non-commercial bank that gives loans to farmers at sustainable rates. “It used to do that in the past, but the bank has commercialised and is no longer responding to the needs of resettled and poor smallholder farmers,” he added.

Although the situation is desperate, the farmers themselves are determined to find solutions, with or without the help of the government.

“We must not be cry-babies,” said 38-year-old Thabeth Marimo, Musengi’s neighbour in Wedza. “[We must] become more self-dependent and organise ourselves into community groups to discuss the challenges we are facing and how best we can deal with the changing seasons. After that, we can approach the government and donors to help.”

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A hard row to hoe for Nigeria to reach food self-sufficiency

By Linus Unah in Kano



A farmer waits for a truck to take his harvest to market. Photo: Anthony Morland/IRIN

ON THE OUTSKIRTS of Nigeria's northern city of Kano is bustling Dawanau, West Africa's largest grain market. Fortunes change hands here daily, with sacks of millet, sorghum, and cowpeas loaded onto trucks for delivery to countries as far afield as Chad, Mali, and Senegal.

But away from the hubbub of Dawanau, the smallholder farmers who produce more than 90 percent of Nigeria's food face an uphill battle to maintain that supply.

Northern Nigeria's vast plains are ideal for agriculture – and rice is an especially lucrative crop.

The staple is a must-have at any social event and a cornerstone of some of the country's most popular dishes, including the ubiquitous spicy favourite, "Jollof".

Nigeria is both the largest rice producer in Africa and the continent's biggest importer. The supply shortfall is made up with imports – mainly from Thailand and India – valued at more than \$8 million per day.

As with rice, so with wheat, maize, and other grains: Nigeria, with a population of 190 million, is a significant producer, but also a net importer.

So given its abundant arable land, why can't Nigeria support its farmers to grow more food and plug the foreign exchange drain?

The answer lies in the dominance of oil. Until the country's oil boom in the 1970s, agriculture was Nigeria's economic mainstay, able to meet both local demand as well as generate export earnings.

Crude oil changed that. With staggering amounts of easy money sloshing through the political system, agriculture languished.

Today, Nigeria's annual food import bill is around \$20 billion.

But a combination of dwindling oil revenues and dollar shortages has persuaded the government of President Muhammadu Buhari to make agriculture a priority again.

Grow-your-own

Under the slogan of "We must produce what we eat", the government is encouraging agribusiness as a way to drive economic growth, and as the path out of poverty and food insecurity for millions of smallholder farmers.

The government has set ambitious targets of becoming self-sufficient in rice production by 2018, and turning a net exporter by 2020.

To create incentives for domestic production, the Central Bank of Nigeria (CBN) has restricted the allocation of dollars for the importation of a series of food items, and hiked import duties – from 10 to 60 percent in the case of rice. It has also restricted imports across land borders to crack down on smuggling.

When Africa's richest man, Aliko Dangote, announced earlier this year that he was making a \$1 billion investment in Nigeria's rice production, it seemed to vindicate the government's approach.

The Dangote Group plans to produce one million tonnes of parboiled milled rice over the next five years, equivalent to 16 percent of domestic demand.

Other big players have also jumped in, including the Lagos-based conglomerate TGI, which opened a rice mill

in August with a capacity of 120,000 tonnes, and Olam Nigeria, part of Singapore-based Olam International, which plans to boost its existing rice output.



Photo : Stevie Man/ILRI

A number of government initiatives are in place to promote small-scale agriculture. They include the CBN's \$300 million Anchor Borrowers' Programme, introduced in 2015 to provide cheap loans and input subsidies for hundreds of thousands of smallholder farmers.

The World Bank is also supporting the government's agricultural transformation strategy with a \$200 million loan to support small- to mid-scale rice production.

The government's grow-your-own push seems to be working. Cereal production has increased, despite the impact on farming of the Boko Haram insurgency in northeastern Nigeria, and rice yields are also up, helped along by higher rice prices.

Hard work with little help

But most Nigerian farmers still struggle, noted Mahmoud Daneji, managing director of the Kano State Agricultural and Rural Development Authority.

He is critical of the government's top-down approach. "You may have a very laudable programme, but in as much as there is no input from the potential beneficiaries, it will definitely fail," he told IRIN.

Daneji ticked off a list of problems farmers face that includes the lack of access to quality seeds, fertiliser, effective agricultural extension systems, and access to credit for those who need it.

Despite the raft of initiatives aimed at boosting output, farmers still typically work with their bare hands in fields lacking irrigation, live in areas with poor roads that limit their access to markets, and are facing a growing threat of climate change without advice on how to adapt.

In a survey last year, farmers cited the lack of fertiliser as their biggest problem by far, despite a long-running government input programme. Nearly three quarters of respondents said they were unaware of any government interventions aimed at helping them.

Abdulrashid Magaji, Kano State chair of the All Farmers Association of Nigeria, told IRIN that's because the bulk of government programmes rarely reach their intended target. They go instead to "political favourites and close associates of politicians," he alleged.

For example, the CBN launched the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending in 2013 to increase access to bank credit.

But this year only 3,700 farmers out of 523,000 in Kano are on track to receive the loans.

The vast majority are unaware of how to access the much-needed financing through NIRSAL, said Magaji.

Nigeria's disconnected farmers have to rely on middlemen, reducing their profits, because of a broken value chain, inadequate storage facilities, and a lack of organised market information systems.

"Here, our farmers are left on their own," said Jibrin Jibrin, director of the Centre for Dryland Agriculture at Kano's Bayero University. "Economists from the World Bank will tell you not to protect the market, but the system doesn't work for our farmers."

Dangote's rice and tomatoes

Dangote's rice initiative is taking on some of these issues. Its "outgrower scheme" plans to provide inputs such as seeds and fertiliser, as well as training for nearly 50,000 medium and smallholder farmers who then provide their land and labour.

The company says it will pay the farmers the average market price for their rice at harvest, after recouping the cost of the inputs it provided.

But the majority of the smallholders who spoke to IRIN in Kano were unconvinced by the scheme. They doubted they would really get a fair price, and that they could meet the company's quality control standards.

Some pointed to the failure of an earlier Dangote project, a \$13 million tomato paste factory set up in Kano last year, as reason to be concerned.

The plant is currently lying idle even though it signed deals with some 5,000 farmers to supply the tomatoes that would be turned into an annual production of over 400,000 tonnes of paste.

On paper it made perfect sense. Nigeria produces some 1.5 million tonnes of tomatoes each year, tomato paste is an ingredient in most Nigerian meals, and, with the government threatening to ban imported paste, a local factory seemed an investment winner.

But farmers were unable to produce the quality and quantity of tomatoes the state-of-the-art plant needed.

Firstly, a pest, the Tuta absoluta moth, wiped out much of the harvest. But then it was the same old underlying problems – a lack of fertiliser, poor irrigation, low quality seed, difficult roads and no cold storage – that really undermined progress.

The poverty of rural infrastructure means Nigeria's post-harvest losses could be as high as \$9 billion annually – much of that burden falling on small-scale producers.

Since the 1970s there have been a raft of high-profile government campaigns to fix agriculture.

Incrementally, Nigeria seems to be slotting the pieces into place, but getting to the final stage – a country able to feed itself – still eludes policy-makers.

"I pity myself, I pity farmers, I pity the association, because we have a lot of problems," said Magaji, Kano chair of the farmers' union. "Sincerely speaking, we have a long way to go."

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After drought, Zimbabwe contends with fall armyworm invasion

By Sally Nyakanyanga



Army worm can devastate maize crops. Photo: Sally Nyakanyanga

IT WAS FIRST DETECTED in Africa in 2016, yet the fall armyworm, a type of caterpillar whose name derives from its tendency to maraud in vast numbers, had by early the next year already infested hundreds of thousands of hectares of maize across more than a dozen countries on the continent, presenting a serious threat to food security.

Spodoptera frugiperda is a formidable foe. Pesticides only work when the larvae are very small and before they have begun to cause visible damage to the crop. After that, there are no quick fixes.

The pest can cause crop losses of more than 70 percent.

In Zimbabwe, El Niño-induced droughts left four million people needing food aid during the 2015/2016 agricultural season. This year, good rains had raised hopes of a decent harvest, but now the fall armyworm is dashing them for many farmers.

Vavariro Mashamba, 51, hoped to harvest 10 tonnes of maize from each of the 20 hectares he planted in his

farm in the Karoi district, in north-central Zimbabwe. But when he started to see ragged holes on the foliage of his crop and sawdust-like frass near the whorl and upper leaves of the plants, he knew he was in trouble. His best hope now is a yield of six or seven tonnes per hectare.

“At first I thought it was the African armyworm (*Spodoptera exempta*) that was damaging my crops. I bought Carbaryl pesticide and sprayed on the plants. There was no change. Instead, the worms continued to multiply in my field,” Mashamba told IRIN.

Experts from the Ministry of Agriculture visited his farm, but by then it was too late to eradicate the fall armyworm (The “fall” part of the name comes from the caterpillar’s feeding habits: In its native Americas, it does most damage in late summer and early autumn – or “fall” in US English.)

Mashamba experimented with different pesticides, but to no avail.

Widespread problem

According to the UN’s Food and Agriculture Organization, which held an emergency meeting on the pest in Harare in February, up to 130,000 hectares of maize and corn could already be infested by fall armyworm in Zimbabwe, 90,000 in Zambia, and 50,000 in Namibia. It was first detected in Africa in Nigeria in January 2016 and its presence has also been confirmed in Botswana, Congo, Ghana, Kenya, Malawi, South Africa, Swaziland, Togo, and Uganda.

Shingirayi Nyamutukwa, acting head of plant protection at the government’s Department of Research and Specialist Services, said all of Zimbabwe’s 10 provinces had reported being affected by the caterpillar but it was difficult to ascertain the extent of the damage to yields now as crops were at varying stages of growth.

“We started receiving reports that there was a pest causing damage on crops in October last year in Matabeleland North,” said Nyamutukwa, warning that most of the country’s 1.3 million hectares of land under maize cultivation was potentially at risk.

Zimbabwe Farmers Union Director Paul Zacariya said the country was ill-prepared for the arrival of fall armyworm.

“No information or warnings were given to notify farmers of the pest. As such, many farmers could not identify the pest and lacked the knowledge and requisite skills on how to contain the damages caused,” he told IRIN.

Food security threatened

Noting its stubborn resistance to available control methods, FAO Sub-regional Coordinator for Southern Africa David Phiri said he was worried “the pest could be here to stay”.

“The costs and implication of such a scenario are very serious indeed, as seen in places where the pest is endemic, like in Brazil where the government incurs control costs in excess of \$600 million per annum,” he warned. “The implications for livelihoods and food security are also too serious to contemplate, and assessments have to be done to ascertain the damage caused.”

At the emergency meeting, the FAO advocated a countrywide response as part of a regional programme of integrated management of fall armyworm.

“Already, we are working in collaboration with other partners. We are ready to assist countries with the necessary assessment activities aimed at improving understanding on the extent and intensity of the fall armyworm threat to the region,” said Phiri.

But he warned that it could take several years to develop effective methods to control the pest.



Researchers train agricultural extension workers about the pest. Photo: Sally Nyakanyanga/IRIN

“Planting quick-maturing crop varieties and early planting may lessen infestation and damage caused by the fall armyworms,” he said. “And no single method or product has been found to completely eradicate the fall armyworm.”

Additional measures proposed at the meeting included the deployment of other insects such as lacewing, ladybirds, minute pirate bugs, parasitic wasps, and flies – all of which feed on armyworm eggs.

Prompt action

Nyamutukwa said farmers should treat their crops before armyworm larvae burrow deep into the whorl or enter ears of more mature plants.

If applied early enough, insecticide applications by ground rig using at least 30 gallons per acre (340 litres per hectare) and high pressure are believed to give the best results.

“It is also advisable to apply pesticides early or late in the day, because fall armyworm larvae are most active at these times,” said Nyamutukwa, adding that ministry experts who directly advise farmers, known as extension workers, were now better placed to respond to the infestation.

“So far, 479 [extension] officers and task force teams have been trained in all 10 provinces in the country and procured chemicals, which were distributed for free in all provinces for the management of the fall armyworm,” he said.

In addition, the Zimbabwean government is preparing for the winter wheat season by putting in place community-based armyworm forecasting systems and intends to put plant clinics in rural communities.

"If farmers do not control the pest and it attacks the cobs and developing grain, then farmers lose by a percentage yet to be determined because crops are still in the field. Fall armyworm infestation impacts negatively on yield, [so] a reduction in yield is a threat to food security and nutrition," he explained.

Zacariya, the director of the farmers' union, noted how critical food security is to Zimbabwe's rural development and the need for assistance given the armyworm invasion.

“The fall armyworm has the effect of drastically reducing the yields of rural farmers,” he said. “As such, the gap created will need to be covered through local safety nets or government and food aid agencies will have to step in with food aid programmes to avert any shortages that may rise.”

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Part two: Adaptation strategies



A farmer planting drought-tolerant beans. Photo: Neil Palmer/CIAT

There's next-to-nothing farmers can do to halt the various manifestations of climate change, such as droughts, floods, rising sea levels, and less predictable rainy seasons. But there are many ways they, and their governments, can cushion the blows of such shocks. As the articles in the following section illustrate, these "adaptation" strategies range from small changes on the farm to major policy interventions at the national level.

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Seed banks help Zimbabwe's farmers tackle climate change

By Sally Nyakanyanga in Mudzi



A community seedbank in Zimbabwe. Photo: Sally Nyakanyanga/IRIN

“SEED SECURITY IS FOOD SECURITY” is something of a mantra in developing world agronomy circles. In Zimbabwe, the adage is gradually being put into action by promoting the use of indigenous small grains threatened with extinction by the dominance of maize, both in fields and on dinner tables.

This dominance has left indigenous small seeds such as millet, cowpeas and sorghum as bit players in Zimbabwe's agricultural sector, despite their greater resilience to weather shocks such as drought, which are occurring with increasing frequency and severity in Zimbabwe because of the effects of climate change.

Such small seeds also tend to require fewer of the expensive inputs required by commercial hybrid maize.

John Misi, the administrator of Mudzi District, in Mashonaland East Province, explained that getting farmers to use small grains “has been a challenge as maize is our staple food, and as such people are used to planting maize in this community.”

For example, most of the land farmed by Jameson Sithole, a smallholder in a marginal and dry area of Chipinge, in Manicaland Province, is planted with maize. He sows just two of his 17 hectares with indigenous small grains.

“Maize is a cash crop such that I am able to sell without challenges, helping me to send my 10 children to school and buy equipment for my farm,” he told IRIN. “With small grains it’s different. But I need to supplement my maize stocks when they run out and feed my family during drought.”

One hurdle standing in the way of greater use of indigenous seeds is their relative lack of availability. Whereas farmers tend to buy maize seeds from commercial suppliers, 95 percent of all other kinds of seed are obtained from their own crops or those of fellow farmers.

Community spirit

Seed banks can help to solve this problem.

Community seed banks tend to work along the same lines as money banks: farmers take out loans of seeds, which in many cases are donated by the local community, and then repay the loan in kind with interest after they harvest their crops.

Seed banks typically consist of small dark rooms protected from the heat of the sun and filled with shelves of pots and bottles containing a wide range of indigenous seeds, including, in the case of Zimbabwe, millet, cowpeas and local varieties of maize.

According to an April 2017 paper on the evolution and role of seed banks in several countries around the world published by Development in Practice, such facilities help “enhance the resilience of farmers, in particular of communities and households most affected by climate change.”

This is because they can “secure improved access to, and availability of, diverse, locally adapted crops and varieties, and enhance related indigenous knowledge and skills in plant management” – including seed selection and distribution.

Jameson Patricia Muchenje, a smallholder farmer in the district of Rushinga, in Mashonaland Central Province, is a case in point.

“In our community we are working towards keeping and protecting our small grains from disappearing through our community seed bank,” she told IRIN. “We have been working together, teaching each other on planting the right seeds and use the best farming techniques.”

She added that she and other farmers in her neighbourhood were soon hoping to sell seeds from the seed bank “to enable us to get some income, which we can use to upgrade our seed bank infrastructure or start our income-generating projects such as market gardening or poultry projects.”

Marjorie Jeke, a farmer in Murehwa District, in the neighbouring province of Mashonaland East said: “In the event that there are floods and our crops don’t do well in the field, the seed bank becomes useful as I will go back to the seed bank and retrieve my seeds for free to replant.

“I don’t have to struggle borrowing from neighbours, or to bother my children with money because the seed bank has made it easier for us to survive as farmers.”

Safety net

According to recent field research conducted by Oxfam in Zimbabwe, “access to the right seeds at the right time, and for the right price, is critical to being able to produce enough food to eat in the face of growing climate disruption.

“Farmer seed systems and community seed banks provide an important safety net for cash-strapped, vulnerable people,” the Oxfam report said. “Supporting them is an adaptation opportunity that is currently being missed.”

In September, the Community Technology Development Trust, an NGO based in Harare, opened a seed bank in Mudzi district. It was the fourth such facility it had set up, and several more are in the pipeline.

They are needed because “farmers are slowly losing their valuable indigenous crop seeds due to the vigorous promotion and growing of hybrid crop varieties, which concentrate on a small number of varieties designed for intensive farming,” CTDI Director Andrew Mushita said at the opening.

If Mushita has his way, seed banks, which he said cost around \$20,000 each to set up, would be established in all of Zimbabwe’s rural districts.

The value of seed banks is clear, but Zimbabwe’s agriculture sector – despite its importance to economic growth – suffers from under funding.

Without sustained external support, there’s a risk that seed banks fall into disuse after the initial start-up financing runs out, the Development in Practice paper noted.

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“Recovery lending” helps disaster-stricken African farmers get back on track

By Robert Kibet in Narok



This farmer lost his entire maize crop to drought in 2016. Photo: Robert Kibet/IRIN

ACCESSING CREDIT HAS LONG been a major hurdle for small-scale farmers in Africa, who produce some 70 percent of the continent’s food. Not only does this mean yields fall far below their full potential, but the ability of farmers to manage the increasingly frequent and severe weather shocks brought about by climate change is also greatly reduced.

However, help could be at hand. A new method of aid microfinancing, known as recovery lending, aims to give such farmers a much-needed short-term boost, especially in times of crisis.

Vision Fund International (VFI) is a project of the international NGO World Vision. It sourced a £2 million returnable grant from the UK’s Department for International Development to be loaned to 14,000 families in Kenya, Malawi, and Zambia after disasters so they can rebuild their lives and start generating income again.

Farmers need loans at the beginning of agricultural seasons to buy seeds, fertilisers, and other vital inputs. But as smallholders often lack title deeds or other forms of collateral, traditional banks don't view them as viable debtors, while the rules imposed by other kinds of lenders – the return of the principal sum in full, for example – don't always suit the seasonal economics of farming.

Charity Mati, VFI Kenya's business development and integration manager, explained that the lender tries to tailor its repayment terms to borrowers' needs, unlike other microfinance institutions that charge interest every month, leaving the entirety of the loaned sum due on maturity.

"Most of our clients are farmers," Mati told IRIN. "While recovering from the El Niño rains, they were met with a second shock: the drought. We sat down with them and developed workable repayment plans, listened to their voices, and arrived at a solution," she told IRIN.

A case study

In 2015, Alice Muthee, a smallholder farmer in Motonyi, a village nestled in Kenya's Narok County, took out a \$200 loan from a microfinance organisation and leased an acre of land with the aim of turning a good profit from growing tomatoes.

"With five mouths to feed, in addition to the pressure of educating my children, life had seemed overwhelming," recalled Muthee. "I had had to sell livestock to meet the rising demand for finances in my family."

Muthee believed her tomatoes would bear fruit and she would be able to repay the loan within three months.

But tomatoes are a notoriously fickle crop and certainly no match for the El Niño rains that wreaked havoc in late 2015, not only in parts of Kenya, but also in Somalia, Uganda, and Ethiopia.

"From the cost of leasing the land, labour, purchase of seedlings, and fertiliser, I ran a deficit," Muthee told IRIN. "My several attempts to have extra money for buying pesticides failed. When the 2015 rains persisted, I watched helplessly as my tomatoes disappeared."

Facing the daunting prospect of having to sell more livestock in order to repay her loan – the terms of which required full settlement of the principal sum in a single payment at the end of the agreed period – Muthee heard about a new kind of finance geared specifically for small-holder farmers, small businesses, and communities recovering from disaster shocks.

'Hand up', not 'hand out'

Recovery lending, described as a "hand up" rather than "hand out" approach, was pioneered by VFI in the aftermath of 2013's Typhoon Haiyan in the Philippines, with the disbursement of almost 5,000 loans with an average value of \$430 designed to help people restart their lost small businesses.

UNJUST BURDEN

According to Philip Ochola, CEO of Vision Fund Kenya, in the wake of major disasters, many microfinance institutions grow reluctant to continue extending loans because potential customers lack collateral and are seen as having little ability to make repayments.

“Credit is required most during post-disaster to help rebuild communities,” said Ochola. “Governments’ help to affected communities during disasters usually come in form of relief, which is not sustainable.



A farmer digs irrigation channels in his maize field. Photo: Robert Kibet/IRIN

“Preparing the communities for loans, helping them establish business and embrace agri-business is the sustainable assistance you can give to a vulnerable community.”

VFI distributes loans on the basis not of lenders’ available collateral but on an assessment of their likely ability to repay. It then provides business training to its customers.

Muthee took out a \$300 recovery loan from VFI, which she invested in growing vegetables and starting a business selling second-hand clothes. She has since been able to settle her previous loan and pay her

children's school fees.

Aid, with conditions

In all, VFI has loaned out some \$1.2 million in Kenya.

"DFID gave us the money not as a grant to dish out in the field, but a returnable one to be used wisely, lend it wisely, recover it, and pay back. Aid with conditions is good," said Ochola.

"Aid is aid and human beings are human beings. If I know that appearing as poor as possible will make me continue receiving charity from you, I will always want to appear that way. But if it comes with conditions, it will help me get on my feet, stabilise, and work."

Among the other beneficiaries is 38-year-old Chiwai Ole Taka, a father of six who lost seven cows and 10 sheep during a severe drought. He used his \$300 loan to buy weak sheep and goats, which, thanks to the training that came with the loan, he fattened up and sold for a profit.

"It is not the first time that I have lost livestock to drought. It has happened before. This drought threatened to drive our community to extreme poverty," said Chiwai, adding that he was now much better placed to meet his family's basic needs.

Recovery lending was the result of joint research by Stewart McCulloch, global insurance director of VFI, and Professor Jerry Skees of GlobalAgRisk. The thinking behind the initiative was published in a report titled: A New Model for Disaster Preparation and Response for Microfinance Institutions.

"Recovery loans are not suitable for the highly indebted or those without viable cash-generating livelihood options; but rather for the economically active poor, including (but not limited to) those not normally targeted for humanitarian aid," the report says. "The support to this group should have a disproportionate effect on the community's economic recovery."

While Alice Muthee could be a poster child for the success of recovery lending, others like Ole Peres have found themselves unable to keep up with VFI's terms amid multiple climate shocks.

Peres, whose maize was destroyed by rains, had trouble making the \$55 monthly repayments on a \$300 loan.

"I obtained a second loan of \$450 where I bought 10 sheep for fattening, but the drought killed five of them. With a monthly loan repayment of \$40 for a 12-month period, I sold the remaining animals I had bought and ventured into maize buying and selling at a profit, but have been faced with shortage," he said.

Peres is now in even greater debt and seeking a reduced interest rate on his loans.

UNJUST BURDEN

The UN's World Food Programme has flagged estimates that hunger and malnutrition could increase by up to 20 percent by 2050 if bold efforts to improve people's ability to prepare for, respond to, and recover from climate shocks aren't undertaken.

Recovery lending is not a panacea for all the problems African farmers face, but it is helping.

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Mind the gap: Why Zimbabwean researchers need to work with farmers

By Sally Nyakanyanga in Gwanda



Finger millet is one of the neglected minor millets that thrive in harsh conditions. Photo: Y. Wachira/Bioversity International

MAIZE SEED IN DROUGHT-PRONE regions of Zimbabwe should by now come with a government health warning: “Planting can seriously damage your well-being”.

That’s because although maize delivers like a champion under the right conditions, it’s highly vulnerable to water stress. If the rains come too late, or even too early, the crop is a write-off.

Tariro Moyo knows this from bitter experience. A communal farmer in Gwanda, in southern Zimbabwe, she has continued to plant maize despite her yields decreasing with each bad season.

“Last year, I watched all my maize crop wilting and dying due to drought,” she told IRIN. “I [had] used all my money to buy maize seed and fertiliser in anticipation of a good harvest.”

Gwanda is in Matabeleland, a region hit by successive poor harvests linked to one of the strongest El Niño events on record. Deep rural poverty and a lack of access to financing means farmers here are forced to rely on rain-fed production and cannot afford irrigation systems.

Climate change will mean still dryer conditions for Zimbabwe. Given that scenario, the challenge for the government and research bodies is how to develop and promote alternative crops that offer farmers some resilience.

Resistance to change

Drought-tolerant small grains such as finger millet, pearl, and sorghum were the traditional foods in Zimbabwe long before maize became the dominant crop across southern Africa more than a century ago.

But reviving them means overcoming significant challenges. The reason maize won out is because it is much higher yielding, requires less labour, and its outer husk provides good protection from birds and other pests.

A powerful agro-industry markets maize meal as the cornerstone of Zimbabwe’s food culture and family life. Millet and sorghum are available on supermarket shelves, but they represent much more of a niche market.

“Very few people buy small grains as compared to maize,” said Moyo, explaining the major production downside: “The amount of time spent and labour needed to prepare these small grains is too much for me. Besides my husband, I have no one to help with farming work as all my children are away.”

Kizito Mazvimavi, the executive director for the International Crop Research Institute for Semi-Arid Tropics, countered: “There is need for labour in any farming activity.”

But even though his organisation promotes small grains, he acknowledged that the technology for processing them “is limited and not readily available in many rural areas” – an additional problem that makes uptake harder still.

Moyo said she was not opposed to small grains if they made economic sense, especially given the lottery that maize production has become.

“If they improve my livelihood and, with the necessary tools and equipment, can be the best for me, I cannot continue to put money into waste,” she concluded.

Research to the rescue?

This is the gap that researchers and the government need to fill, argues Shepherd Siziba, chair of the Agricultural Economics and Extension Department at the University of Zimbabwe.

Not enough is being done to ensure the relevant research is being understood and acted upon by farmers in the field like Moyo, Siziba told IRIN.

“Theses are being done at universities and literature on climate change generated, but what is missing is the intensive interaction between policy, research, and farmers,” he added.

Noah Kutukwa of Oxfam Zimbabwe believes the government needs to play a more active role.

“Farmers continue to grow maize where it’s not working,” he said. “Though the adoption of small grains has improved, uptake has been slow.”

Even though small grains are seen as a critical component of adaptation to climate change, there is no effective support to champion production.

One simple example: The government continues to distribute maize seed as a drought recovery measure in arid regions instead of more appropriate small grains.

“There is a need for deliberate efforts through availing small grains seed, creation of markets for the crops, and providing appropriate technology to lessen the time spent and labour needed for the production of small grains,” said Kutukwa.

The explainers

The vital link in that chain between the research and production should be the government’s agriculture extension workers.

They are supposed to provide farmers with information on best practice, including climate change adaptation techniques. But in the face of Zimbabwe’s decade-long economic crisis, they have been starved of funding.

Ideally, there should be one extension worker for a maximum of 300 farmers, according to Donald Mbangani, an agribusiness specialist at the Agriculture and Extension Services Department. In reality, each officer has double that caseload – and no transport is provided.

There are also few training and refresher courses available to equip the officers with the skills they need, let alone the necessary equipment, from laptops to motorbikes.

If Zimbabwe seriously wants to build resilience to climate change, what is really needed is to “strengthen the research, extension [worker], and farmer linkage,” said Mbangani.

This, he said, would mean that as new crop varieties and farming technologies are developed, there is collaboration at the research trial stage “with the farmer and agriculture extension workers involved.”

The urgency of the reforms is underlined by the successive poor harvests Zimbabweans have endured. At the peak of the 2017 lean season, 4.1 million people were estimated to be food-insecure because of El Niño-induced drought.

Zimbabwe’s food relief programmes are already underfunded, and now there are threats by President Donald Trump's administration to cut US aid to Zimbabwe, including programmes designed to reduce the effects of climate change.

The country could be running out of time to get its crop strategy right.

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Climate-friendly farming solution fizzles in Zimbabwe

By Tawanda Majoni in Chitungwiza



One form of conservation of conservation agriculture. Photo: Peter Steward/Flickr

BEST INTENTIONS DON'T ALWAYS translate into best practice, as David Dzama found out to his cost.

At first, conservation agriculture seemed like the solution to the climate change-linked problems facing the smallholder farmer in Zimbabwe's Seke district, about 50 kilometres south of Harare.

Chief among these problems is food insecurity, which is now perennial in Zimbabwe, especially among rural smallholder farming communities.

This means farmers need strategic help adapting to climate change and to build their resilience.

But is conservation agriculture the way to go?

Its champions do not always see eye-to-eye with supposed beneficiaries, and claims that it has been a clear success don't appear to be backed up by the evidence.

"When donors introduced conservation agriculture to us, our hopes were raised," Dzama, 60, told IRIN. "They said it would give us good yields, and hunger would be a thing of the past."

Conservation agriculture (CA) is a way of farming that aims to avoid disrupting the structure, composition, and natural biodiversity of soil.

While CA can be applied to a wide range of crop types, it always shares three characteristics: keeping soil covered with residues from previous crops or specially-grown cover plant material; keeping tillage to an absolute minimum; and rotating crops regularly.

To avoid tilling, CA farmers are encouraged to dig shallow basins in the dry season, cover them with mulch, then sow at the onset of the first rains. This increases the chances of crops surviving dry spells and foreshortened rainy seasons because it reduces runoff and evaporation.

Proponents of CA argue that it is a climate-smart practice that promotes food security by increasing yields, especially on farmland that is not irrigated.

Need for solutions

Some 70 percent of Zimbabwe's rural population depend on agriculture for their livelihoods. According to the country's Climate Change Response Strategy, these livelihoods are threatened by ever more frequent and longer dry spells during the rainy season.

"The majority of rural Zimbabweans live in semi-arid zones and will suffer disproportionately from the emerging impacts of climate change and variability, including disasters associated with extreme weather events such as droughts, periodic flooding, disease outbreaks for both humans and livestock, and loss of crop lands," says the strategy document.

When it was introduced in Dzama's Seke community in 2009, almost every farmer took up CA, laboriously digging basins in the pre-farming season, covering them with plant residue, and planting when the first rains began to fall.

The international agencies that introduced CA also supplied free fertiliser and seeds as incentives to farmers to take up the more labour-intensive agricultural work required.

But while yields have generally been bigger on those portions of land given over to CA methods – generally between a third and a half of an acre – for many the boost is not enough to make much difference to their margins or indeed to overall food security.

Although some are doing well and have never looked back, two years later, Dzama and his neighbours, like a lot of other farmers in other parts of the country, have grown disillusioned and abandoned CA practices altogether.

‘Dig and die’

“We call it ‘dhiga ufe’ [a Shona phrase meaning ‘dig and die’] instead of ‘dhiga udye’ [‘dig for good yields’] as the donors referred to it. There is so much labour involved, yet the results have never been good. It’s not worth it,” Dzama told IRIN, explaining that CA involved the additional chore of weeding crops – in the absence, thanks to mass urban migration, of sufficient manpower to do so.



David Dzama has abandoned CA, and now uses his crop residue as animal fodder. Photo: Tawanda Majoni/IRIN

The UN Food and Agriculture Organisation (FAO), which plays the secretarial role in the Zimbabwe Conservation Agriculture Network (ZIMCAN) that also involves the government, concedes there was a significant drop-off rate but maintains that was just an early chapter in a CA story that will continue to evolve.

“In the mid-2000s a lot of input and extension support for CA saw many smallholder farmers coming on board – the majority being vulnerable farmers targeted for the use of humanitarian funds,” David Phiri, FAO’s head in Zimbabwe, told IRIN.

“A significant amount of these farmers dis-adopted from 2012, in particular when most of the input support was withdrawn,” he added.

“However, beyond 2012 to date, we have seen a gradual increase in the number of farmers implementing CA without any input support, therefore being solid adopters and practitioners,” said Phiri. “The observation of

better performance in CA systems has convinced many farmers, and more and more farmers are recently appreciating the benefits.”

The FAO says some 300,000 smallholder farmers have now taken part in the CA initiative in Zimbabwe.

The devil's in the data

While Phiri said most had “experienced yield gains”, hard evidence for this is scarce, according to a 2015 study conducted in the Chipinge district of Zimbabwe’s Manicaland Province.

“Most evaluations are largely self-assessments conducted by implementing organisations and their close partners, hence raising more questions on the authenticity or sincerity of the presented outcomes,” said the study, based on a detailed survey and observation of 200 farmers, and published by the Zimbabwe Journal of Science and Technology.

The survey found that most farmers adopted CA “not for the good of it in fighting food insecurity but to benefit from free agricultural inputs and free food during trainings and meetings.”

The report found that food security didn’t improve among farmers who adopted CA (and in some areas actually worsened), but it did note that this was not so much a result of the shortcomings of CA as a concept but because of poor implementation.

Had there been more consultation with farmers, a rollout more tailored to local conditions, and a greater supply of hoes and picks, the results might have been more promising.

The evidence in Zimbabwe to date shows that “conservation agriculture is oversubscribed as a panacea to food security,” it concluded.

Lack of resources

Indeed, some of those involved in rolling out CA are also disappointed. The government, which is a partner in the project, employs teams of agricultural extension workers to advise farmers about how to make the most of their plots.

“We don’t have the resources to meaningfully implement CA here,” said one such worker deployed in Mhondoro, a district some 80 kilometres south of the capital where hundreds of people were allotted smallholdings under a fast-track land reform programme in the early 2000s.



Magaya's yields aren't what they used to be. Photo: Tawanda Majoni/IRIN

“The government gave us very small amounts of seed to distribute to the farmers and there is no fertiliser,” said the worker. “[We need] a bigger team to properly demonstrate and educate people on how CA works, and to monitor what the farmers are doing.”

The extension worker, who asked that his name not be published, was one of just three sent to promote CA in the district before the main 2016/7 farming season.

The farmers are indifferent too, he added. They lack adequate awareness of the benefits of CA and view it as a poor man's way of farming as it ends up requiring hoes and manual labour rather than tillage using animals or mechanised power.

FAO admitted that “availability and access to CA machinery remains a challenge.”

More on the way?

Joseph Made, the minister responsible for agriculture and farming mechanisation, told IRIN the government was mobilising resources to ensure the success of CA.

“We are taking conservation agriculture seriously and are doing our best in the present circumstances to ensure that smallholder farmers, who produce most of our cereals, are supported to beat the adversities of climate change,” he said.

“We are encouraging farmers to adopt conservation agriculture and working on ways to ensure that the financial sector funds them as part of our broader policy of boosting farming, which forms the backbone of our economy.”

Made would not say how much money had been allocated to CA, but Zimbabwe is currently facing an economic crisis marked by a cash crunch and an inability to fund key projects.

To overcome the burden of intensive labour, efforts were being made to promote mechanised CA by using animal- and tractor-drawn equipment, in addition to training in the better use of manual tools, said FAO’s Phiri.

Farmers in areas like Mhondoro and Seke, however, are yet to enjoy the benefits of mechanisation.

Dzama’s neighbour, Tilda Magaya, a 34-year-old single mother, is one of the few in her community still toiling away with a hoe to dig basins.

“I have no cattle to plough with since all the livestock my family had was taken away by late husband’s relatives when he died three years ago,” Magaya told IRIN. “My two boys help me dig the basins, but it is difficult to prepare enough land and my harvests have always been poor.”

For the last two years, every September, she and her children have dug the basins in about an acre of hard, dry soil and then gathered what wild grass they could find in the overgrazed area to use as mulch.

Since Magaya’s field is not fenced, roaming livestock trample on the basins and termites eat up the mulch, forcing her to start again when the rains start falling. But by that time material for mulch is hard, if not impossible, to come by.

So poor was her maize yield after the last season that Magaya has resolved to work in her neighbour’s field next year, bartering her own labour for the use of animals to start tilling her own plot again.

Wonder Chabikwa, the president of Zimbabwe Commercial Farmers Union (ZCFU), told IRIN it is now time to think again: “There is [a] need to reconsider the whole CA strategy for it to work because, as it stands, it has not achieved much.”

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The little shrub making a big difference in rural Senegal

By Cissokho Lassana in Kaymour



A woman in the commune of Kaymor shows leaves of the leydour plant. Cissokho Lassana/IRIN

IN INDIA, ITS DRIED LEAVES are used as a hair conditioner; in east Africa it's fed to livestock; Mauritians smoke its seeds; and in rural Senegal, where it goes by the name of leydour, its medicinal uses are helping many make up for the agricultural losses brought about by climate change.

Senna (or Cassia) italica is a deciduous perennial herb that can be harvested year-round – one of the reasons its cultivation is catching on in parts of Senegal.

Farmers in Nioro du Rip, a department in the central Kaolack region, have traditionally grown groundnuts, millet, and maize, but recent years have seen revenue from these crops fall.

More than 300 women in three villages in the commune of Kaymor are compensating by growing the shrub on a large scale.

Bocar Dioum, the former head of the commune's health department, now runs agricultural training activities in the Kaymor area.

"Leydour, which plays a part in social mobility, has radically changed the economic and health conditions of women in Kaymor," he told IRIN.

“Faced with the drop in agricultural revenue due to climate change, and the high number of consultations at the health centre, we have found an answer in the revival of medicinal plants, specifically, leydour.”

Many uses

In Senegalese traditional medicine, the leaves, pods, and mature seeds of leydour are used to cure stomach complaints, fever, jaundice, venereal diseases, and biliousness. The plant is also prescribed as a cure for intestinal worms, while its leaves are used as a dressing for skin problems such as burns and ulcers.

“A hectare of leydour brings in much more money than two hectares of millet or groundnuts, with much less financial investment or physical effort,” explained Cheikh Ndiaye, a local village chief.

“Leydour leaves can be harvested every two months, whereas millet and groundnuts are seasonal,” he said. “A kilo of leydour sells for much more (1,500 CFA francs/\$2.6) than all the other crops here.”

Fatou Deme heads an association of 115 women growers in Keur Samba Die and two other villages in the Kaymor commune.

“The consumption of this plant has noticeably improved the health of the villagers,” she explained. “We go ever less frequently to the health centre in Kaymor. The other advantage is that we sell it, and the revenue helps us meet certain needs.”

Impact of climate change

Agriculture, which forms the backbone of the rural economy in Senegal, has been severely affected by climate change and the situation is only expected to get worse.

According to Ibrahima Hathie, research director at the Initiative Prospective Agricole et Rurale, a Dakar-based institute that conducts research and training in agriculture, temperatures in central Senegal are set to rise by between 1.5 and 1.75 degrees by 2050, while rainfall will decline by 20 to 30 percent.

“Inhabitants of the Sahel region feel the effects of climate change on a daily basis. They impact food security and access to water, and degrade ecosystems,” said Souleymane Diallo, chief of staff in the Ministry of Environment and Sustainable Development. “So it’s important to take steps that limit the effect of climate change on agriculture and its consequences for food and nutritional security.”

Eying new markets

Deme told IRIN that the Keur Samba Die collective, which has 25 members, had brought in 215,000 CFA francs (\$370) this year through leydour cultivation.

“Some of this is saved in a bank account and we share out the rest among members,” she explained. “It really does provide financial help and we have an interest in keeping up the cultivation of leydour in our village,” she said, adding that she hoped to find new markets with the help of government bodies and the private sector.

Deme’s marketing ideas include better labelling to indicate the plant’s geographical origin as well as its various benefits.

The potential market extends well beyond Senegal: In many parts of the world, the crushed, dried leaves of the leydour plant are sold, including on major online trading platforms, as a hair-conditioning product called “natural henna”.

And the production process doesn’t take long: Two months after planting a leydour seed, one can begin harvesting its leaves, dry them, and sell them.

Going organic

“We don’t use any fertiliser or chemical pesticides. Everything is organic,” said Deme, adding that oil from the neem tree is used to stop parasites attacking the shrubs.

Growing leydour benefits the whole village, added another member of the association, Aissatou Toure. “We use it as a medicine and treat our animals with it. Now, other villages are following in our footsteps.”

Ndeye Ndiaye Toure, who heads a growers’ association of 70 women in the village of Passy Kaymor, said cultivating the shrub had turned their lives around.

“Of course we grew vegetables,” she said. “But we needed money to buy seeds and other inputs. But leydour requires no real financial investment. We use it as medicine and make more money. We grow it together with totally organic market garden produce. It’s a real plus for us women.”

The dried and powdered leaves of the leydour plant are sold to herbalists for 1,500 CFA francs per kilo, of which the collective lodges 375 francs in a common kitty.

“We manage to save 500,000 CFA francs after each harvest that we use to support the needs of our members, for religious festivals for example, or when someone has an occasional need for money,” said Toure. “What’s more, we’re able to buy groundnut seeds for our husbands who reimburse us after their harvests.”

Impressive yields

The men of Passy Kaymor were initially sceptical of the leydour project, recalled Kany Toure, who said that it didn’t take long for the village’s women to show they could harvest the plant’s leaves in significant quantities, even if the very first harvests only amounted to about 10 kilos.

Yields began to take off after communal land in the village was divided into individual plots for each member of the cooperative.

Kany Toure pointed to an added benefit: “Leydour put an end to the cutting of trees, which we used to sell to feed ourselves. Nowadays, we are standing on our own two feet.”

She added that the annual production of dried leydour leaves could soon reach a record quantity of around 500 kilos in Passy Kaymor alone.

The success of leydour in the area has spread to other parts of the department, and even beyond the Kaolack region, as its pioneers have lent their know-how to other parts of Senegal.

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Bumper Zimbabwe harvest prompts bigger bet on “command agriculture”

By Tawanda Majoni in Harare



ZIMBABWE IS EXPECTED TO HARVEST 2.1 million metric tonnes of maize this year after good rains followed successive El Niño-induced droughts. For the first time in many seasons the country will be able to feed itself and not require commercial imports or food aid. But is this the result of good fortune or good policy?

The Zimbabwean government is convinced it has found the secret to food security after the biggest maize harvest since a controversial land reform programme was launched nearly two decades ago. It's ignoring the critics who say success was mostly due to the better weather and who worry about the scheme's gaps and longer-term returns.

New President Emmerson Mnangagwa is doubling down on “command agriculture”, a major private sector-backed subsidy programme in which farmers are provided with seeds, fertiliser, fuel, and chemicals – on loan, with repayment made with a portion of the harvest the following season.

Some 50,000 small-scale and commercial farmers working 160,000 hectares of maize in “high potential” areas benefited from the programme and are expected to sell a hefty five tonnes per hectare back to the state-run Grain Marketing Board as part repayment on their loans.

Happy farmers

Simpson Mukari from rural Goromonzi, 50 kilometres southeast of the capital, Harare, said he harvested an average of seven tonnes per hectare after being provided with fuel and tillage services.

“I cultivated 20 hectares under command agriculture and what I harvested exceeded my expectations,” he told IRIN. “I have repaid the loan in full, set aside enough maize to last a year for my [six-member] family, and might not need another loan since I made a good profit.”

After repaying the loan, he was left with a net harvest of 40 tonnes of maize worth more than \$15,000.

Command agriculture is being repeated with even more ambitious targets this year – and extended to include wheat, soya, and livestock.

Maize production will cover 220,000 hectares – 60,000 hectares irrigated and the rest rain-fed – at an anticipated cost of \$213 million. A fuel supply company, Sakunda Holdings, among other private firms, is financing the programme on behalf of the government, although details are vague.

Command agriculture was “designed to solve a fundamental problem facing our country in the aftermath of the land reform, that of mobilising sustainable and affordable funding for our agriculture,” Finance Minister Patrick Chinamasa wrote earlier this year. “The 2016-17 harvest sets the stage for achieving this goal.”

A difficult road to food security

Zimbabwe has tried a number of schemes to kick-start agriculture since the disruption of land reform in 2000, in which white-owned commercial farms were seized without compensation and redistributed to landless Zimbabweans.

The economy was hit by a lack of foreign investment as a result, with successive droughts also undermining production. In response, in 2005/6 the army ran Operation Taguta/Sisuthi, which forced farmers to surrender their maize surplus, but this was deemed a failure.



Newly installed President Emmerson Mnangagwa is doubling down on "command agriculture". Photo: IRIN

In 2007, the Reserve Bank introduced a Farm Mechanisation Scheme, but the equipment seemed to go mainly to the well-connected, was widely viewed as corrupt, and again failed.

Mnangagwa, as vice president last year, championed the command agriculture contract farming system. In his inauguration speech as head of state last month, he prioritised food security as a government goal.

Underlining the determination, he appointed Perence Shiri minister of agriculture. A former air force commander, Shiri, like Mnangagwa, won notoriety for his role in a government crackdown on dissidents in the 1980s that killed more than 20,000 civilians in Matabeleland.

At the core of Mnangagwa's command approach is the centralised planning and development model borrowed from the Chinese – an old ideological partner of the ruling ZANU-PF party. The army and their logistical support plays a key role in the scheme alongside regular ministry of agriculture extension officers.

The cost of success

But the government is ignoring the economics behind the programme, critics say. It announced last year it would pay farmers \$390 a tonne for maize this harvest – well above the world price, and reportedly roughly a third more than millers had offered the government.

According to Reuters, that price difference is worth \$118 million, adding to a deficit for this year forecast at \$400 million and an already heavy debt burden.

Institute of Development Studies research fellow Ian Scoones argues that agricultural subsidies are nothing new – domestically it was what was used to develop white commercial farming by the colonial government in the 1930s and 1940s.

He suggested that the current government could be looking to provide a shot in the arm to the struggling class of black commercial farmers who, although well-connected to ZANU-PF, have not performed as successfully as small-scale farmers as a result of land reform.

“The big question is of course, ‘how sustainable is this approach for the longer term – economically and politically?’” Scoones noted. “A bad rainfall year, or even a middling one, may unravel things quickly, loading more onto an already crippling national debt.”

John Robertson, a Harare-based economic consultant, believes command agriculture is a “big fallacy” – especially as climate change threatens the viability of rain-fed maize production.

“This is particularly important to note because most of the irrigation infrastructure across the country is in very bad shape,” he told IRIN.

Out of the 50,000 farmers who benefited under the maize scheme, more than 10,000 have reportedly not delivered to the GMB as required – largely because of the marketing board’s reputation for long delays in payment.

The difficult calculation made by farmers at harvest time is whether to sell to the GMB or to informal dealers who can pay on the spot but offer much less – an option that also avoids the additional cost of transporting your maize to the GMB’s silos.

The gaps

According to one news report, as of 31 July the GMB had received just 230,000 tonnes of grain – out of the 2.1 million tonnes forecast to have been harvested. That poor result led to the deployment of the army to persuade farmers to release their harvest.

Without clear figures it is difficult to gauge the success of command agriculture. A report last month by the parliamentary lands and agriculture committee that had toured the country generally hailed the programme, but also pointed to significant gaps in implementation.

It found some of the free inputs were inevitably sold on the black market – the bane of other government subsidy programmes. Many farmers did not receive the full package on time and, in some cases, had to travel long distances to reach a GMB centre, where they were frustrated by the bureaucracy.

The committee also acknowledged that some farmers opted out of the scheme “because of fear of the word ‘command’. The perception was that this is a military programme and if one does not live up to the expectations, the consequences will be meted out in military style.”

On the back of the good harvest, Zimbabwe is expecting economic growth of 2.5 to 3 percent in 2017, according to the International Monetary Fund. The IMF also points out that the success of the contract farming system is about sustainability.

The government is aware of the budgetary implications but views targeted support as “warranted” to achieve food self-sufficiency, the IMF said in a statement.

It notes that the government is taking a bet that private sector participation in command agriculture will grow, allowing its role in turn to diminish. For critics, this is wishful thinking.

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Seeds of rural renewal sown in Senegal

By Cissokho Lassana in Djimini



The village of Djimini is enjoying a new lease of life. Photo: Cissokho Lassana/IRIN

FOR SEVERAL DECADES, the prospect of a better life has prompted countless inhabitants of rural parts of Africa to head to cities. In Senegal's Fuladu region, a local initiative aimed at making agriculture more viable aims to reverse that trend. It revolves around seeds.

A veteran of the Senegalese peasant movement now in his seventies, Lamine Biaye founded and chairs the Association Sénégalaise des Producteurs de Semences Paysannes, which uses local knowledge and trading systems to boost biodiversity through the promotion of seed production.

Having set up projects among women's groups in different parts of Senegal, Biaye is currently focused on Fuladu, a region in Upper Casamance. Five years ago, he moved to the Fuladu village of Djimini, where he started an educational farm that specialises on seed production and market garden techniques.

Some 350 women from a dozen villages in the area now benefit from the farm's training programmes.

“The challenge is primarily economic,” he told IRIN. “Lots of money is involved [in agricultural seeds]. We know that the multinationals don’t make things easy.”

Noting that commercial onion seeds cost between 40,000 and 50,000 CFA francs (\$70 to \$80) per kilo, Biaye railed against a system that prices farmers out of the market for the seeds they need to survive – a fact that demonstrates why the work of grassroots movements like his ASPSP association is so vital.

“Producing our own seeds is essential for ensuring our food self-sufficiency,” he said, explaining that the seeds he works with are “well adapted to our soil and climate”.

“You know one has to take climate change into account,” he added.

The Galmi violet onion is a case in point. “Whatever the variations in the weather, it’s a variety that thrives and reaches maturity. Its yield potential is good, even when there is less water,” said Biaye, explaining that “so-called improved or hybrid” types of onion are much more demanding, requiring expensive inputs such as fertiliser and pesticide to deliver decent yields.

Fatou Diallo, who leads women farmers in Djimini, spoke highly of ASPSP’s work.

“This training came at the right time. We would never have thought that one day we would be able to produce our own seeds ourselves,” she said. “We’ve taken big step forwards. ASPSP removed a major thorn from our feet, because buying seeds took up a lot of our costs. Now we are better equipped to produce more onions and sell them to our neighbours who have not yet mastered the technique of producing onion seeds, which are very expensive here.”

Twice a year, Djimini now plays host to a seed fair, which draws visitors from across Senegal and even neighbouring countries.

At these events, participants trade not only seeds but also practical tips about best farming techniques. They also serve as an opportunity to sell the produce from the market gardens and to forge ties between local associations.

Turning the tide

In the 1960s, 70 percent of Senegal’s population lived in rural areas. By the early 1990s that proportion had dropped to 57 percent. It has stayed at a similar level ever since.

As in many African states, rural-urban migration in Senegal is driven largely by the poor performance of the agricultural sector, which has shown meagre growth, especially compared to the country’s booming population.

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Climate change (lower and less predictable rainfall), falling crop prices, and a resultant lack of financing for equipment and seeds all played important roles in making farming less attractive than life in the cities, despite the economic uncertainties there

Biaye's farm also produces rice seeds – rice is a staple in Senegal – which it provides to farmers in the area. Once these farmers harvest their rice crops, they return the quantity of seeds they were given to the seed bank, plus an additional 25 percent that is held for that farmer for future planting. This means that every two years, participating rice farmers have enough seeds of their own to be self-sufficient.



Seeds of success: the Violet de Galmi is a hardy variety of onion. Photo: Cissokho Lassana

Many rural Senegalese also traditionally migrated to The Gambia, which their country surrounds, in search of employment. But Djimini and nearby villages are witnessing an influx from both The Gambia and Senegalese cities.

People with roots in the area have started heading back in larger numbers, often with the idea of buying plots of land so as to try their hand at agriculture.

“I decided to come home and rely on the land. From what I’ve heard, now it’s possible to do business here. It’s better than taking pointless risks abroad,” said Abdoulaye Fofana, who came back home from Dakar, where he used to sell onions and salt.

Issa Mballo, 23, travelled far to seek work – The Gambia then Guinea-Bissau, as well as several other areas of Senegal – before returning to his roots in Djimini in 2013.

At the end of the last agricultural season, as well as the sorrel, gumbo, and onions grown in his family’s small market garden, he harvested 35 50-kilogram sacks of groundnuts. “It’s going well. I think I can make it here,” he told IRIN. “The soil is very fertile, which makes it suitable for several crops without having to resort to industrial fertiliser and industrial pesticides.”

The chief of Djimini village, Oumar Sylla, said the recent training of local women in organic farming techniques had brought significant benefits.

“Before, our wives went to the market in [the nearby town of] Velingara to buy various foods. Those days are over, and the credit goes to our guests,” he said.

He added that the proof that his village is on the up and up lies in the growing number of requests for land over recent years – requests that can’t all be satisfied.

Sylla’s wife was so won over by Diaye that she gave him a parcel of land big enough for his home and his educational farm.

Digging deep

Challenges, however, remain. And the effects of climate change make things worse, as do human reactions to them.

Djimini comes from the Mandingo word for “where one digs water”. Older residents of the village speak of a time when residents of nearby Velingara used to come here because the water was so plentiful and sweet.

But the water table here is much lower than it used to be. One has to dig to a depth of around 50 metres before a well starts to fill up.

As drought grew more common, from the 1970s onward, so cultivating crops became more difficult.

In an effort to make ends meet, many farmers turned to illegal tree-cutting, either to produce wood for carpentry or to make charcoal, an activity that often led to bush fires, further reducing forest cover and decimating local fauna that played a key role in the local ecosystem.

Attitudes are changing, and village committees work to protect the forest. At Biaye's instigation, "we tell our husbands about the harmful effects of deforestation," said the head of one women's group. "And I think this is bearing fruit."

Success breeds success.

Motorised pumps are now used to irrigate the proliferation of market gardens in and around Djimini, which now yield more than their growers can eat. The surplus is sold in Velingara, where people can now rave about the food from Djimini as well as the water.

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How women farmers are battling climate change in Zimbabwe

By Tonderayi Mukeredzi in Rusape



Chengetai Zonke in her maize field. Photo: Tonderayi Mukeredzi/IRIN

CHENGETAI ZONKE LOST MUCH of her maize crop to drought last year. When it came to planting again, she decided to reduce her stake in what has become a recurrent climate change gamble.

At her homestead in Chiware, in Zimbabwe's northeastern Manicaland Province, the 52-year-old farmer explained why. "I've abandoned tilling the bigger fields to avoid the risk of putting more land under crops that may fail due to lack of rain or too much rain," she told IRIN. "Replanting costs money, which is scarce."

Allowing for the unpredictability of climate change turned out to be a shrewd move. After years of drought, Cyclone Dineo struck mid-February. Almost the entire country is now affected by floods, which have washed

away bridges and roads and marooned some communities in the south entirely.

Almost 250 people have been killed in what President Robert Mugabe has declared a “national disaster”. Nearly 2,000 more have been left homeless, while many others remain vulnerable to dams bursting or overflowing upstream.

Several weeks of heavy rain have also taken their toll on agriculture – already struggling due to a critical shortage of fertiliser and a persistent outbreak of fall armyworm.

“Some farmers face hunger because they planted late. Their crops are waterlogged, and have been leached,” said Zonke, whose own maize was affected.

Before the cyclone struck, the Zimbabwe Food Security Cluster (UN agencies, NGOs, government and donor representatives) was estimating that 43 percent of the rural population, some 4.1 million people, would be food insecure at the peak of the lean season, between January and March.

Women’s work

Zonke has four children, who have all finished school, and lives with four grandchildren. As is the norm in Zimbabwe, although she has a husband, it is she who does most of the work on the family farm.

Women – like Zonke – bear the greatest burden of these erratic changes in weather patterns, as they are the mainstay of agricultural production, Leonard Unganai, a project manager with Oxfam, told IRIN.

“Most of the crops they grow, like maize, are badly affected by the occurrence of dry spells and heavy rains,” he said. “In the end, it is women who get affected most, compromising their ability to produce for the household and the markets.”

Nanganidzai Makoho, a programme officer with Women and Land in Zimbabwe (WILZ), a local NGO, said that if farmers – who tend to be women – plant incorrectly, they might lose a whole season’s harvest. This can also lead to domestic violence, because men, who typically buy the seeds, will have expected a good return on their investment.

Delmah Ndlovu, who raises livestock in Bubi, a district in Matabeleland North Province, said the recent droughts meant women had to travel long distances to find water, giving them less time to work in their fields, reducing yields.

“We’ve witnessed unprecedented loss of pastures,” she said. “Grass is dying. Even grass to thatch our houses, which we found freely in the past, is now getting scarce.”

Changing rainfall patterns have led many farmers to innovate.

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“We’ve learnt to dig filtration pits to preserve water,” said Matilda Khupe, a farmer in Bulilima. “We dig the pits so that when rains come they fill the pits first, as well [as] putting gutters on the house. We use the water we collect and [the] water we use in our daily business to water trees and gardens.”

Zonke has also had to learn to adapt. “We have adopted [the] cultivation of small-grain seeds on a much bigger scale than before, and new varieties of crops that are easier to grow but pay more,” she said.



Recent rains have caused considerable damage to infrastructure. Photo: Oxfam

“Like this year, I’ve used retained maize seed I got from Zambia. It’s very robust, and doesn’t need chemicals to preserve it. If local seed companies could make such seed, farmers would be very grateful.”

Responsibility, but no control

State support for small-scale farmers in Zimbabwe hasn’t kept pace with the growing needs of recent years, especially with regard to water.

“There has largely been poor government investment into agriculture,” said Oxfam programme officer Maggie Makanza. “Subsidy programmes have spent [lots of] money on [seed] inputs and nothing on preserving so much rain, as we have had this year.

“All of the rain is flowing into the ocean. We have not built any additional dams to harvest water, even small weirs in the local communities.”

Despite reforms to land tenure, and the fact that women make up 70 percent of the rural population and account for the same proportion of agricultural labour, it is extremely rare for women to own or control land, or the assets needed to mobilise seed, fertiliser and credit.

“Most women do not have authority over the land. Hence, they can’t make a decision on what to grow, where and when,” explained Sharon Chipunza, another programme coordinator at WILZ. “The husbands decide, and most of the time they advocate for cash crops at the expense of food crops.”

This is despite the fact, according to the UN’s Food and Agricultural Organization, that when women have equal access, ownership and control over land and other productive resources, their crop yields increase by 20 to 30 percent.

Chipunza said the lack of jobs, coupled with recurrent droughts, has forced many men to migrate to towns or abroad in search of work. Women are often left with the sole responsibility of looking after families.

Many women farmers are unable to cope, admitted Zonke. But it’s not just the women. Zonke said a growing number of children, especially in households where male adults are absent, were dropping out of school to help their mothers work the fields or to look for paid work.

“Climate change is really troubling us,” she said. “But we have nowhere to run to.”

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Kenya's bottom-up approach to adaptation

By Anthony Langat in Kibwzi



Members of a women's cooperative drying mangoes: Photo: Anthony Langat/IRIN

IT WAS A MODEST INTERVENTION — a drop in the ocean of global climate finance — yet it has made the difference between profit and loss for a group of businesswomen in southeast Kenya's Makueni County.

Ever since their cooperative, Huruma Asili, began receiving daily weather updates via mobile phone a year ago, fewer of their sliced mangoes turn an unsellable shade of black when laid out to dry.

The service sprang not from a one-size-fits-all template drawn up by a government ministry or a far-flung aid agency, but from the women's own considered response to a simple question posed by their peers to the whole neighbourhood: "What do you need to lessen the harm of climate change?"

It's a bottom-up approach that underpins fledgling local adaptation initiatives in Kenya, one of the largest recipients of climate finance in sub-Saharan Africa. It also paves the way for the country's 47 counties to gain

access to major sources of money, such as the UN's Green Climate Fund and the Adaptation Fund, which was set up under the Kyoto Protocol of the UN Framework Convention on Climate Change.

Climate change has made the weather not only more dramatic but less predictable, so what the women of Huruma Asili needed to make ends meet was the certainty of a full day's sunshine.

Decisive data

A few overcast hours are enough to lower the temperature and raise the humidity in their plastic-covered drying sheds to the point where ruinous putrefaction overtakes value-adding desiccation.

Properly cured, the bright yellow mangoes are sold for the equivalent of \$50 per kilo to a Japanese exporter based in Nairobi. If discoloured, the fruit is worthless and has to be discarded.

"When the ward committee asked us what we wanted, we told them: Accurate information on the weather so that we know when to dry our mangoes," said Rehema Madaga, whose association, set up in Makueni County in 2006, also sells dried pumpkins, a variety of vegetables and chickpeas.

Every afternoon now, the Kenya Meteorological Department sends the women a very localised weather forecast in a text message to their mobile phones.

"This has helped us stop losses due to blackening of the mangoes when we dried them and then the weather turned cloudy or rainy," explained Madaga.

Community control

In several counties cross Kenya, neighbourhood climate change planning committees made up of residents of county subdivisions, or wards, are working on the front lines of adaptation to climate change, from initial project conception, through execution, to evaluation and financial oversight.

In Nguu Masumba ward, also in Makueni County, residents told their local committee they needed dams to be built. After the proposals were approved at the county level, two such projects were completed within a few months, just before the start of the rainy season, at a cost of just under \$70,000.

Now, even in the dry season, the river sand that has built up behind the dams retains sufficient moisture for the residents' animals and to water crops such as maize, beans and peas. Previously, when rains failed, farmers and herders had to travel far to fetch water.

The ward committee's work did not end with the shortlisting and subsequent approval of specific projects, according to James Mbatha, 49, the elected secretary of the committee in Nguu Masimba.

After overseeing the tendering process to ensure it was above board, “we were also involved in choosing the community members who were to supervise the construction of the dams,” he said. “This ensured that materials were not misappropriated by the contractors or their employees.”

Unlocking finance

Makueni is one of five counties in Kenya’s arid and semi-arid regions where the financing of climate change adaptation projects by local rather than national administrations is being piloted. These counties cover 29 percent of the country’s total landmass and are home to more than four million people.



James Mbatha (left) surveys the fruits of his labours. Photo: Anthony Langat/IRIN

The aim is that these local governments’ climate change funds will evolve into what, in the jargon of international climate finance, are termed subnational “implementing/executing entities”, a status that allows them to tap into national and international funding pots, which have strict conditions for disbursements.

These will include the Green Climate Fund, which, when running at full capacity by 2020, will have around \$100 billion to spend every year, half of it on adaptation projects (some \$10 billion has already been pledged to

the fund).

Currently, funding in the five pilot counties comes from the UK's Department for International Development and is channelled through an adaptation consortium made up of government bodies and various local and international NGOs.

By the end of 2017, the consortium, which also helps counties set up their climate change funds, estimates that some 2.5 million Kenyans will have benefited from adaptation projects conceived and executed using this localised approach.

In Makueni, nine projects were carried out in six of the county's 30 wards in 2016. This year, all wards are expected to benefit and the county has set aside about \$600,000.

Makueni is one of two counties to have passed local legislation committing it to spending between one and two percent of its development budget on adaptation finance. Such laws are prerequisites for receiving many external forms of climate finance. Other counties are set to pass them soon.

According to Richard Munang, who coordinates the UN Environment Programme's Africa Regional Climate Change Programme, the community-driven approach to adaptation is "critical to mobilising other complementary means of implementation, including technical capacity, indigenous knowledge, business partnerships and collaborations for out-scaling solutions, all critical to complementing financing for optimal delivery of climate interventions."

"The development that Makueni has done toward sustainably financing climate action will not only help Makueni, but provide valuable lessons for Africa as a region," said Munang.

§§§

The smart way to help African farmers adapt to climate change

By Sophie Mbugua in Kakamega, Kenya



A smallholder farmer in Kenya. Photo: Esther Havens/USAID

AGRICULTURE IS THE MOST IMPORTANT sector of African economies, from the livelihoods it supports to the future jobs it can generate.

The basic recipe for boosting performance is well known: more investment, better access to financial services, improved seeds, and a lot more fertiliser (appropriately applied).

What is less appreciated is the key role played by agricultural extension workers. They link small-scale farmers to new research, helping to improve their knowledge and skills so they can take advantage of market opportunities. In African countries prone to climate shocks, these extension workers have an increasingly important role to play if farmers are to learn to adapt and build their resilience.

There's just one big problem: governments have tended to ignore extension work.

“The extension service provider’s role is enormous and urgent, especially as [the unpredictability of] climate change has brought a new dimension to agricultural research and development,” Max Olupot, of the African Forum for Agricultural Advisory Services, told IRIN.

In addition, Qureish Noordin, from the Alliance for a Green Revolution in Africa (AGRA), warned that climate variability is distorting “a huge portion of indigenous knowledge”, making the design of “realistic and practical adaptation programmes” even harder.

African agriculture, in general, is massively underfunded. In 2003, African governments agreed to the Maputo Declaration, committing 10 percent of spending to agriculture. But only 13 countries have ever managed to reach that target in any one year.

Two decades of IMF programming had pushed governments to cut spending, diminishing the reach and quality of the assistance provided to small-scale producers.

The UN’s Food and Agricultural Organization recommends there should be one extension worker for every 400 farmers. In the rich world, the ratio is roughly one to 200, but in Africa it’s closer to one to 3,000, according to Noordin.

The Kenyan example

Kenya has the largest, most diversified economy in East Africa, and farming is its market-driven mainstay. In 2010, it adopted a new constitution supposed to devolve significant powers to county governments.

But in reality, agricultural policy is still set at the national level and there is a complicated relationship with the counties over responsibilities for the day-to-day running and financing of services and programmes.

Kakamega is a lush county in western Kenya, a seven-hour drive from Nairobi. More than 80 percent of its population is directly employed in the agricultural sector.

The Kenyan government should be stepping up its help for farmers here, but since devolution there’s been a drop in the number of extension workers employed.

Currently, the ratio is roughly one to 3,000-5,000 farmers, according to Johnston Imbira, the county’s director of agriculture.

“The number has decreased due to officers retiring and exiting from the service since devolution,” Imbira told IRIN. “There are no deliberate efforts to support day-to-day extension delivery as it does not appeal to the county legislators compared to roads, which are visible to the electorate [and are a vote-winner].”

The county spends less than 4 percent on agriculture annually, despite the government’s 10 percent target.

“Expertise is dwindling,” said Jacob Masimba, an extension research liaison and training officer. “There is no regular short course training, even with climate change.”

That’s bad news for farmers like Harrison Wesa, a 63-year-old retired teacher who grows bananas on his irrigated, half-hectare plot. “We used to have monthly visitations by government officers,” he told IRIN. “Today, you are lucky to be visited.”



Harrison Wesa tends his crop. Photo: Sophie Mbugua/IRIN

Wesa was forced to abandon vegetable farming due to unpredictable rains and a rise in insect infestation. He soon found he was spending far too much on pesticides, pushed by agro-dealers out to turn a profit.

With losses mounting, his son introduced him to the internet, where he soon found plenty of websites on banana production. “My challenge [now] is too much information that at times confuses me,” he said.

Noordin recognised this problem well. “Even if some farmer can download some of the information, they might require help to interpret some of the messages,” he explained.

Smartphone use is spreading, but not all small-scale farmers can individually afford the data charges for downloading YouTube videos on the latest techniques, few of which are in Kiswahilli, the most broadly spoken language in Kenya.

New approaches

But there are alternatives.

In many countries, extension services are going through profound change, out of necessity. What used to be a centrally controlled, top-down model is increasingly more participatory, farmer-led, and market-orientated.

Farm Africa is an international NGO that has been working with East African farming communities for decades. Its approach includes not only a farmer-to-farmer extension model in which “elite” farmers are trained and pass on the message to their peers, but also partnerships with the private sector.

Geoffrey Nyamota, Farm Africa’s head of market engagement, explained how private businesses buying peas and beans are now providing extension services “directly to the farmers”.

“Public-private partnerships are a win-win,” he told IRIN. “The government is happy, as they know their goals will be delivered on; the private sector is happy, because they get the quality they need.”

Farm Africa has also tested mobile technology in Tanzania, with farmers viewing interactive training modules on tablet computers, as an alternative to traditional demonstration plots. It found that farmers trained using tablets were able to achieve similar increases in knowledge of sesame cultivation, but for about a third of the cost.

And old-fashioned radio still has a role to play, acting as a “megaphone” for extension work. Typically, farmers group themselves into listeners’ clubs and can call in or use SMS to participate in the FM programmes.

And while some governments don’t appear to be getting the message yet, Agriculture for Impact, an advocacy initiative, says a revitalised and expanded role for advisory and information services is now seen “as central to pro-poor agricultural growth”.

§§§

Kenyan slum activists go it alone with resilience

By Lou del Bello in Nairobi



Mukuru after the rains. Photo: Lou del Bello/IRIN

LIVING IN THE KENYAN SLUM of Mukuru is hard enough, but when it rains it's downright miserable. Streets flood, sewage overflows, homes are inundated.

After each bout of torrential rain, Nairobi's largest informal settlement is left a little shabbier, a little poorer, the community more insecure.

Climate projections for East Africa suggests parts of the region will receive heavier rains in the future, which will impact the most vulnerable. In the case of the Kenyan capital, that means the 60 percent of its residents currently living in informal settlements.

A walk through Mukuru is enough to appreciate the magnitude of the challenges. A courtyard turned into a pond by recent flash floods reflects the metal shacks surrounding it, now inaccessible until the water dries up.

That could take weeks.

Residents cross, tiptoeing on the rocks just visible above the water to reach the main street. A short walk ahead, a bridge over the nearby river leads to the other side of the slum, where the local school is. When the river bursts its banks, the bridge becomes inaccessible, sometimes for months, and kids miss their classes.

Insecurity

Finding solutions in Mukuru is especially difficult because it is built partially on private land, which traps residents in chronic land tenure insecurity: they could be evicted and lose what little they have at any time. This doesn't encourage them to plan for the long-term.

Aware that climate change will magnify risks, slum activists from local universities and research institutions are teaming up to take action in Mukuru, working with the residents to build resilience, and develop legal and financial tools to force accountability from public authorities.

Shadrack Mbaka, of Slum Dwellers International, is one of the brains behind the project – spurred on by the fact that “informal settlements [have] been cut out of the development plans” of the Nairobi City Council.

SDI is partnering with Strathmore University, the International Development Research Centre, Nairobi University, the Katiba Institute and Muungano wa Wanavijiji, a slum dwellers' network, to develop the research and come up with recommendations for upgrading Mukuru.

The lack of pipe-borne water and sanitation is one major issue. Of more than 800 households surveyed in Mukuru, just four percent had access to adequate bathrooms, only seven percent had proper toilets, and just 29 percent had adequate water provision.

Christine Wayua makes a living for herself and her family by threading beads into colourful jewellery. She works from a bench outside her home in a narrow passage, off one of the main roads in Mukuru.

“Whenever it rains it's a disaster for the communities living here,” she told IRIN. “There will be a lot of flooding and it's not just rainwater: it's water mixed with sewage, and the water gets into the homes.”

That can lead to the spread of waterborne diseases, like cholera, which is common in Kenya's slums.

Profiling

SDI and its partners are trying to tackle the community's vulnerability from the bottom up, with the help of people like Wayua.

UNJUST BURDEN

First they “profiled” Mukuru, counting people and households. Then they sat down with the residents to imagine a new, better design for the community’s infrastructure. With an agreed plan, they can engage the politicians, who had previously ignored their needs.



When the river floods it gets a lot worse. Lou del Bello/IRIN

Wayua is aware of climate change, and recognises it may exacerbate the problems the community already faces. But she is pragmatic, looking to focus instead on how to prepare for the future.

In the case of Mukuru, she feels the issue boils down to land tenure. “We need more guarantees that we will be able to occupy this land in the future,” she explained.

Mukuru’s coalition of activists are exploring a range of strategies to improve land tenure and property rights – including converting private holdings into community land, and then establishing a Community Land Trust. The CLT will help defend constitutional rights to housing, water, health, and sanitation.

Another approach is to foster liveability, safety and affordability. This includes initiatives to improve service delivery through “community partnerships” and “community-based management structures”. One target is the

cartels, whose control means prices for services in Makuru, as in other slums, is higher than in Nairobi's middle-class suburbs.

"It's fundamental that people realise that the community is theirs to protect and upgrade," said Wayua.

She gave the example of a garbage point, designated as a place where the community could collectively dispose of their rubbish: "But still you will find that no one really wants to carry their garbage there, so the nearest open space they see is where they are going to dump it."

Mbaka says that engagement is growing, and will lead to behavioral change. Even garbage collection could, eventually, be a success.

Urban poor

Responding to the "complex realities in Mukuru" could help develop the "long-term solutions" to benefit the rest of Kenya's informal settlements, says a Strathmore University study.

There are 158 overcrowded informal settlements dotting Nairobi. They host the majority of the city's population, but take up just 1.6 percent of the city's land area.

The land is marginal and disaster prone, and houses are typically flimsy. But what really drives vulnerability for the urban poor is "the lack of risk preparedness, and the capacity to respond when something bad happens", said David Dodman, an expert on resilience with the International Institute for Environment and Development.

"You can't separate the process of rapid urban population growth, which means that more people are located in increasingly hazardous sites, from the actual changes in the climate that may be making those sites even more risky.

§§§

Education is an insurance policy, but only for some

By Sophie Mbugua in Kalokutanyang



Break time at Karoge Primary School. Photo: Sophie Mbugua/IRIN

LIVESTOCK IS SO CENTRAL to the economy, food, and status of pastoralists in Kenya's northern drylands that formal education has traditionally taken second place to the role children play in tending to cows, goats, and sheep.

But with climate change increasingly seen as imperiling livelihoods, many pastoralists are now taking the longer view and regard education as a sort of insurance policy. And yet the severity of the current drought affecting much of east Africa, coupled with a long interruption in the provision of free meals, has led to a drop in school attendance.

"The drought has become too harsh," said Atiir Lokwawi, a 42-year-old mother who lives in the village of Kalokutanyang, in Kenya's Turkana County.

“Animals are dying in huge numbers. We restock, but before we stabilise, drought comes and takes away our investment.”

Lokwawi’s husband travelled to Uganda to graze most of the family’s herd. Of the 40 goats he left behind, 35 have died because of the drought.

“It is good if at least one child goes to school,” said Lokwawi. “Educating our children is also another way to earn money – animals alone cannot help us survive,” she said, explaining that of her seven children, only one, a 15-year-old girl, is currently attending school.

“It will take time for our children to go to school and get jobs, but at least there is hope that, someday, someone will be there for us.”

To help make ends meet, Lokwawi makes charcoal and attends evening classes at a local mobile school.

“I burn charcoal to invest in my daughter’s education. The government pays for her fees, but I have to buy her books, pen, and uniforms. She is my hope, my only family hope,” said Lokwawi, adding that she would like her daughter to become a doctor.

Another of her daughters was married off, bringing the family a substantial dowry of livestock. But most of these animals also perished.

Teaching adaptation

Christine Tukei, a teacher at Kalokutanyang’s mobile primary school, said education for pastoralists “needs to go beyond the [national] curriculum.

“It needs to add value and incorporate their lifestyle. It is vital to help communities prepare for and respond to impacts of climate change while promoting a sustainable way of life.”

The mobile school has about 100 students: roughly two thirds youths aged between nine and 17, and one third adults aged between 35 and 42.

Classes take place between 8 and 10 pm, as during daytime the children are usually tending to livestock herds while the adults make and sell charcoal.

The ravages of the drought have led Tukei to add adaptation strategies to what she teaches.

“We discuss the importance of early destocking, minimising herds to manageable levels; the importance of investing in education; and alternative businesses. I also teach about preserving meat with salt as they slaughter some animals and store for food; and about good health and sanitation,” she explained.

Disastrous drought

The current drought, which started in 2016 and which the Kenyan government deems a national emergency, has dried up water resources in half of the country's 47 counties, leaving an estimated three million people lacking access to clean water, according to OCHA, the UN's emergency aid coordination body.

"Recurrent droughts have destroyed livelihoods, triggered local conflicts over scarce resources and eroded the ability of communities to cope," OCHA said, noting that prices of staple food had risen considerably.

The drought has sent rates of global acute malnutrition soaring: in Turkana North sub-county, the rate is 30.7 percent, more than double the emergency threshold.



Many children in Turkana tend to livestock rather than attend school. Photo: Wendy Stone/IRIN

Large numbers of livestock deaths have been reported in Turkana County, as well as in the counties of Marsabit, Samburu, and Mandera.

Across Kenya, up to 3.5 million people are expected to need food assistance in August, up from 2.6 million in February, according to the UN's World Food Programme.

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Low enrolment

Although the national introduction of free primary education in 2003 led to an increase in school attendance across Kenya, enrolment rates in dryland counties such as Turkana remain much lower than the rest of the country.

And of those who enrol in the first year of school, barely one in five stick it out through the eighth year, with dropouts attributed to early marriage and the need to look after livestock.

Even though going to school can lead to improved agriculture, better health, improved community relations, and better management of natural resources, “the culture [here] does not allow the community to attach much premium on education,” Muthengi Muvea, the director of education in the sub-county of Turkana Central, told IRIN.

“A high number of pastoralists are not willing to wait for over 20 years to see returns on their investment, while a child has immediate returns such as dowry for girls and herding for boys,” he explained.

According to Muvea, at any given time, at least 40 percent of children who are supposed to be in school in Turkana County are not.

This is attributed to: parents migrating during drought in search of pasture and water; inadequate infrastructure; understaffing in schools; and the parents' general unwillingness to enroll their children in school.

“January 2017 saw enrollment [in Turkana] drop by over 9,200 from the 2016 third term,” said Jesse Nyongesa, of the Ministry of Education.

Matters were made worse in the first few months of 2017 by an interruption in the provision of free school meals across much of the country, although these meals – provided since 1980 by WFP and the Kenyan government and now benefiting 1.5 million children at an annual cost of four billion shillings (\$39 million) – resumed in May.

“During drought, the meal the children get in school is the only meal they are likely to get for the day,” said Matthew Epetet, the head teacher of a primary school in the Turkana Central village of Lochwa.

“It’s critical to attaining food security in this part of the country. Unless it’s assured, the rate of retention is low, especially for the junior classes.”

Since it launched a Home-Grown School Meals programme in 2009, the government of Kenya has gradually increased its role in feeding school children. HGSM now benefits twice as many children as WFP’s contribution and is set to feed all by 2019.

Under the programme, food is bought from nearby farmers, thereby stimulating the local economy while encouraging children to attend school.

The interruption of free school meals, combined with the migration of parents in search of water and pasture, led attendance at the school to fall by more than half, said Epetet.

“From a total of 585 students, only 257 students are attending class now,” he said. “Among the 103 girls enrolled in school, about 37 are no longer in school. The pre-primary pupils have already stopped coming to school.”

The head teacher explained that the recent start of oil exploration in Turkana’s Lokichar Basin had been another factor in falling attendance.

“Fifteen boys have dropped out of school to work as motorcycle riders within Lokichar,” he said. “Some are seeking manual jobs from those employed in oil exploration companies such as fetching water.”

Muvea believes it will take time before education fully improves the welfare of the community and contributes to a meaningful, sustainable manner of resilience.

“It’s about perception,” asserted Muvea. “School becomes necessary during drought emergencies because of food access. The way pastoralists perceive education has to change if it is to play a fundamental role in strengthening their resilience.”

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More than a buzzword? Resilience in Zimbabwe

By Tawanda Majoni in Harare



Blight-hit maize, Photo: Eva-Lotta Jansson/IRIN

CLIMATE CHANGE-INDUCED DISASTERS will keep on coming, as sure as the sun rises. But rather than governments and aid agencies swinging into belated – often chaotic – action after they’ve struck, the smarter move is to strengthen communities by building their resistance ahead of time.

It’s cheaper, faster, and devolves more control to the affected communities. But while resilience has long been a buzzword among aid agencies and governments alike, it’s difficult to gauge yet how effective the measures have been.

Zimbabwe is a good place both to highlight the need to develop people’s resistance to “shocks” and to illustrate how difficult it is to put that idea into practice.

Agriculture is a key sector of the economy. It employs 60-70 percent of the population, contributes to about 40

percent of total export earnings, and, in a good year, covers the country's cereal needs.

But Zimbabwean agriculture is mostly rain-fed, and therefore vulnerable to climate change-induced drought. An El Niño event in 2015 has produced two consecutive seasons of failed rains. The cumulative result is that more than four million people are in need of food aid over the next three months, until the 2017 harvest comes in.

Worse to come

And the forecast is for worse weather to come. A 2013 study predicted that between now and 2080, Zimbabwe will suffer steeply reduced rainfall, which will hit production of drought-sensitive maize, further denting food security.

The trend has been clear for more than a decade. But the government and aid partners seem to have made the short-term calculation that the next season will be better, preferring to resort to emergency relief when disaster strikes than to spend on longer-term solutions.

For the government, the primary reason is it's broke. Last year, it struggled to pay even public sector teachers and nurses.

"Zimbabwe has for more than a decade faced numerous economic, environmental, and political pressures that have probably proved to be too much for the government to effectively promote resilience," said climate researcher Leonard Unganai.

"It is evidently aware that it has to do something, but the challenges could have also overwhelmed it."

In almost every year out of the last 15, Zimbabwe has been forced to import grain. More than 200,000 metric tonnes of maize was imported in 2016. That's well short of the 1.7 million metric tonnes the country actually needed, but seemingly all the cash-strapped government could afford.

The burden has therefore fallen on its aid partners. Zimbabwe received \$177.7 million in aid funding in 2016, but that represents only roughly 50 percent of the overall appeal. Clearly, charity has its limits.

"Traditional approaches to humanitarian and development assistance have not been very successful in minimising the impacts of disasters on communities," said UN Development Programme Resident Representative Bishow Parajuli.

What are needed are interventions that "enhance communities' and individuals' preparedness and resilience," he said at last year's launch of the Zimbabwe Resilience Building Fund (ZRBF).

"Building the resilience of communities helps them to be prepared to anticipate, absorb, accommodate, or recover from crises and disasters in a timely, efficient, and sustainable manner," David Phiri, Southern Africa

coordinator for the UN's Food and Agriculture Organization, told IRIN.

Interventions

Resilience building is not a new phenomenon. It's a fashionable phrase included in just about every humanitarian and development document. It has institutional support expressed through the 2005-2015 Hyogo Framework of Action, and its successor, the Sendai Framework.



World Food Programme warehouse. Photo: WFP

But while the goals of addressing the underlying vulnerabilities that lead to humanitarian crisis are laudable, it has proved difficult to fully harness as an organising principle.

Its grassroots focus means it requires time-consuming local consultations; needs astute analysis as to why people are at risk; and then inter-agency collaboration to help deliver the appropriate interventions. This is more bespoke than the usual cookie-cutter approach to aid.

“Many donors traditionally fund either emergency or development initiatives, meaning that resilience... tends to be underfunded,” Phiri explained. “However, donor interest is now slowly building towards supporting resilience building projects.”

There is indeed a raft of initiatives under way in Zimbabwe.

Development agencies jointly launched the ZRBF in May in conjunction with the government and with support from the European Union and the UK Department for International Development.

It includes a multi-donor fund to enable partners to improve the adaptive, absorptive, and transformative capacities of communities, and a disaster risk financing mechanism to promote reliable prediction and management of climate-induced shocks.

It also entails identifying vulnerable communities to target with the appropriate resilience measures.

Does it work?

Other initiatives include the 2016-20 Zimbabwe United Nations Development Assistance Framework, which includes a resilience building component to help strengthen household food and nutrition security.

USAID is also involved in development and food assistance programmes worth \$100 million over the next five years aimed at addressing the underlying causes of food insecurity and malnutrition.

WFP is also training farmers on climate change adaptation, including encouraging the adoption of small grains and short-season varieties, and the FAO is scaling up its irrigation support programme and its climate smart agriculture programmes.

None of these schemes is a magic bullet. One obvious constraint with such interventions is that they reach only a limited number of communities because of funding and resource constraints.

Phiri also bemoaned the conservatism of farmers, which he believed was one reason for the slow adoption of resilience initiatives.

“This [slowness] requires patience and commitment in demonstrating the benefits of appropriate food production technologies that help communities in mitigating the threats and risks,” he told IRIN.

It’s too early to tell if these interventions will eventually work. But they do offer an alternative to traditional disaster responses, which step in only after communities have already lost assets and livelihoods.

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Part three: Focus on Turkana



Photo: Anthony Morland/IRIN

Turkana County, in Kenya's northeastern drylands, is one of the poorest and most marginalised in the country. Extreme chronic poverty is endemic and malnutrition is rife, in some areas topping twice the level deemed to be an emergency. Because of the lack of arable land, most of the county's inhabitants raise goats, sheep, camels, and cows for a living. A devastating drought has made this way of life all the more precarious, and claimed the lives of around half a million head of livestock. This series of reports highlights the particular challenges faced by pastoralist communities.

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Drought pushes Kenya's pastoralists to the brink

By Anthony Morland in Lodwar



Withered pasture in Turkana County. Photo: Fredrik Lerneryd/IRIN

EVEN AT THE BEST OF TIMES, the people of Turkana live on the edge. Almost all of the 1.3 million inhabitants of this arid county in northwest Kenya endure extreme poverty. Malnutrition rates are among the highest in the country. Since much of the land here is unsuitable for agriculture, most of the population raises livestock, herding animals long distances to find good pasture and plentiful water.

These days, both resources are in catastrophically short supply. Long dry spells and occasional droughts have always been part of the rhythm of pastoralism here, but Turkana, like much of east Africa, is currently nine months into one of severest droughts in living memory.

In February, when 23 of the country's 47 counties were affected, and after the number of food insecure people had more than doubled, from 1.3 million to 2.7 million, the Kenyan government declared a national drought

emergency.

Since then, the situation has worsened considerably. The annual “long rains”, which usually fall between March and May, ended early. It was the third successive poor or failed rainy season.

By August the number of food insecure Kenyans – those lacking access to food sufficient to live a healthy life – had risen to 3.4 million. According to a flash appeal published in early September by OCHA, the UN’s humanitarian aid coordination body, half a million Kenyans fall into the category of “emergency” food insecurity.

In Turkana, “very critical” rates of global acute malnutrition (one of the key indicators of humanitarian crises) of up to 37 percent or above have been recorded in some areas – more than double the emergency threshold of 15 percent. This is largely a result of higher food prices and a reduction in milk and food supplies.

Dying animals and vanishing vegetation

“Turkana is the epicentre of the drought,” Chris Ajele, director of the county’s ministry of pastoral economy, told IRIN in late September in Lodwar, the county capital.

The drought “has rendered some families destitute”, he said. “In Turkana, the economy revolves around pastoralism,” he explained. “People attain their daily requirements through the sale and consumption of livestock.”

In arid counties like Turkana livestock usually accounts for some 80 percent of a household’s income through sales of animals and milk. Livestock also represents a considerable store of wealth: Many herders with few other possessions aside from a wooden stool, a knife, and some cooking utensils own 100 or more goats and sheep, each worth around \$60. Camels are worth more than 10 times as much.

“We have lost about half a million head of livestock [in Turkana] – mostly sheep and goats, as well as cattle and some camels,” Ajele said. High rates of livestock death have also been recorded in the counties of Isiolo, Laikipia, Marsabit, and Samburu.

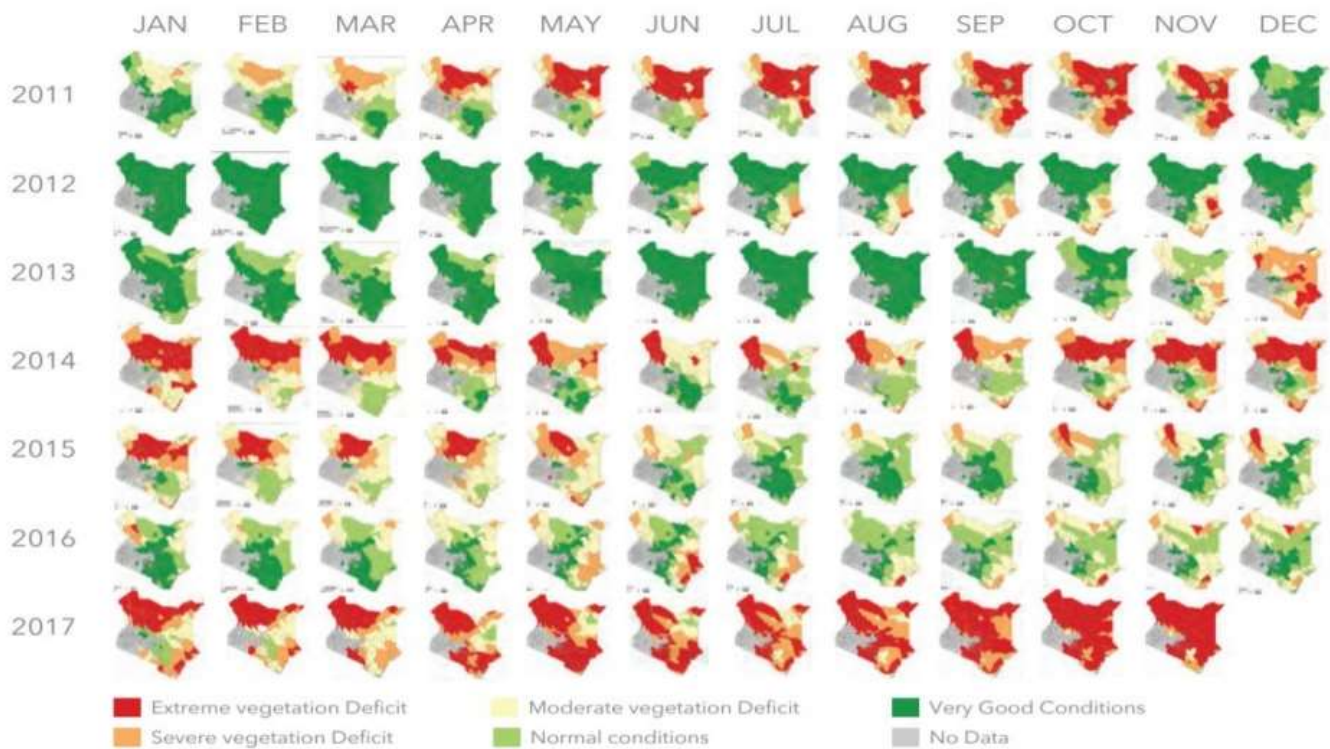
This is mainly because the animals don’t have enough to eat. According to a chart compiled by the UN’s Food and Agriculture Organization, things are only going to get worse in the months to come: In the map for November 2017, almost the entire country is shaded red, indicating “extreme vegetation deficit”. Just last year, foraging conditions in most of the country were either “normal” or “very good”.

And the longer a drought lasts, especially when coupled with over-grazing, the greater the risk that subsequent growth and reproduction of the grasses eaten by livestock will be compromised. There is strong correlation between foraging conditions and levels of human malnutrition.

UNJUST BURDEN

“Drought is a part of life for pastoralists, but whereas they used to happen every 10 years, now, because of climate change, the gap is narrowing and they are becoming unpredictable,” said Josephat Lotwel, who works on drought response in Turkana for the National Disaster Management Authority. “The forecast is that this drought will continue, malnutrition will increase, and more animals will die.”

FORAGE INDEX MAP 2000 - 2017 FAO



Forage conditions worsened dramatically in 2017

“I live like a dog”

All the pastoralists IRIN met in Turkana said most of their herds had perished as a result of the drought.

“200 of my goats died,” said Joseph Lopido at a livestock market in the small town of Kerio. “I used to be a man. Now I live like a dog because I am poor.”

Lopido said everyone in the community was affected because getting enough food to survive was a real problem.

“Some of my family eat wild fruit to survive and sometimes it can cause health problems,” he said. “The only thing that helps us is rain. When it rains, the grass grows and the goats graze. How can we survive without rain?”

Lopido had come to the market hoping to sell his two remaining goats, but the prices he was offered were so low he decided to hang on to them.

According to OCHA, average prices of livestock in Kenya “have declined by up to 40 percent, and the combination of low household incomes and high staple food prices has significantly reduced the livestock-to-cereals terms of trade”. In other words, goats, sheep, and cows are worth far less maize than they used to be.

On the road to Kerio, camel herder Ebei Lotubwa was trying to flag down cars, waving a yellow plastic cooking oil bottle cut off at the top to serve as a jug – he was desperate for water.

“This is the worst drought. There is no grass. It did rain last month, but they were only showers,” he said, explaining that 16 of his camels – animals renowned for their ability to survive for months without drinking – had died during this drought.

“To find water for our animals, sometimes we have to walk for 30 kilometres. That’s why we beg water from passing cars. Not everyone stops.”

“When there is no rain, we get no milk from the camels.”

Another herder, Peter Okapelo, said 100 of his sheep and goats had died, leaving him with 20. “The only way for me to get more is for them to breed. But if this drought continues, these 20 will also die. I don’t know what I will do then.”

Asked about the long-term future, he said: “I think pastoralism will be finished because of the droughts. All the animals are dying.”

Vulnerability to climate change

In the absence of prolonged drought, pastoralism generally makes better use of open rangeland environments, and delivers better food security than other agricultural systems. It delivers greater returns per hectare, for example, than ranches. And while often dismissed as geographically isolated and economically peripheral, the African Union recognises that “pastoralists supply very substantial numbers of livestock to domestic, regional and international markets and therefore, make crucial – but often undervalued – contributions to national and regional economies in Africa”.

Pastoralists have long coped with – even thrived on – wide variations in temperature and rainfall, but they are extremely vulnerable to the harsher weather shocks brought about by climate change in three ways: exposure, sensitivity, and adaptive capacity.

As a 2014 paper on pastoralism and climate change adaptation in northern Kenya explains, pastoralists are

especially exposed to climate change because in east Africa it manifests itself in “increasing temperatures and higher rainfall variability... with both escalating the likelihood of more frequent and extended droughts.”

According to a 2007 study by the Intergovernmental Panel on Climate Change, Kenya is warming at a rate roughly 1.5 times the global average.

The paper’s authors add that Kenyan pastoralists are particularly “sensitive” because their livestock “depends on the availability of water and pasture which is negatively affected by climate change”.



Without water points like this, many more animals would die. Photo: Fredrik Lerneryd/IRIN

And on the third vulnerability, the paper explains that while “pastoralists have developed their adaptive knowledge and skills over centuries, their options for adaption and economic assets have been limited by political and socio-economic marginalisation.”

According to Johnstone Moru, who advises the county government in Turkana on climate change on behalf of German consultancy firm Ambero, “the colonial and successive governments [in Kenya] had no proper policies on the development of arid and semi-arid lands, including pastoralism.”

The International Livestock Research Institute sums up the chronic plight of those who live in Kenya's drylands: "With a dearth of alternative productive livelihood strategies to pursue, scant risk management options to provide safety nets in the event of shock, diminished rangelands and increasing incidents of violent conflicts, these populations grow ever more vulnerable to the range of risks that afflict them."

Solutions?

That's not to say nothing at all has been done, or could be done in the future, to make pastoralism in Kenya more sustainable and resilient to climate change.

Cash transfers, an index-based insurance scheme, an off-take programme under which the government buys livestock in times of drought to give pastoralists a monetary lifeline as well as meat from the slaughtered animals, and efforts to diversify sources of income through the promotion of agro-pastoralism and the processing of animal by-products, are examples of recent investments.

But there are shortcomings to many of these initiatives: The feed stores where pastoralists are supposed to spend their insurance payouts to ensure their animals' survival are often far away; the off-take programme generally pays less than potential market rates; land exploited for agriculture tends to be close to rivers, blocking traditional migration routes; and a tannery near Lodwar, conceived to boost pastoralists' income through the production and marketing of leather goods and launched with some fanfare in April, was entirely dormant when IRIN visited in September, with no clear timetable for a resumption of its operations.

The adoption in Kenya of a new constitution in 2010 set in motion a process of political devolution and led to the creation of county governments, with the aim of improving services better suited to local needs.

Turkana County's 2016-2020 Investment Plan sets out 16 areas for "quick wins" in scaling up the pastoralism sector. These include exporting live animals; setting up feeding ranches as well as meat processing plants; building more tanneries; and developing bio-gas projects.

But the pastoralists IRIN spoke to were less than impressed. "Devolution hasn't made any difference I can see," said Lopido. "The local government has built some structures, but we don't have any food in our stomachs."

§§§

In their own words: How drought is bringing despair to Kenyan herders

By Anthony Morland in Lodwar



Photo: Anthony Morland/IRIN

TURKANA IS ONE OF SEVERAL arid counties in Kenya in the throes of a prolonged and extreme drought. Most people in these areas raise livestock for a living, grazing their sheep, goats, cows, and camels on open rangeland.

Usually, two annual rainy seasons ensure there's enough grass to keep the millions of animals healthy. But this year, hundreds of thousands of animals have died of hunger, thirst, and disease.

IRIN asked several Turkana residents about the impact the drought was having on their lives. This is what they told us.

Lucas Lotieng

Photo: Fredrik Lerneryd/IRIN

Over the past four years ago most of my livestock has died, I only have five animals left. I had 250 goats and 50 sheep. They died because of the drought – they had nothing to eat. Normally, we take our animals to graze on the hills, but you can see there is no grass there now.

When I was young, we could predict when the rains would come – we knew it would fall after six months. When I had animals, we had enough to eat. We used to eat meat and drink milk and sometimes the blood of sheep and goats. We would only sell livestock when we were hungry – during the good times when they could graze well we did not sell them.

There has always been drought, but this one is the worst in my lifetime because it has killed so many animals, and the problem is spreading to humans – we are getting sick. Recently, there were showers for just three days, and the grass started growing for about a month. But that was not enough for the animals to grow healthy.

It is like this everywhere in Turkana.

If it rains, I will get more animals if my daughter gets married and I get a bride price. If it doesn't rain, I will be left with nothing.

If I could talk to the county governor, I would tell [him] about our way of life and ask him to help us with maize. We need development, to have more bore holes so that we can start farming. I would like to both farm and raise livestock.

I see things are changing and the changes that are coming make me sad. If we old ones die, everything will change, the younger ones will move away from the life we have lived. The way we used to live was good. We lived a free life. We could go where we wanted.

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Ewoton Epeot



Photo: Fredrik Lerneryd/IRIN

I was born in 1947 and I grew up here. My father worked this plot of land and also raised livestock.

Now my husband is dead and I have no sons to help me. There are only widows who work this land. Sometimes, animals come and destroy our work so we have to chase them away.

Before, I also had livestock. I would buy animals by selling the surplus from my crops. But over the past three years, when the drought came, it took all my animals; they died of hunger, including the newborns, so I stopped being a pastoralist, and I only farm now.

When there was no drought and I had livestock, life was good. When the animals gave birth, we had milk. We ate our crops and gave the chaff to the animals.

Now there is only hunger – I have nothing to eat. We receive a cash transfer of Ksh5,000 (\$50) every three months – I am not sure who pays it. We would like to get the money more often. People depending only on that money will die of hunger.

Earlier this year I planted maize on this plot but it became infested with insects, so we had to dig up the maize and destroy it. Now we will plant sorghum. When we have finished working the soil, we will open up the channels to let in water [from a nearby borehole]. It's hard work – it takes two months just to plough and sow the land.

When I feel hungry I go and look for wild fruit. But when you eat that every day, you get diarrhoea. We only eat it because we are hungry.

If the government wants to support us, they should buy livestock for us or give us some food. But they should give it to us directly, not to the village elders who, when food aid is given, often only distribute it to their relatives.

Sometimes, when we hear that some food has been delivered, we go and wait under a tree to get some, but it all goes to others, and eventually we go back home. That is why we eat wild fruit.

We may be old but we are trying and will keep trying until the government comes to help us. When the drought ends, I will sell this crop to buy more animals. But if the drought continues, we will die.

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Ebei Lotubwa



Photo: Fredrik Lerneryd/IRIN

I herd my father's camels, they number around 50. A camel is worth Ksh70,000 (\$680) if it has recently given birth [and is therefore producing milk].

Over the past 20 years almost 100 of our camels died because of drought. In this drought, 16 died. In our household we have also lost 40 cows, leaving us with just seven.

This is the worst drought. There is no grass. It rained last month but there were only showers.

We are suffering from hunger right now. Sometimes we go 10 days without getting food. We got some food aid once, some cereal, but we had no water to mix it. Food prices have gone up, a cup of maize [in the market] used to be Ksh10, now it is Ksh50.

To find water for our animals, sometimes we have to walk 30 kilometres. That's why we beg for water from passing cars on the road. Not everybody stops.

What we want from the government is for it to introduce agriculture to our community. We are used to raising animals, and pastoralism used to be good, the rain was there. But now, because of drought... all that will help us is agriculture. When there is no rain, we get no milk from the camels. Sometimes, if we see rain clouds in the distance we will travel there.

I have really suffered with this drought and hunger, and now I would like a job. It would be better that I work so I can help my children.

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Joseph Lopido



Photo: Fredrik Lerneryd/IRIN

I came here to the livestock market to sell my two goats because I am hungry, but I did not sell them as the price of livestock is so low. I wanted Ksh3,000 for the she-goat and 5,000 for the male one. But the buyers, middlemen, only offered me Ksh1,500 for the female and Ksh1,700 for the male.

Before, when I had lots of animals, I had 300 goats – I was a man. I paid 100 of them as a dowry. I also had three cows my father gave me towards the dowry. Two hundred goats died in the drought. Everyone in the community has been affected. Now, I live like a dog because I am poor.

Getting enough food is a problem. We are not getting any food aid. We are getting thinner and thinner. Some of my family eat wild fruit to survive, and sometimes it causes health problems.

We need more help from the government. Before, they were not selective in who they helped, but now only a few get aid.

I don't know how I can get back to what I had before. I know that in the future my children will not live as pastoralists because of drought. We decided to put them in school, but we have no money to pay for that, so they will not finish school.

The only thing that helps us is rain. When it rains, the grass grows and the goats graze. How can we survive without rain?

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Peter Ikaru



Photo: Fredrik Lerneryd/IRIN

I live with my two wives, my mother, and I have 12 children. Making and selling charcoal is the only way I get food. I used to have 25 camels, seven donkeys, 12 cows, and 250 goats, but they all died in the drought, except for the few that we fed with maize bought with the money from selling charcoal. All the grass has dried up.

When a dead tree falls down, we dig a hole in the ground, cut the tree into logs, burn it under a covering of leaves. I make charcoal like this every day. Traders come from Lodwar to buy it. They pay Ksh200 for a 50kg

sack. I make about two sacks every day. I know that in Lodwar the same bag sells for 700 or 800 shillings – but that is the way with traders. This is our only source of income.

Because of hunger, some people are cutting down live trees to make charcoal, although this is not allowed.

We are not getting any help from the government – it would be good if they gave us medicine and fodder for our animals.

In normal times, to find out where the grazing is good, we send out small groups of young scouts to find the best grass. When they return we go to that place with our animals.

I think the future will be very hard – this drought is very bad and there will be more like it to come. I don't think my children or grandchildren will be pastoralists – some will go to school. All that will be here in 100 years is drought and hunger.

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David Nakusi



Photo: Fredrik Lerneryd/IRIN

People come to this market from far way, sometimes travelling on foot for more than 200 kilometres.

The money I make trading here goes to pay school fees for my seven children.

The drought has destroyed our business. Before, we used to get customers from Nairobi – they don't come anymore because they've heard there is no grass here to feed animals during the journey back. Now, only locals are buying. The price has come down a lot since last year, from Ksh7- 8,000 to Ksh5-6,000. The government buying up livestock helps us, but the money they pay is not enough.

Before, when we had healthy goats you could sell at a good price and buy what you need. Now, the goats are malnourished and sell at a lower price, so it is hard even to keep the children in school.

Because of this drought, I think all the animals will die. In the future, life will not be good; it will be a struggle if we don't get more support from the government and donors.

Livestock traders like me are thinking about changing business – like opening a hotel or selling second-hand clothes.

It makes no difference who wins the [presidential] election – whoever wins will only benefit themselves. Nothing comes to Turkana. Even with the county government [created under a devolutionary constitution adopted in 2010], only those who are close to it get the benefits. We at the grassroots are not getting anything.

If my children said they wanted to be pastoralists, I would say they should stay in school. Even if you become an MP, you can still have livestock.

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Oil rich yet on edge

By Sophie Mbugua in Lodwar



Oil exploration site in Turkana County. Photo: Tullow Oil

REBECCA EKALE DOESN'T BELIEVE anything good can come from the black gold bonanza that will bring untold riches to arid Turkana, the poorest county in Kenya.

"I have no interest in oil," the mother of six told IRIN outside her brick-and-thatch home in the village of Lomokamar.

Like many pastoralist herders, Ekale has been hit hard by a fierce and prolonged drought: the bones of 16 goats lie on the ground nearby.

But life here is hard at the best of times. Around 90 percent of the county's 1.3 million inhabitants live below the poverty line and some 80 percent have never attended school. Chronic marginalisation has left Turkana with a

dearth of basic services, and there are few opportunities in the private sector for making a living outside the precarious realm of pastoralism.

Yet unimaginable wealth lies beneath the county's soil: an estimated 750 million recoverable barrels of oil. In early 2021, construction is set to begin on an 820-kilometre, \$2.1 billion pipeline from Turkana to the Kenyan coast.

Within a few years, this is expected to start generating billions of dollars annually for the Kenyan state, with at least five percent (there is an almighty row over the figure) earmarked for local communities and 20 percent going to the county government – an entity set up in a landmark devolutionary constitution adopted in 2010.

Opinion is divided between those who think the oil boom will provide Turkana with an economic lifeline and those who fear production will exacerbate existing conflicts driven by competition over scarce pasture and water resources.

“Nothing but a curse”

Ekale already seems to have made her mind up.

“It has brought us nothing but a curse,” she said, as a pungent smell wafted through her homestead. Ekale said the stench came from a tailings dump just two kilometres away.

“It's killing our goats and I have not seen the national or county government coming to our rescue,” she complained.

Other local residents told IRIN that when it rains, chemicals enter water sources and make their animals sick.

Tullow Oil, the British firm that discovered Turkana's oil in 2012, operates (in some blocs in partnership with Africa Oil) across 48,000 square kilometres of Kenya leased from various county governments.

Exploration and appraisal is taking place in several dozen sites located within community-owned land in Turkana.

One of these sites lies 14 kilometres from Ekale's home. Tullow denies releasing toxic waste, but told IRIN it temporarily stores mud residue from drill sites in a manner approved by the National Environmental Management Authority, and that it conducts environmental and social impact assessments before starting any new projects.

Restricted mobility

Aside from the disputed issue of waste, a common complaint about the oil installations is that they get in the way.

“Our animals have no access to pasture,” explained Ekale.

To keep their millions of animals healthy, Turkana’s pastoralists have to be able to herd them across long distances to reach water and, since they are picky eaters, the right kind and sufficient quantity of grass. Oil is just one of many barriers to this “strategic mobility”.



Rebecca Ekale, who lost 16 goats to drought, doubts oil will make her life easier. Photo: Sophie Mbugua/IRIN

Sites where oil is already being extracted – in the South Lokichar Basin – have been fenced off (Tullow didn’t specify exactly how much land is involved).

According to Thomas Nyapid, a livestock herder who also runs a peacebuilding and sustainability programme in Lodwar, the county capital, Tullow has failed to fully take into account local dynamics. For instance, he said, South Lokichar Basin has long been used as a dry-season grazing reserve.

Ahead of the oil operations, “no one took an interest in telling us what was happening, or understanding how we used the land and how it would affect us in the end,” he told IRIN.

Francis Opiyo, a Nairobi-based specialist in resilience, climate change, and disaster risk reduction, explained how critical dry-season grazing areas are.

“Once they are fenced for oil exploration, the pastoral communities are left to access the wet-season grazing areas, which only generate pasture during the rainy season, or have to move to [areas] often marred with conflict,” he said.

It is impossible to assess the scale of this problem as the Kenyan government has not mapped out Turkana’s grazing areas in detail, but seasonal usage is well understood by local communities: their livelihoods depend on it.

It isn’t clear to what extent the Turkana pipeline will disrupt migration routes and access to pasture, nor how legal provisions for “full and just compensation” for the compulsory purchase by the government of adjacent land will be met, especially given that it is community-owned.

Chris Adjele, director of pastoral economy in the county government, told IRIN the compensation issue will have to be resolved before work on the pipeline, scheduled to begin next year, will be allowed to start, but he added that the county would be unable to pay anyone until it is receiving its share of the revenue.

Profit and loss

Turkana has already received many of the benefits that often come with oil wells: jobs, business opportunities and infrastructure – all of which serve as cushions against the economic effects of climate change and partly fill the gaping development holes left by successive central governments.

Tullow, which says it takes pride in its corporate responsibilities, has spent around \$4 million on social projects related to water, health, education, and the environment in Kenya.

Ekale’s village, for example, receives weekly supplies of water from the firm. But there is good reason.

Tullow acknowledges it takes three to four barrels of water to extract one barrel of oil, a rate of consumption that, once production starts in earnest, is likely to aggravate local shortages in a drought-prone area.

In its defence, the company said: “this is the subject of study” and that options will be assessed to ensure “all impacts at socioeconomic level are well understood and mitigated before exploitation”.

In an email to IRIN, Edward Mungatana, Tullow’s general manager for external affairs, described the company’s provision of tanks and bowsers to local communities as a “short-term intervention”, adding that “government support is necessary to provide longer-term solutions”.

Conflict risks

A 2015 paper on Turkana published by scientific journal *Earth Systems Dynamics* warns that “unmet community expectations for water, employment and development pose a significant risk for violent conflict between local communities and the operating oil company”.

Such violence has already occurred on numerous occasions.

In June 2017, for example, Tullow’s attempts to truck oil to the port of Mombasa were suspended after staff were prevented from accessing drilling sites, and after workers from a separate company were attacked while upgrading a road leading to oil fields.

Exports are due to resume in December, as long as a controversial petroleum bill is passed into law. This has been held up by President Uhuru Kenyatta’s insistence that the revenue share for local communities is reduced from 10 to five percent.

Violence, predominantly in the form of cattle raids, has long been common in Kenya’s drylands. But Augustine Lokwang, who advises the county government on security issues, explained how it has evolved in recent years to become controlled by cartels involved in the growing national market for meat.

“It’s highly likely that the banditry would evolve again to become oil-driven. A shady financier [of violence] would mainly be motivated by the need to control oil revenues and sites, and by local politics,” he told IRIN.

If the oil sector drives up land prices in Turkana, as some fear, this would also increase the potential for conflict.

“The stage is already set,” Lokwang added. “If [pastoralists] feel they are losers from the exploration and will only carry the brunt of the aftermath of the project, while oil revenue benefits go to other people, it’s a basis for conflict.”

The onus here lies on Kenyan authorities, rather than Tullow.

Opiyo recommended that the county government devise an integrated land management system that demarcates clear and sustainable grazing routes to avoid conflict. “If we have a secured, well-planned structure for the pastoralists... we can manage any violence and conflict that can arise from competition over resources as they become scarce as droughts persist,” he said.

A fork in the road

Asked whether oil would be a blessing or a curse for the people of Turkana, Lokwang told IRIN: “The trajectory is not clear yet. We have opportunities to influence the best scenario.”

The authors of a respected 2016 paper on the impact of the oil sector in Turkana reached similar conclusions. They said it could boost employment and development in the region, but stressed it was vital to give local communities a voice in key decisions and manage their expectations. Minimising the loss of access to land and reducing any pollution of water and soil through robust environmental legislation will also be critical.

How all these issues are managed, the paper concludes, will determine whether oil riches lead to a “healthy and peaceful Turkana” or towards “a vicious cycle of violent conflict, poverty and underdevelopment”, or even, as the blunter language of the summarising graphic puts it, to “civil war”.

§§§

Kenya's drought "solution" becomes a major menace once again

By Anthony Morland in Lodwar



Prosopis juliflora. Photo: Forest and Kim Starr/Wikimedia Commons

IN 2006 A TOOTHLESS GOAT made legal history in Kenya – and headlines around the world – when it appeared in court as part of a bid to sue the government over a plant deliberately introduced a few decades earlier to help rural communities adapt to drought. That plant became an invasive alien weed, and it is still causing havoc to this day in the country's drylands.

The goat had no teeth because it had fed on the corrosively sweet pods of *Prosopis juliflora*, a drought-resistant, deep-rooted evergreen shrub of Central American origin also known in parts of Kenya as *mathenge* and, in the Turkana language, as *etirai*.

Although the judge in the 2006 trial threw out the case – one of several similar lawsuits – *Prosopis* has not gone away and is now making life even harder for livestock herders in Turkana County as they contend with one of the worst droughts in living memory.

“When I was growing up, there was no etirai; there was rain and grass,” recalled Ekaru Lopetet at the livestock market in Lodwar, the main town in Turkana County.

“It has really invaded our pastureland. There is nothing we can do to get rid of it – you have to uproot it, which is very hard work, because if you just cut it back, it grows stronger, and it absorbs a lot of water... I don’t know how to defeat it.”

Johnstone Moru, an advisor on climate change issues to the county government in Turkana, told IRIN the plant “colonises pasture and consumes a lot of water”.

“It flourishes even in the dry season, so areas that used to have water are drying up,” he explained.

“Elimination is hard because the seeds are spread by wind and animals.”

Ewoton Epeot, a Turkana woman in her 70s who still farms a plot of land near the village where she grew up, described how the latter works.

“When the pod matures, the animals eat it and the seeds pass through them and are deposited in their droppings,” she told IRIN. “*Prosopis* then grows in our fields amid our crops.”

A paper published this year on the economy of Turkana County described *Prosopis juliflora* as “one of the most destructive invader plant species in the world”.

From solution to invasion

Yet just a few decades ago, the plant was seen as more of a solution than a problem.

This was chiefly because, being a fast-growing evergreen that produced timber and was a good source of shade and apparently good fodder, it seemed an ideal candidate for the rehabilitation of depleted environments in Kenya’s arid regions.

Prosopis juliflora was deliberately introduced to the Turkana and Barongo districts of Kenya in the 1980s and 1990s.

But before long many of the plant’s shortcomings became apparent, as a paper published in 2011 in the journal *Biodiversity* explained.

“Once in the soil, seeds can lie dormant for long, till good conditions return. *Prosopis* is deep-rooted and coppices well when cut above ground. These factors make it highly invasive and hard to control once established,” it noted.

By the early 2000s, *Prosopis* was found in seven of Kenya’s eight provinces.

“It was more aggressive in arid lands of the north where it formed thorny impenetrable thickets especially along water courses, flood plains, roadsides and in inhabited areas. It was encroaching upon paths, dwellings, irrigation schemes, crop farms and pastureland, significantly affecting biological diversity and rural livelihoods,” the paper added.

A survey of Kenyans in affected areas conducted by the paper’s authors found that while residents mentioned 18 positive attributes of *Prosopis*, these were outweighed by 24 negative factors, including invasion of pastureland, cropland, and homesteads, and the harmful effects of the plant’s thorns.

“It was evident that in areas where *Prosopis* was well established, it was beyond the community’s ability to control its expansion. *Prosopis* invasion had reduced the capacity of pastoralists to keep large herds of livestock in affected areas,” the paper said.

Some potential

The Turkana county government’s investment plan barely mentions *Prosopis*, beyond suggesting it “may be a blessing in disguise and should be sustainably exploited for commercial production of charcoal, animal fodder and bio-fuel”.

Such exploitation has successfully taken place in other parts of the world where *Prosopis* is also prevalent.

The International Livestock Research Institute, in a 2007 paper about climate change adaptation in Kenya’s arid lands, noted that the plant had in some countries been incorporated into agroforestry systems, producing not only firewood and charcoal, but also tannins and dyes from its bark, and medicinal preparations. It also noted its use in Mexico to produce a coffee substitute, flour, sweet syrup, even an alcoholic drink.

“*Prosopis* is known to enhance soil quality and structure, can be used to control erosion and can be planted as shelter belts and live fences,” the paper added.

In Kenya also, some projects exist to turn *Prosopis* into a resource. With support from the UN and a local NGO, residents around a refugee camp near the Turkana town of Kakuma are making charcoal from the plant using high-efficiency kilns, and then selling the charcoal, which is distributed to the most needy of the camp’s 180,000 residents. For years, the camp’s huge demand for cooking fuel led to rampant deforestation.

But the county government's five-year plan acknowledged that scaling up the sustainable utilisation of *Prosopis* would require significant investment in the most impoverished and marginalised regions of Kenya.

For the time being, as Sylvester Sulu of Tupado, a local NGO, put it to IRIN, the plant remains "a major blow".

"It is everywhere," he explained. "If you look at this place from a plane, it looks green [but] the grass can't get to grow."

Back at the market in Lodwar, Lopetet knows *Prosopis* pods get stuck in his goats' teeth, making them weak so they rot and fall out, but he feeds them to them regardless – 90 of the 100 goats he used to own have died in recent months for lack of water and food.

"We don't give the animals this very often," he said. "But because of the drought, there is little else to eat."

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Fact files



Climate change and the global effort to combat it are highly technical fields of often dizzying complexity. The fact files in this chapter are designed to help the non-expert get to grips with the ins and outs, from the impact at ground level to what the international community is doing to help those most affected.

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Climate change adaptation finance

By Anthony Morland in Paris



MORE FREQUENT AND SEVERE DROUGHTS, floods, and storms associated with climate change mean the livelihoods of the world's roughly half a billion smallholder farmers are growing ever more precarious.

Despite the extreme and widespread vulnerability of farmers, who are key to the food security of many countries, resources to help them cope with climate change – in the form of adaptation finance – have long been dwarfed by the money made available to reduce greenhouse gas emissions and develop low-carbon economies.

Developing countries need tens of billions of dollars a year to meet their adaptation needs, according to the UN Framework Convention on Climate Change (UNFCCC).

In the agricultural sector, examples of adaptation include encouraging better use of scarce water resources, developing drought-tolerant crops, building flood defences, constructing roads (to improve market access), setting up early warning systems, and rolling out climate-related insurance schemes.

The ratio between mitigation and adaptation finance has historically been about 3:1, although the past six years have seen a rise in adaptation funding, notably with the operational launch of the \$10.1 billion Green Climate Fund in late 2015.

The Paris Agreement, signed at the 21st Conference of Parties to the UNFCCC in December 2015, did much to give more emphasis to adaptation finance. For detailed analysis of this, see pages 16-25 of this text.

There are currently more than 50 funds providing adaptation finance. Here's an overview of some of the biggest and most relevant to smallholder farmers:

Green Climate Fund (GCF)

Established in 2015 and headquartered in South Korea, the GCF is now the UNFCCC's main finance channel. It has some \$10.1 billion in its coffers, about half of which is meant for adaptation.

The GCF is currently supporting 43 projects – 20 of them in Africa – costing a total of \$2.2 billion and benefiting some 128 million people with initiatives including water conservation, irrigation, flood management, and climate information.

To make it easier to access its funds, the GCF has made up to \$1 million per country per year available for help with the application process for grants, loans and equity investments, and to see projects through to completion.

However, not just anyone can knock on GCF's door with their adaptation ideas and ask for money:

Applications have to be channelled through "accredited agencies" that meet the fund's standards in areas such as financial probity and gender. The agencies can be local organisations, government bodies, multinational regional entities, and also private sector bodies.

UK International Climate Finance (ICF)

The main channel of the UK government's adaptation and mitigation financing, this \$5 billion fund became operational in 2011. It is managed by a board comprising officials from several UK government ministries, with most of the money coming from the foreign aid budget.

ICF disbursements are channelled through national governments in developing nations, regional organisations, and a range of multilateral bodies such as the World Bank and the UNFCCC.

The ICF portfolio is divided between capital contributions/concessional loans and grant finance. The majority of contributions to multilateral funds are in the form of concessional capital. Grants are used primarily as a mechanism for bilateral contributions.

According to its own published results, between its inception and September 2016, the fund helped 21 million people cope with the effects of climate change through 29 programmes, a figure projected to rise to 54 million during the lifetime of the fund.

Pilot Programme for Climate Resilience (PPCR)

This is a \$1.2 billion adaptation funding window of the \$8.3 billion Climate Investment Funds, which were designed by both developed and developing countries and are run by multilateral lenders such as the World Bank, the Asian and African development banks, the European Bank for Reconstruction and Development, and the Inter-American Development Bank.

The PPCR works hand-in-hand with poor countries' development plans, notably their National Adaptation Programmes of Action, which are overviews of the most pressing needs and the plans for addressing them.

To date, the PPCR has approved \$939 million for 58 projects in 28 countries and two regions, supporting some 2.8 million beneficiaries. These projects are expected to attract a further \$2 billion in co-funding from other sources.

Least Developed Countries Fund (LDCF)

This \$1 billion fund set up in 2001 by the UNFCCC and managed by 18 international organisations under the Global Environment Facility (GEF), is designed mainly to help some developing states draw up their National Adaptation Programmes of Action.

By 2016, the Fund had approved around \$1 billion for projects and programmes in 49 countries, leveraging almost \$4 billion in financing from partners.

Special Climate Change Fund (SCCF)

The SCCF is a \$362 million GEF fund that complements the LDCF but is open to all developing nations and provides financing to a wider range of actions related to climate change, with an emphasis on adaptation.

Adaptation Fund

Also part of the UNFCCC architecture, the Adaptation Fund became operational in 2001 to support specific projects in developing countries that are especially likely to be badly affected by climate change. More recently it has expanded its scope to fund regional projects, the first being one to improve food security in east Africa.

It currently has \$417 million committed for 63 projects in 53 countries.

The fund is partly financed with some of the proceeds of the Clean Development Mechanism (CDM), among other sources. Two percent of the proceeds of Certified Emissions Reductions issued for CDM projects go to the fund. Other funding comes from governments and private donors.

The fund is supervised by a 16-member board that meets twice a year.

It channels its money through accredited implementing agencies: national, regional, and multilateral bodies that met the fund's criteria and help develop specific projects.

In 2014, the fund's board approved a facility for providing small grants to help rural farmers and other vulnerable communities in South Africa cope with the effects of climate change. This more direct approach is expected to be expanded to other countries.

Adaptation for Smallholder Agriculture Programme (ASAP)

ASAP, a grant-based trust fund, was set up in 2012 by the UN's International Fund for Agricultural Development (IFAD) to help smallholder farmers in IFAD's 176 member states access information, tools, and technologies that help build resilience to climate change and boost their yields.

It currently operates through national governments in over 30 developing states and has channelled more than \$300 million to smallholder farmers. By 2020, ASAP aims to have helped more than eight million farmers.

ASAP's funds are accessed according to the same procedures used across IFAD. These start with the submission of a project concept by an arm of the recipient country's government that is developed into a detailed project design, which is eventually put to the IFAD executive board.

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Climate change, food security and adaptation

By Anthony Morland in Paris



Photo: Maria Olsen/EC/ECHO

THE HUMANITARIAN CRISIS UNLEASHED by drought in Somalia has again highlighted the close links between extreme weather and food security. But how exactly are the two connected? And what can farmers in developing countries do to lessen the negative effects of climate change? This Q&A provides an overview of the key issues, with a focus on smallholders in Africa.

What is food security?

The term may sound like jargon for simply having enough to eat or knowing where one's next meal is coming from, but food security is a multifaceted concept that has evolved significantly over time. According to the

current UN World Food Programme definition, people are said to be food secure when “they have availability and adequate access at all times to sufficient, safe, nutritious food to maintain a healthy and active life.”

In other words, it’s not just about now, but the foreseeable future; and it’s not just about food, but the right kind of food, and the ability to prepare it safely.

“Access” is a key component of this definition: even when there is plenty of food in markets or granaries, people will be food insecure if they cannot afford to buy it, or have nothing to barter for it. Even famines sometimes occur when food is available but not accessible.

To help aid agencies respond effectively to a food crisis in Somalia, a system was established in 2004 to precisely define and analyse local food insecurity, using a scale consisting of five categories: None/Minimal, Stressed, Crisis, Emergency, and Humanitarian Catastrophe/Famine.

The evidence-based Integrated Food Security Phase Classification system, run by a range of UN agencies and NGOs, and which was thoroughly updated in 2017, has now been adopted in 25 countries across the world.

How does climate change affect food security?

One of the key effects of climate change is that extreme weather events such as floods, droughts, heatwaves, and rainfall variations become more frequent and more severe.

Rising sea levels linked to climate change cause coastal erosion and loss of arable land. Rising temperatures encourage the proliferation of weeds and pests and threaten the viability of fisheries.

All this has a direct impact on agricultural production, on which the food security of most people in developing nations primarily depends. This is because agriculture in these countries is almost entirely rain-fed, and so when rains fail, or fall at the wrong time, or major storms strike, entire crops can be ruined, key infrastructure damaged or destroyed, and community assets lost.

Consequently, climate change is widely seen as the greatest threat facing the estimated 500 million smallholder farmers around the world.

According to the WFP, “Changes in climatic conditions have already affected the production of some staple crops, and future climate change threatens to exacerbate this. Higher temperatures will have an impact on yields while changes in rainfall could affect both crop quality and quantity.”

Rising grain prices and falling yields hit the world’s poorest people hardest, as they spend most of their income on food.

In the long term, climate change could “create a vicious cycle of disease and hunger”, WFP warns.

By 2050, child malnutrition is expected to increase by 20 percent relative to a world with no climate change. Meanwhile, the world's population is set to reach nine billion by 2050. With more people eating meat and dairy products, and more farmland given over to biofuel crops, the UN's Food and Agriculture Organization believes that (to satisfy demand in 2050) global food production will have to increase by 70 percent over 2005 levels.



Photo: Nahom Tesfaye/UNICEF

Why is agriculture in Africa especially vulnerable?

Smallholder farmers account for some 80 percent of food production in sub-Saharan Africa. With only a tiny proportion of farmland under irrigation, and reliable water sources becoming scarcer, most crops depend on rainfall, which climate change is making increasingly erratic and unpredictable.

Farming in Africa is often done in marginal areas – such as flood plains, deserts, and hillsides – where ever more frequent weather shocks cause severe damage to soil and crops.

While there have always been variations in climate, the current pace and intensity of these changes mean that traditional methods of adapting to changes in weather patterns are no longer sufficient.

The millions who raise livestock in more arid areas of Africa are particularly vulnerable to extreme weather, as the current drought affecting Somalia and Kenya demonstrates.

When shocks do occur, and crops are ruined or livestock dies, the endemic poverty of most rural farmers means they have little to cushion them in terms of savings and stockpiles.

Few African smallholders own the land they cultivate, so they have difficulty in obtaining credit for inputs, such as fertilisers and pesticides, or machinery. Many also lack the ability to store their crops, while poor infrastructure often limits their access to markets.

Modern yield-boosting technologies, as well as insurance policies, are beyond the reach of many smallholder farmers. Even when farmers do have extra cash, there is little incentive to invest in the land they farm if they lack the title deeds.

According to the fourth assessment report of the UN Framework Convention on Climate Change, “Africa is likely to be the continent most vulnerable to climate change.

Among the risks the continent faces are reductions in food security and agricultural productivity, particularly regarding subsistence agriculture, increased water stress and, as a result of these and the potential for increased exposure to disease and other health risks, increased risks to human health.”

What can African farmers do about it?

Changes made to mitigate the effects and risks of climate change, whether at the regional, national, or very local level, are known as “adaptation”.

Smallholder farmers facing weather shocks and other climate-change related events are already using a variety of adaptation measures. These include diversifying and rotating the crops they grow, engaging in non-agricultural income generating activities, adjusting the times they sow their lots, conserving soil and water, building irrigation systems and flood defences, using more inputs such as fertilisers, sowing improved seeds, planting trees, and integrating crops with livestock.

Farmers need support from their governments to make the right adaptation choices. This support can take the form of more reliable and localised weather forecasts, subsidies for inputs, well-trained extension workers, better facilities for livestock health, well-funded agricultural research, and improved rural infrastructure such as road networks.

What about the money?

Although it directly affects the livelihoods of billions of people, agriculture has long received only a fraction of overall climate finance. According to this World Bank report, agriculture, forestry and other types of land use

combined received just \$6-8 billion of the \$391 billion spent on climate finance globally in 2014. Mitigation – reducing emissions and transiting to low carbon economies – has traditionally received three times as much as adaptation.

But the importance of investing in climate-resilient agriculture is gaining recognition, notably in the Sustainable Development Goals and in the Paris Agreement of the UN Framework Convention on Climate Change (UNFCCC), both adopted in 2015.

Most countries party to the UNFCCC have included at least some estimates of the costs of agricultural adaptation in their individual climate change action plans, known as Intended Nationally Determined Contributions. Details of man

The newest and largest source of climate finance, the \$10-billion Green Climate Fund, aims to balance its resources equally between mitigation and adaptation. Precisely what effect US President Donald Trump's withdrawal from both the Paris Agreement and the GCF will have on agricultural adaptation finance remains to be seen, but experts are pessimistic.

Globally, there are more than 50 different funds supporting adaptation projects. Some of the most important ones are outlined in our factsheet on adaptation finance.

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Pastoralism and its future

By Anthony Morland in Lodwar



A livestock-raiser in Kenya's Turkana County. Photo: Fredrik Lerneryd/IRIN

IN DRYLAND AREAS ACROSS THE WORLD, tens of millions of people raise domesticated animals on open rangeland. Extreme variations in weather mean such pastoralists have to be highly adaptive and deploy a range of specialised skills. Climate change is making this way of life increasingly precarious.

This fact file sets out some of the key issues:

What is pastoralism?

Pastoralism is a type of livelihood in which income and social status depend mostly on livestock grazed on communal open rangeland where the availability of nutrients and water vary greatly over both time and space.

In other words, pastoralists are herders (mostly of cows, sheep, goats and camels, but also of yaks, horses, llamas, alpacas, reindeer and vicunas) who are frequently on the move in inherently unstable environments.

This defining characteristic of pastoralism is known as “strategic mobility.” It’s “strategic” because, while appearing aimless or haphazard to the untrained eye, its motive is to enhance production and herd size by ensuring livestock consumes the most nutritional grass available.

When this mobility takes the form of regular back-and-forth trips between the same departure and destination areas, it is known as “transhumance”, whereas “nomadism” describes journeys that vary according to the location of the best resources.

Pastoralism is therefore a very specialised system that requires extensive social networks and deep knowledge – honed over centuries – of weather patterns, breeding techniques, herd management, and the intricate characteristics of different species of animal and vegetation.

Put in economic terms, pastoralism is a complex exercise in the perpetual analysis and management of costs, risks, and benefits. But what is being tested now more than ever is the ability of pastoralists to constantly adapt to changing circumstances.

Why is it important?

What chiefly distinguishes pastoralism from sedentary agriculture is that, thanks to strategic mobility, environmental variations are (except in times of drought) seen as an asset rather than a problem: If you can move, good grass is always within reach.

In dryland environments, pastoralism tends to deliver better food security than crops and produces edible proteins more efficiently than intensive livestock systems.

Pastoralist regions are often undervalued or even ignored by national governments. As African countries decolonised in the 1960s, development policies tended to borrow from European models, emphasising “modernisation” and the commercialisation of agriculture and privatisation of pastoral rangelands.

Yet the contributions pastoralist systems make to national economies are frequently considerable: As well as supplying meat and milk to growing urban populations, they often provide jobs in the transport and food sectors, for example.

How many pastoralists are there?

Estimates of the total number of people living a pastoral livelihood vary widely. A 2006 study published by the Food and Agriculture Organization put the number at 120 million, which includes some people who also grow crops (known as “agro-pastoralists”). Of these, 50 million are in sub-Saharan Africa, 31 million in the Middle East and North Africa, 25 million in Central Asia, 10 million in South Asia, and five million in South and Central America.

Not long after the FAO published its study the International Fund for Agricultural Development said there were 200 million pastoralists in the world.

A 2007 estimate put the number of animals raised in pastoral production systems in Kenya alone at 14.1 million, with a value of \$860 million.

Why is it under threat?

In many parts of the world, government policy poses significant hurdles for pastoralists. For example, a 2015 paper by the Forced Migration Review explains how the governments of Oman and Mongolia “encourage settlement or provide only limited support for customary mobile lifestyles whilst favouring extractive industries for tax revenue.”

Pastoral lands have also shrunk because of the increase in conservation areas, mechanised agriculture, irrigation schemes and bio-fuel plantations.

According to the African Union, pastoral areas occupy about 40 percent of Africa’s landmass and are found in almost all of the continent’s countries, mostly in arid or semi-arid areas that in many cases suffer from historic marginalisation, a dearth of basic services such as roads, markets, clean water, schools and healthcare, and misguided development policies that continue to regard pastoralism as inefficient and even backward.

Seven years ago, the AU published a major policy framework for pastoralism in Africa, warning that its sustainability faced a range of emerging threats, such as “demographic trends, protracted conflicts, reduced access to grazing land and water, and in some regions, climatic changes.

“Some pastoral areas are known for increasing levels of destitution and food insecurity, and the impacts of drought are worsening,” it said.

Drought depletes all the resources on which pastoralists depend: water, pasture, livestock health, milk, meat, and crop yields.

IRIN’s recent reporting shows the effects in the Kenyan county of Turkana, where more than 90 percent of the 1.3 million inhabitants live in extreme poverty and where a prolonged drought has killed hundreds of thousands of head of livestock by critically reducing the availability of pasture and water.

The discovery of oil in Turkana has led to the construction of large exploration sites that have impeded the essential mobility of pastoralists there.

What about conflict?

In some of the world’s pastoral areas, such as the Karamoja cluster, which includes parts of Kenya, Uganda, South Sudan, and Ethiopia, livestock-raising communities have a long history of raiding each other’s animals. In the absence of effective state-provided security, small arms are common among many of these groups.

The history of raiding is rooted in traditional rites of passage and the desire to acquire dowries or “bride prices”. But in recent years the phenomenon has evolved, at least in Kenya, with raiding becoming embroiled in organised crime within the meat sector and the orchestrated violence of rival politicians.

Whether such conflicts over resources are triggered by drought, or more broadly by climate change, is the subject of considerable academic debate. And evidence from Kenya suggests that pastoralists tend to fight more during times of abundance than scarcity.

In times of drought, different communities may step up their cooperation, whereas during the wet season animals are healthier and grass is richer: factors which facilitate the long journey home from a raiding location.

What future?

If the primary Sustainable Development Goal of “eradicating poverty in all its forms everywhere” is to be achieved for the world’s tens of millions of pastoralists, governments need to stop viewing pastoralism as archaic and inefficient, and provide the sector with the political and economic support that ensures its sustainability and prosperity.

In order to deliver the “unreleased potential” of pastoralism, a 2013 paper published in *Animal Frontiers* urges decision-makers to invest in the sector, “identifying and implementing strategies to understand, consolidate and increase the present contribution of pastoral systems to food security and livelihood from the local to the global level.”

Without the right kind of investment, as herder Peter Ikaru told IRIN in Turkana, “all that will be here in 100 years is drought and hunger.”

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Commentaries



This final chapter of the e-book is given over to advocacy for specific changes from two experts in their respective fields: Everjoice Win of Action Aid International and Cathy Watson of the World Agroforestry Centre. Win calls for women to be placed front and centre of adaptation efforts, while Watson champions the more widespread adoption of a practice known to both mitigate climate change and lessen its impact: planting trees amid farmland.

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Don't ignore the one group that can make climate action happen

By Everjoice Win

International director of programmes and global engagement at Action Aid International



Photo: Ish Mafundikwa/IRIN

LAST YEAR, THE PLANET SUFFERED the terrible impacts of one of the worst drought and hunger crises seen for decades. At the end of 2015, 30 percent of the global land area was in drought conditions, one of the highest figures since modern record keeping began.

As many in the humanitarian sector will already be aware, this deep and extended crisis was brought on by a disastrous combination of climate change and the 2015 to 2016 El Niño cycle.

In Southern Africa, which was one of the hardest hit regions, countries faced their worst drought in 35 years. National emergencies were declared in Lesotho, Malawi, Namibia, Swaziland, and Zimbabwe. In South Africa, eight out of nine of the country's provinces, which collectively produce 90 percent of the country's maize, were affected.

This time last year, 18 million people in Southern Africa were estimated to be food insecure.

While El Niño is a naturally occurring global weather cycle that takes place every three to seven years, many scientists conclude that it and climate change combined last year to create new and extreme impacts.

This was the year in which the Earth's atmosphere experienced its highest ever level of greenhouse gases. It was also the hottest year on record, the third record year in a row. Last year's El Niño was also one of the strongest events on record, as well as one of the longest lasting.

And as anyone working in the humanitarian sector will know, the effects of this drought have been devastating. The impacts of El Niño went beyond causing immediate hunger, jeopardising the longer-term prospects for farming and often wiping out livelihoods in the process. These long-term impacts of the crisis continue to affect many people today.

The most vulnerable

The drought felt across Southern Africa has had particularly damaging outcomes for women smallholder farmers, who make up 43 percent of developing countries' agricultural labour force.

As with any kind of disaster, women are particularly vulnerable to the impacts. Being a woman will often mean additional work and social burdens, but lower status and fewer privileges when disaster strikes.

Negative "coping mechanisms" commonly employed by women and girls became much more widespread as a result of the El Niño drought. For example, women frequently put their children and husband's nutrition first during disasters, and were often the last to eat, if there was any food left for them.

Women and girls reported needing to walk for several hours longer each day to find scarce water, thus missing out on education, income and rest opportunities.

In Malawi and Lesotho, reports from communities working with ActionAid, the anti-poverty NGO, indicated that some women were resorting to sex work to make ends meet, putting them at higher risk of violence and HIV & AIDS. Child marriages were also reported to be on the increase.

These trends threaten women and younger girls' well-being, and can further hold them back from taking part in activities that could improve their own status and human rights, their resilience – and that of their family and community – in the longer term.

Fortunately, Southern Africa is now in a recovery phase. This is a long and slow process, because the extended drought has taken a severe toll on communities' incomes, livestock, land, savings, education, health, and more.

But with climate change worsening, we know that extreme weather events are becoming increasingly frequent and severe.

Any recovery and rebuilding efforts must have an eye on the future, and the climate change impacts that will likely continue to affect the region.

Recovery efforts as well as ongoing programmes in development and agriculture in the region must therefore prioritise adaptation, disaster prevention, and preparedness.

Amid the crisis last year, a number of key initiatives can teach us important lessons on effective strategies to scale up resilience.

Women's leadership

The critical importance of working with women in development as well as in crisis situations is becoming increasingly recognised in the sector, and ActionAid found this approach to be a key reason for success in both strengthening farmers' resilience to drought, and in responding to the disaster.

It is well recognised that those hardest hit during disasters are the most vulnerable sections of society, such as women, girls, and persons with disabilities.

The exclusion and disadvantages women and girls face long before disasters strike mean they often have unequal access to, and control over, productive resources such as land and services like education, health care, the ability to build assets and reduce risks, or to access post disaster relief.

Disasters such as the El Niño crisis further entrench these inequalities.

But women are responsible for most of the food produced and eaten in many African countries, and are responsible for key household activities.

Women often hold families and communities together, yet they are all too-often made invisible, regarded as dependent on males, and are left out of key decision-making processes.

Sexual and gender based violence, which women already disproportionately experience across most societies, are often exacerbated and magnified during disasters.

Addressing chronic underlying vulnerabilities, including those faced by women, can therefore go a long way towards preventing recurrent and preventable crises.

Improved gender equality is proven to make humanitarian response outcomes more effective, in particular when recognising and promoting women's leadership, so that they can address barriers within their communities as well as meeting women and girls' collective needs and upholding their rights.

Women know what they want, what they need, and what can help them in times of disasters. It is imperative that aid agencies talk to the women themselves and involve them throughout the programme cycles.

Furthermore, promoting and valuing women's leadership is a profound way of fundamentally (and hopefully permanently) shifting the unequal power relations common across most communities.

Women's leadership should therefore be at the core of both community adaptation programmes, as well as disaster preparedness and risk reduction programmes.

Programmes and policies must actively pursue the participation, empowerment, and leadership of women in addressing climate change impacts and future crises.

Agroecology

Agriculture plays a critical role in food security, livelihoods, and development in Southern Africa. Ensuring that agriculture is able to adapt to a changing climate is therefore a key component of ensuring rural communities' resilience.

"Agroecology" is a name for a set of agricultural techniques that apply ecological principles to agriculture, and which are proving to be one of the most effective resilience strategies available to smallholder farmers.

These techniques work with nature, increase biodiversity, and avoid harmful agro-chemicals that can impact the environment and human health.

Agroecology is similar to "organic" farming, but specifically seeks to advance the interests of smallholder farmers, their rights over resources such as local seed diversity, and to strengthen their local economies.

In the face of erratic rainfall and weather patterns brought on by climate change, agroecology is proving to be a lifesaver.

The addition of organic materials improves soil structure, helping it to absorb more water and to retain it in times of low rainfall and drought, as well as to retain its structure in times of heavy rainfall and flooding. By increasing locally adapted crop diversity, farmers can also spread their risk and reduce the likelihood of crop failure.

With unpredictable and extreme weather events on the rise as a result of climate change, farmers, NGOs and policy-makers must open their eyes and minds to the importance of these approaches.

Joined-up policy needed

It's clear that policies for adaptation, development, disaster risk reduction, and climate change must be more effectively integrated and coherent. As Southern African countries develop their National Adaptation Plans, ministries must reach out to a range of stakeholders and consider these cross-cutting lessons.

They must challenge their assumptions, break moulds, and adapt their policies to the new realities of climate change.

Women's leadership and agroecology are two vital tools that are urgently needed in Southern Africa for strengthening resilience to the challenges of climate change.

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Agroforestry should play a bigger role in tackling climate change

By Cathy Watson

Chief of programme development, World Agroforestry Centre (ICRAF)



Photo: ICRAF

NEVER HAS IT BEEN SO PRESSING to address climate change. So let's hurry to embrace a proven part of the solution. The radical (but not new) concept of agroforestry – be it integrating trees to create shade over coffee bushes, adding trees to Colombian cattle ranches, or managing and encouraging shea trees to flourish amid millet crops in the Sahel – must move to centre stage.

The Global Carbon Project estimates that 2017 will see a two percent rise in worldwide carbon dioxide emissions, reversing the downward trend of the previous few years.

Almost a quarter of these emissions come from agriculture and the conversion of forests and wetlands into farmland.

This year is also set to be one of the hottest three ever recorded, according to the World Meteorological Organization. And, unlike 2016, 2017 has managed this even without a temperature-boosting El Niño weather system.

Flash floods in Southeast Asia, drought in East Africa, and melting glaciers in Latin America are just three examples of the extreme weather events linked to climate change that affect all corners of the world.

This is, truly, a global disaster, and one largely of our own making.

Solution at hand

But we also have the power to mitigate global warming, through reducing emissions of CO₂ and increasing its absorption by expanding or protecting “carbon sinks” such as forests.

One especially effective but still yet to be fully recognised mitigation strategy is agroforestry – the purposeful regeneration, planting, and maintenance of trees and woody bushes on farms and rangeland.

Already, almost a billion hectares of agricultural land across the world contains trees that farming families deliberately manage side by side with their crops and livestock. Around 1.2 billion people depend on these agroforestry systems.

The soil, vegetation, and biomass on every hectare of such land can capture 3.3 tonnes of carbon per year – much more than that captured by land without trees.

Recent research indicates that tree cover on agricultural land across the planet absorbs some 0.75 gigatonnes of carbon a year. That’s a sizable chunk of the 9.75 gigatonnes of CO₂ the world emits annually.

Notable fringe benefits

As well as absorbing carbon, the trees and shrubs grown among crops and on pastureland deliver a range of lucrative benefits to farmers, such as timber, fuel, fruit, oil, nuts, and animal fodder.

Nitrogen-fixing trees also enrich soils by withdrawing the element, which is essential for plant growth, from the atmosphere. This can lessen the need for chemical nitrogen fertilisers, which have a powerful global warming effect, both as they are made and as they eke back into the atmosphere.

Finally, the presence of trees on agricultural land improves groundwater recharge and regulation of water, thereby increasing yields of crops, milk, and meat.

Agroforestry therefore not only mitigates global warming, but also helps farmers adapt to the often devastating effects of climate change, such as floods, droughts, and unpredictable rainfall patterns.

Without the additional sources of income trees can deliver, farmers whose crops are damaged or destroyed by such weather shocks are often forced to take steps that drive them further into poverty, such as selling tools and consuming seeds reserved for planting.

Research conducted in 2011 in western Kenya by the organisation I work for found that “agroforestry improves farm productivity, off-farm incomes, wealth, and the environmental conditions of... farms”, and that it releases farmers from “detrimental coping strategies”.

Gaining recognition

In the last year, as the Armageddon facing the Earth concentrated the minds of policymakers and activists, agroforestry has received some much welcome recognition and accolades.

Drawdown, a major international project based on field research by 200 scientists, features two forms of agroforestry in its list of 100 solutions to global warming that are already in use. The solutions are ranked by the extent to which they would reduce CO2 emissions by 2050 if they were adopted at realistic rates.

Silvopastoralism, where trees are combined with pasture, increasing carbon sequestration up to tenfold, comes in at number nine, ahead of nuclear power, wind turbines, and electric vehicles.

Creating a canopy of tall trees over one or more layers of lower-lying crops (coffee and cacao are common examples) – a practice known as multistrata agroforestry – is listed in 28th place.

Governments of developing states are also turning to agroforestry with a lot of hope. More than 20, including agricultural giant India, cite agroforestry in their climate change action plans under the Paris Agreement.

Scientists have been aware of the benefits of agroforestry for decades and farmers for millennia, and the practice is gradually expanding every year. But with 22.2 million square kilometres of agricultural land on the planet, there's a long way to go.

Donors and development banks need to wake up to the importance of trees in farming systems. Too many promote an agricultural vision of large treeless fields.

While this may look modern, it is profoundly high-risk. Without trees, how will groundwater recharge? How will soil carbon be maintained? What will stop soil blowing away? Where will pollinators forage?

Agroforestry might not be a silver bullet, but it has a vital role in cushioning farmers from the harshness of weather patterns gone awry, and the world from the downward spiral of climate change.

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Conclusion

A couple of things are certain: climate change is not going away, and hundreds of millions of smallholder farmers across the developing world – among those least responsible for carbon emissions – will continue to suffer some of the worst effects of the greenhouse gasses emitted by industrialised countries. The challenges these farmers face in achieving sufficient yields to feed their families and turn a modest profit are considerable.

Yet the situation is not hopeless. As the articles in this e-book illustrate, there are many ways farmers can begin to adapt to the hard realities of climate change. Often, these entail only small steps requiring modest capital investment, such as sowing different kinds of seeds, using more fertiliser, conserving soil and water, planting trees amid fields, or rotating crops.

But they can't do it alone. Extension services – the networks of government trainers who teach farmers how to make the most of their plots – need to be beefed up with funding, personnel, and resources. Farmers are for the most part priced out of mainstream banking. They need easier access to credit so they can purchase these yield-boosting inputs and invest in better infrastructure and technology to add value to their harvests and get them cheaply to market.

Far more African governments should honour their commitment to spend 10 percent of their budgets on agriculture. But this is unlikely to be enough. The onus for delivering on the key Sustainable Development Goal of ending world hunger befalls the global constituency. Adaptation has been the poor cousin of the international community's response to climate change, with mitigation – mainly focused on reducing carbon emissions – taking the lion's share of available finance. The 2015 Paris Agreement, with the emergence of new funds, signals an important shift in emphasis towards "climate equity". This momentum must not be lost.



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