1 Stories from the field

CLIMATE SOLUTIONS THAT WORK FOR FARMERS

ABOUT CTA

The Technical Centre for Agricultural and Rural Cooperation (CTA) is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities.

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For more information on CTA, visit www.cta.int

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CLIMATE SOLUTIONS THAT WORK FOR FARMERS

SUCCESS STORIES FROM THE FIELD

A review of proven practices, tools or policies that promote resilience and help farmers to address the challenges posed by climate change

COORDINATED BY
Paul Neate, CTA
Bianca Beks, CTA

WRITTEN BY
Charlie Pye-Smith, United Kingdom

PEER-REVIEWED BY
Oluyede Ajayi, CTA

EDITED BY
WRENmedia, United Kingdom

DESIGN AND LAY-OUT
Stéphanie Leroy, France

PRINTED BY
Proud Press, the Netherlands

MAKING THE CASE FOR INNOVATIVE CLIMATE-SMART AGRICULTURE SOLUTIONS

Smallholder farmers in developing countries are likely to be among the people hardest hit by climate change because of agriculture's dependence on weather and the low level of resilience of farming to climate variability and change.

The good news is that innovative approaches are being developed to meet this challenge. One of these approaches – climate-smart agriculture – aims to increase farm productivity and incomes in a sustainable manner, enable farmers to adapt and build resilience to climate change and (where possible) reduce greenhouse gas emissions.

Farmers and government decision-makers need support if they are to make climate-smart agriculture work. First, they need reliable information to identify proven solutions to climate change and make informed decisions. Secondly, cooperation among institutions is essential to develop and disseminate best practices and promote conducive policies for climate-smart agriculture. CTA and its partners are at the forefront of efforts to provide this support and to generate the evidence base needed to underpin effective policy-making.

The stories in this booklet present a selection of climate-smart agricultural practices, tools and policies that are already having an impact on farmers' lives and livelihoods. These were identified by a call issued by CTA for case studies on such practices that are working at a local level and that show promise for scaling out.

It is my hope that this booklet contributes to promoting climate-smart solutions that can help millions of smallholder farmers. CTA looks forward to collaborating with different partners to identify opportunities for integrating these innovative solutions in the implementation of the Intended Nationally Determined Contributions (INDCs) of various countries and regions.

Michael Hailu
Director, CTA

EMBRACING CLIMATE-SMART SOLUTIONS

RISING TEMPERATURES, CHANGING PATTERNS OF RAINFALL, AN INCREASE IN EXTREME WEATHER EVENTS SUCH AS DROUGHTS, FLOODS AND HURRICANES AND THE SHIFTING DISTRIBUTION OF PESTS AND DISEASES ARE ALREADY HAVING AN IMPACT ON FOOD PRODUCTION IN MANY PARTS OF THE WORLD. IN THE TEMPERATE REGIONS OF THE NORTHERN HEMISPHERE LONGER GROWING SEASONS MAY LEAD TO HIGHER CEREAL YIELDS, BUT GLOBALLY THERE ARE LIKELY TO BE FAR MORE LOSERS THAN WINNERS.

Climate change is already depressing crop yields in some African, Caribbean and Pacific (ACP) countries. It is also having a negative impact on the abundance and distribution of fish stocks, on the nutritional quality of food and on biodiversity. According to the UN Food and Agriculture Organization (FAO), global food production needs to increase by 70% if we are to feed a projected population of 9 billion by 2050. If that is going to happen, farmers must find ways of becoming more resilient to climate change while at the same time increasing their productivity.

"When you hear people talking about climate change, they're often focusing on the problems," says CTA policy and climate-change expert Dr Oluyede Ajayi, "but increasingly, this question is being asked: where are the solutions? It is very important to understand and catalogue the measures that farmers are taking to cope with climate change, and the opportunities for using information and communication technology (ICT) and financing mechanisms to address climatic risks."

This was the aim of a CTA project, 'Documentation of proven practices, tools or policies that promote resilience and help farmers to address the challenges posed by climate change.' A call for proposals in mid-2014 elicited over 300 responses from researchers, farmers' organisations, development agencies, non-governmental organisations (NGOs) and international institutions. The proposals fell into three main categories: practices and technologies for adapting to climate change that have been successfully adopted by large numbers of farmers; the deployment of ICT tools and processes which are helping farmers become more resilient to climate change; and policies and financial instruments conducive to climate-change adaptation or mitigation.

After several stages of evaluation, the 14 most promising entries were chosen and supported by CTA. Having completed most of their documentation, leaders of the winning proposals were invited to discuss their research findings at a workshop at CTA's headquarters in Wageningen, the Netherlands, in August 2015. This booklet is an output of that workshop.

One of CTA's key aims is to promote policies and practices that increase agricultural productivity and farmers' resilience to climate change. In 2013, CTA and the CGIAR Research Program on Climate Change, Agriculture and Security (CCAFS) published a booklet in CTA's 'Success Stories' series which featured 16 examples of climate-smart agricultural innovations. The following year, CTA and CCAFS published a further series of climate-smart agricultural case studies from Africa. This booklet further expands our pool of knowledge about climate-smart agriculture.

Some of the projects which feature in the following pages describe approaches which have been used by farmers for many decades; others are relatively new and have yet to be fully validated. One way or another, all of them are designed to help farmers become more resilient to climate change, while improving their livelihoods and standard of living.

CHAPTER 1

MAKING THE MOST OF WATER

In many parts of the world, farmers are having to cope with changing patterns of rainfall.
In some areas, climate change has caused a decrease in rainfall; in others it has led to changes in the timing of rainy seasons and their duration. Farmers in many ACP countries are also facing the challenges posed by more frequent floods and droughts. The first four stories explore projects and processes designed to make the best use of available water resources.

Small structures have helped farmers to cope with variable rainfall and led to significant increases in sorghum and millet yields

STORY 1

Indigenous water harvesting boosts yields in the Sahel

Irénikatché Akponikpe and colleagues from the Université de Parakou, Benin, assessed the efficacy of a range of indigenous rainwater harvesting practices used by farmers in sub-Saharan West Africa. Meteorological data suggests that there has been a decrease in the number of rainy days and an increase in periods of heavy rainfall during recent years, leading to soil erosion, uncertain yields and seasonal food shortages.

Farmers in these areas have a long history of using small structures such as zai pits and stone or earthen bunds to reduce run-off and erosion and retain water to ensure healthy crop development. These structures have helped farmers to cope with variable rainfall and led to significant increases in sorghum and millet yields, by 30–50% in some areas. Indigenous rainwater harvesting practices have also helped farmers to restore degraded soils and led to an increase in biodiversity.

The researchers found that levels of adoption varied, with the practices being most widely used in arid and semi-arid areas in the Sahel. However, they could also help farmers to cope with climatic variability in the wetter areas to the south, in northern Benin, Côte d'Ivoire and Ghana. "These practices have many advantages when it comes to scaling up," says Dr Akponikpe. "They are easy to construct and do not require any major physical structures, so farmers can do all the work themselves." Millions of farmers in the region are now using these structures, and the number of adopters has been steadily increasing. Sixty-eight per cent of farmers in northern Niger are using zai pits and up to 90% are using variants of stone lines and ploughing in parts of Benin and Burkina Faso. ■

"The private sector has been driving the process and this provides a good indication of the sustainability and profitability of recirculating systems"

STORY 2

Recirculating water in the Caribbean

During recent decades, the Caribbean has witnessed significant climatic changes. Higher temperatures, rising sea levels, changing patterns of rainfall and an increase in the intensity of hurricanes are having an impact on traditional open-field, rain-fed farming systems, leading to declining yields and in some cases the loss of crops. Growing high-value crops under cover is one way of adapting to climate change, and can be particularly effective when combined with systems which recirculate water.

The Agricultural Research and Outreach Organisation (AGRO) analysed recirculating hydroponic and aquaponic systems – the latter combine vegetables with fish – in the Bahamas, Jamaica, Suriname and Trinidad and Tobago. Recirculating systems lose just 3–10% of the initial water supply and losses are markedly lower than those experienced with conventional irrigation systems. Owners of commercial systems reported that they are able to tap into high-end markets, thanks to the quality of their produce, and require less labour than conventional farming systems. Owners of smaller "backyard" hydroponic and aquaponic systems have increased their food security and their incomes.

"The private sector has been driving the process and this provides a good indication of the sustainability and profitability of recirculating systems," says AGRO's Malcolm Xavier Wallace. As a result of their success, government institutions are now establishing research and demonstration units, and the Inter-American Institute for Cooperation on Agriculture is getting individuals from the private sector to provide training for other farmers. ■

STORY 3

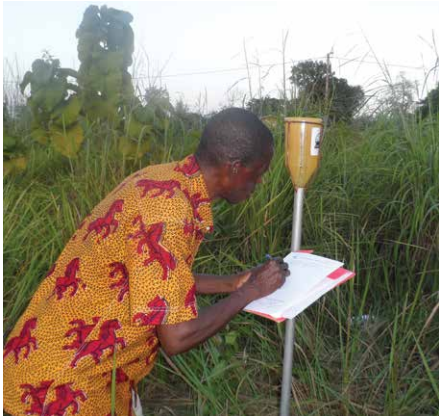
Harvesting rain in rural Uganda

Farmers in Rakai District, in southern Uganda, are receiving the same quantities of rain each year as they did in the past, but they are now having to cope with longer dry spells and shorter periods of heavier rainfall. As a result, four different rainwater harvesting technologies, first introduced some 40 years ago, have become increasingly important. Their effectiveness has been analysed by a research team from Makerere University.

The technologies help to reduce run-off by holding rainwater behind stone or earth embankments and they prolong the period of infiltration. They are frequently used in conjunction with conservation agriculture techniques which are designed to reduce the loss of top soil and retain moisture. The technologies help to prevent erosion and flooding, enhance soil fertility and increase the yields of high-value perennial crops like bananas. However, researchers found that several factors have acted as a disincentive to their wider adoption. These include inadequate technical support, the labour-intensive nature of construction, and the fact that open water provides a habitat for mosquitoes.

According to researcher Florence Kyazze, rainwater harvesting techniques have worked particularly well as part of a package of measures. "In Rakai District, they have been successfully embedded in other livelihood improvement measures, such as health and sanitation schemes, agroforestry programmes and group savings initiatives," she says. "Taken together, these measures are helping to improve crop yields and household incomes and leading to better health and education."

Approximately 680 farmers have adopted rainwater harvesting technologies in Rakai District. The rates of adoption for four different rainwater harvesting technologies have increased dramatically over recent decades. Recent research suggests that two in-situ technologies – Fanya Chini and Fanya Juu – have been adopted by 74% and 57% of farmers respectively. ■



STORY 4

Getting climate information to farmers in Côte d'Ivoire

In 2008, the World Meteorological Organization and the Spanish State Agency for Meteorology launched the METAGRI project in five West African countries. This involved roving seminars to increase the interaction between farmers and national meteorological services, based on similar initiatives in Mali which led to a significant increase in crop yields. By 2011, the project had been extended to nine other countries, including Côte d'Ivoire.

CTA support enabled climate expert Apollinaire Zian to evaluate the success of the METAGRI project in Côte d'Ivoire. During a two-year period, the project provided training for over 1,000 farmers from 435 villages. Farmers were given training on weather and climate issues. They were also taught how to use agro-meteorological data and rain gauges to determine the best time to plant crops.

Interviews were conducted with 100 farmers from 50 villages which had benefited from the training and the provision of rain gauges. An initial analysis of the data revealed that 74% of farmers believed the project had provided real benefits and influenced their planting times. Over 60% had doubled their crop yields as a result of the METAGRI training in just one year. Farmers who had received training were passing on their knowledge to other farmers, and the project had improved food security. ■

CHAPTER 2

LIVESTOCK FARMERS ADAPT TO CLIMATE CHANGE

Agriculture is not just a victim of climate change; it is also a significant cause. It is directly responsible for 10–12% of human-generated greenhouse gas emissions, and much more if the clearance of forests to make way for crops and livestock is included. Enteric fermentation in livestock accounts for around a third of all the nitrogen oxide emissions produced by agriculture, and overgrazing by livestock leads to significant greenhouse gas emissions. However, as the three stories below illustrate, better livestock management can also help pastoralists and farmers adapt to the changing climate.

STORY 5

Enhancing food security through on-farm fodder production

The Somali pastoralists who herd their cattle in Mandera County in north-eastern Kenya have always had to cope with scanty and unpredictable rainfall, but in recent years droughts have become more frequent, leading to heavy livestock losses and severe food shortages. In 1996, the government introduced fodder farming to communities living along the perennial River Daua. Prior to that, during times of crisis, fodder was brought in from hundreds of miles away. Now, over 300 agro-pastoralists are producing up to 2000 kg of fresh fodder per hectare per year, and this has given rise to a thriving new market.

In 2015, Diana Onyango of *Vétérinaires sans Frontières* interviewed over 250 farmers in 18 villages to assess the impact of the project. Besides providing a significant source of income for farmers, fodder production has led to an increase in milk production and improved livestock survival rates. This has helped communities adapt to the vagaries of the climate and significantly reduced livestock mortality during drought for fodder producers.

Adoption was initially slow, but increased significantly when NGOs began to provide support from 2000 onwards. "During recent years, more agro-pastoralist families have begun growing fodder crops without any external support, other than advice from the government extension agencies," says Dr Onyango. In other words, market forces now favour the expansion of fodder production. Successful scaling up of the practice will require improvements in the supply of high-quality seed and better access to credit. ■

> *Besides providing a significant source of income for farmers, fodder production has led to an increase in milk production and improved livestock survival rates*

STORY 6

Increasing pastoralists' milk production in Uganda

Over the past two decades, there has been a livestock revolution in Uganda's Southwest Region. A generation ago, the pastoralists here were proud owners of pure-bred, long-horned Ancole cattle, a traditional beef breed. Since then, many have transformed their farming strategy by crossing their Ancole cattle with black-and-white Friesians, a high-yielding dairy breed imported from the Netherlands. As a result, they now get five times more milk per cow, and the increase in milk production has led to corresponding increase in incomes. Many pastoralists now earn more money from milk than from the sale of cattle. With the extra money they now make, many pastoralists have built small dams to retain water during the dry season, diversified economic activities so they are not entirely dependent on cattle, and improved their rangeland management. These activities have helped to increase their resilience to climate change.

Ernest Niemi of US-based Natural Resource Economics and Ugandan farmer and entrepreneur Jacob Manyindo analysed the development of the pastoralist milk industry in Uganda, and its potential for scaling up. They identified a number of factors which have helped pastoralists to become major milk producers. These include changes in land tenure, encouraging the switch from nomadic to sedimentary pastoralism; strong leadership from the president; the introduction of Ancole-Friesian crosses; and good technical support.

"The way the markets work, the shift to commercial dairy farming is self-financing," says Ernest Niemi. Over-the-fence learning has been a key factor: most farmers said they only adopted commercial milk production after learning about the success of other farmers. Ernest believes that Uganda's experience demonstrates the pastoralist households could produce milk commercially across large landscapes in other parts of sub-Saharan Africa. ■

"Many pastoralists have built small dams to retain water during the dry season, diversified economic activities, and improved their rangeland management"

STORY 7

Fodder and soil fertility the key to resilience in Ethiopia

In 1998, when the French humanitarian agency Inter Aide launched a project to improve food security in a mountainous region in south-western Ethiopia, its inhabitants faced a critical situation. High population density, uncontrolled grazing and intensive cultivation had led to the loss of woodlands and pastures, soil erosion and declining yields. This was exacerbated by climatic changes, with short periods of violent rainfall interspersed with longer dry periods.

Now, 17 years later, there is much to celebrate. A programme combining soil and water conservation with the production of fodder crops has improved incomes and helped safeguard natural resources. Since 2005, over 15,000 families have introduced soil and water conservation measures and planted over 2,000 km of fodder crops on bunds and field boundaries. An important measure has been the introduction of "backyard" fodder nurseries. Over 90% of farmers interviewed believe the project has reduced soil erosion and increased crop yields and the availability of indigenous grasses, which have become an important cash crop.

"The demand for soil and water conservation measures and fodder crops comes from the farmers themselves," says Getamesay Daneke of Inter Aide. "It has not been imposed on them." The success of the project owes much to a fruitful partnership between farmers, traditional organisations called *iddirs*, local Inter Aide teams, research agencies and the Ministry of Agriculture. ■

"A programme combining soil and water conservation with the production of fodder crops has improved incomes and helped safeguard natural resources"

CHAPTER 3

CLIMATE-PROOFING STAPLE CROPS IN AFRICA

Plant breeding is the story of adaptation: of developing varieties with the traits best suited to the environment and the needs of farmers and consumers. These include the ability to resist diseases, withstand drought, produce high yields and perform well in the kitchen. Now, more than ever, the race is on to develop crop varieties which will help farmers adapt to the changing climate, whether this means less rain, higher temperatures or longer droughts. The stories below focus on the development of new crop varieties in Africa.

STORY 8

Promoting climate-smart sorghum in West Africa

Since 1960, mean temperatures in Benin have steadily increased and there has been a slight decrease in the annual rainfall. During the same period of time, crop yields have declined by 3–18%. Although this is not necessarily a case of cause and effect, there is a pressing need to develop crop varieties with the potential to cope with the changing climate.

In 2011 and 2013, Professor Polycarpe Kayode of the Université d'Abomey-Calavi coordinated two projects which introduced new varieties of sorghum, first tested and developed in Mali, to farmers in 10 districts in Benin. These were grown on demonstration plots and in farmers' fields, alongside local varieties which showed good drought resistance. Farmers were then able to assess their relative performance.

In 2005, Professor Kayode revisited the experimental sites. He found that producers were still growing three of the four improved varieties. According to farmers, these were more drought-resistant and precocious than local varieties, and showed good resistance to the parasitic *Striga* weed. Over 50% of producers were still growing the Soumalemba variety, and over 40% were growing Gouana. The farmers' choice of which varieties to grow also reflected preferences related to taste. "Even if a drought-resistant variety gives higher yields than local varieties, farmers won't be interested if they and their customers don't like the taste," says Prof Kayode. ■

Sorghum contains high levels of antioxidants and is gluten-free. Add to this its drought-tolerance, and it could become an increasingly attractive crop for farmers in the future

STORY 9

Developing new varieties of sorghum in Zambia

Continuous cropping, conventional tillage and poor land management have caused serious soil erosion and declining fertility in many parts of the Zambezi Valley. Small-scale farmers are also having to cope with frequent floods and droughts, which further undermine their food security.

The challenge lies in finding crops that can cope with extreme weather events. Sorghum may well provide an answer. It is deeper-rooting than maize and better at holding the soil. It can also withstand floods and droughts and grow with little fertiliser. The Zambia Agricultural Research Institute (ZARI) has developed over 20 different varieties of sorghum, and some of these have been trialled by farmers in four districts in the Zambezi Valley. The number of farmers benefiting the project rose from 488 in the project area in 2007 to 2,714 by 2011, with indirect beneficiaries exceeding 5,000. Many farmers have significantly increased their productivity. For example, in one region, yields have risen from around 1.7 tonnes to 4.5 tonnes per ha, leading to significant increases in income. Indeed, some farmers have done so well out of sorghum that they have been able to construct new houses.

However, sorghum, much of which is used in the brewing of beer, has an image problem, with most Zambians favouring maize as their staple food crop. "We're trying to challenge the perception that sorghum is a crop for the poor," says Lloyd Mbulwe, a scientist at ZARI's Sorghum and Millets Improvement Programme. Sorghum contains high levels of antioxidants and is gluten-free. Add to this its drought-tolerance, and it could become an increasingly attractive crop for farmers in the future. Well developed markets and the involvement of the private sector along the length of the value chain could help to increase the number of farmers adopting climate-smart varieties of sorghum. ■

CHAPTER 4

HARNESSING THE POWER OF ICTS

STORY 10

New mobile technology provides location-specific information

One of the great challenges facing African farmers is land degradation and declining productivity. If farmers are to become more resilient to climate change, they need to know how to improve their soils and which crops to plant. Two years ago, a collaboration led by the US Department of Agriculture and the Africa Technology Policy Studies Network (ATPS), and supported by the United States Agency for International Development, began research on a technology to help farmers make the right decisions about how to manage their land. The Land Potential Knowledge System (LandPKS) mobile technology was launched in Kenya and Namibia in April 2015.

LandPKS enables users to capture point-specific data – for example, about soil characteristics, rainfall and temperature – using a suite of apps connected to cloud-based storage. "This is essentially a decision-making tool," says Nicholas Ozor of ATPS. "It doesn't tell farmers what to plant or when, but provides the information for making the best decisions about which sort of farming practices work best in specific places." The apps also connect people living in areas of similar land types and potential so that they can share management practices and experiences.

In pilot projects, the apps were particularly popular with the 21–40 year age range, who are familiar with mobile technology. Around 80% of users said that they were "very satisfied" with the LandPKS apps and more than 70% said that the information they received had an impact on their land-use decision-making. As the apps are only as good as the content, accurate point-specific information, for example about soil quality, is essential for its scaling up. ■

ICTs are revolutionising the way knowledge is being transmitted to farmers in the developing world. In Africa, mobile phone subscriptions will soon reach 1 billion and a growing number of applications now provide farmers with information about everything from market prices to veterinary advice. Mobile apps, such as those described in the stories below, will play an increasingly important role in helping farmers become more resilient to climate change.

STORY 11

Designing agro-weather tools for farmers

The success or failure of a crop has much to do with the timing of agronomic activities: plant too soon or too late and crops may wither or die. Providing farmers with accurate forecasts can help farmers cope with the vagaries of weather. This was the aim of a pilot agro-weather advisory service launched in Embu and Ada'a districts in Kenya and Ethiopia. Key partners included extension agencies, the World Bank, research institutes and farmers' organisations.

The agro-weather tools, which are based on historical climate and agronomic data, use models which simulate the best time to carry out farming activities. Farmers receive geo-referenced information by text messages, local radio and newsletters advising them when to sow their crops – those covered include maize, beans and sorghum – and carry out other activities. In Kenya, up to 150,000 people received information by radio, 15,000 from newsletters and 60,000 via text messages and an interactive voice response system.

Idowu Oladele, professor of agricultural extension at Northwest University, South Africa, compared the yields of farmers who had taken advantage of the agro-weather advisory with farmers who had not in Embu District. Assessment results show that their crop yields were 30% higher, which suggests that the service was having a significant impact, although other factors might also be involved. If the agro-weather advisory service is to be scaled up, more weather stations will be needed. The service could also cover a wider range of crops and provide market information. Research found that farmers are willing to pay a share of the costs, which suggests that the system could be sustainable if it is carefully planned. ■

> *If the agro-weather advisory service is to be scaled up, more weather stations will be needed. The service could also cover a wider range of crops and provide market information*

CHAPTER 5

AGRICULTURAL INSURANCE HELPS FARMERS ADAPT TO CLIMATE CHANGE

Since time immemorial, farmers have had to cope with the vagaries of the weather. Droughts, floods, hurricanes, rainy seasons that arrive too late or too early can cause – and frequently have caused – devastating losses of crops and livestock. It is at times like these that farmers need all the help they can get. The two stories which follow illustrate how insurance schemes can provide farmers with the means to survive, and adapt, to unpredictable climatic events.

The insurance scheme is eminently scale-up-able, especially in other small island developing states

STORY 12

Agricultural insurance stands the test of time in Mauritius

In 1945, Mauritius set up what was to become the Sugar Insurance Fund Board after a cyclone destroyed the country's sugarcane crop. The Board's compulsory insurance scheme has played a major part in the industry's survival, providing a safety net for some 33,000 planters when their crops have been affected by extreme weather events. The planters' premiums pay for the running of the scheme.

The government has also introduced the Agricultural Calamities Solidarity Scheme (ACASSS), which provides insurance for small vegetable and fruit growers. Payments for sugar growers are made when the yields fall below a specified threshold, whereas payments for vegetable and fruit growers are triggered by a weather index, and farmers are paid in kind – for example, with seeds and compost – rather than with cash. ACASSS is supported by contributions from the government and farmers' premiums.

According to Bhanooduth Lalljee of the University of Mauritius, sugar growers are very satisfied with the insurance scheme, not least because premiums are deducted at source when they are paid for their sugar, so they don't feel as though the money comes out of their pockets. The fund has been so well-managed that the government has waived premiums for the next two years. "I think the insurance scheme is eminently scale-up-able, especially in other small island developing states, such as Fiji and Trinidad and Tobago, providing it is for cash crops," says Dr Lalljee. ■

STORY 13

Insuring pastoralist losses in drought-prone areas

Some 3 million pastoralist households in northern Kenya have to cope with frequent droughts, which can cause catastrophic losses of livestock and plunge populations into poverty. There have been 28 droughts in the last 100 years, four of which occurred during the last decade. Pastoralists have traditionally responded by selling off livestock, often at derisory prices; governments and donors have responded by distributing food aid.

In 2010, the International Livestock Research Institute, in collaboration with commercial partners, the government and international donors, launched a pilot Index-based Livestock Insurance Product for pastoralists in northern Kenya and southern Ethiopia. Traditional insurance products simply wouldn't work here, not least because transaction costs involved in determining payouts would be too high. Index-based insurance is different. Payments are triggered not by claims, but when satellite imagery indicates that forage availability has fallen below a certain level.

Research by the Agency for Rangeland Information and Development in Kenya (ARID-K) found that the index-based insurance products have had a significant impact. Households who have taken out the insurance tend to be better off, have increased their investment in veterinary and vaccination services, reduced their herd size and increased milk production and incomes.

"Insurance has also reduced the likelihood of distress sales by 30% and the likelihood of forgoing meals as a coping strategy by 25%," says Gargule Achibe of ARID-K. If the scheme is to spread and benefit larger numbers, pastoralist communities need to be properly trained about the long-term benefits of taking out insurance. ■

CHAPTER 6

CLIMATE RESILIENCE AS PART OF A LARGER PACKAGE

As the stories in the previous chapter show, projects designed to improve the resilience of communities to climate change frequently provide a range of other benefits, such as an increase in crop and livestock productivity and higher incomes. At the same time, projects designed to tackle poverty or environmental degradation may also help communities become more resilient to climate change, even if that is not their primary purpose, as the story below illustrates.

By reducing slash-and-burn farming and planting eco-orchards much is being done to protect biodiversity and reduce the emission of greenhouse gases

STORY 14

Transforming forest lives in Cameroon

In 2009, a group of young people in the village of Tayap in Cameroon established a banana plantation to improve their incomes. A year later it was burnt down – collateral damage caused by the slash-and-burn farming system used throughout much of the Congo Basin.

Having lost their banana plantation, the young men and women convinced other villagers to reduce the use of fire. This led to the birth of an organisation which has subsequently transformed the environment and dramatically improved the lives of those who live here. Guided by the *Agriculteurs Professionnels du Cameroun* (AGRIPO), and supported by a range of organisations including the United Nations Development Agency, villagers in Tayap have planted over 110 hectares of orchards on fallow land, reduced the use of fire, and set up a green financing initiative and various new businesses which have led to the creation of 15 new green jobs. Average incomes have increased fourfold, from 16,600 CFA (€25) to 40,000 CFA (€60) in 2014.

By reducing slash-and-burn farming and planting eco-orchards much is being done to protect biodiversity and reduce the emission of greenhouse gases. Calculations by scientists working for AGRIPO suggest that the project had sequestered over 2,250 tonnes of carbon dioxide equivalent by 2015. "At the same time, all the activities are helping the community to become more resilient to climate change," says Marthe Eone, who has evaluated the project. A comprehensive communications programme, involving the publication of technical guides, recipe books and children's stories is helping to spread the message far beyond the village. ■

Farmers are more likely to adopt new technologies when they see that they have been successfully implemented by other farmers, especially in their village or surrounding villages

DURING THE FINAL SESSION OF THE REVIEW WORKSHOP, CASE STUDY LEADERS REFLECTED ON THE KEY FACTORS THAT HAD HELPED TO MAKE THEIR PROJECTS SUCCESSFUL, ON THE KEY CONDITIONS WHICH HELP TO TRIGGER WIDESPREAD SCALING UP AND ADOPTION, AND ON THE VARIOUS FACTORS WHICH ARE LIKELY TO HINDER SCALING UP. HERE IS A BRIEF SUMMARY OF THEIR FINDINGS.

Active farmer participation is widely seen as a key ingredient for success. Frequently, this involves building strong farmer institutions which can mobilise farmers and liaise with extension agencies and others involved in project management. If projects are designed in such a way as to be attractive to young people, then so much the better. This might involve the use of innovative ICTs, in which young people tend to be particularly adept. If projects are to be successful, they should be based on proven benefits, and ideally they should lead to immediate improvements in terms of incomes and livelihoods. Several of the case study leaders discussed the importance of over-the-fence learning: farmers are more likely to adopt new technologies when they see that they have been successfully implemented by other farmers, especially in their village or surrounding villages.

A range of factors are likely to help trigger widespread scaling up and adoption of new practices and technologies. Local champions can help to build enthusiasm and spread the message. Capacity building will often play an important role. This may involve both government extension agencies and the private sector. Ideally, technologies should be simple, effective and provide immediate benefits for those adopting them. Farmers will often need access to good information and credit. The market is also important: there is no point in introducing a new climate-smart variety of sorghum if nobody is willing to buy it. Several case study leaders pointed out that successful projects often depend on the involvement of the private sector.

There are many examples of seemingly successful technologies and innovations which have not caught on in any significant way. Case study leaders discussed some of the pitfalls that need to be avoided when attempting to scale up new practices and technologies. Projects which involve high levels of initial investment or drudgery, fail to attract young people, and are costly in terms of time and labour are unlikely to be successful. Lack of information and the failure to successfully involve farmers in the design and implementation of projects, are also likely to lead to failure, as is inadequate technical support.

This booklet has provided a brief overview of 14 case studies which have been supported by CTA under the project "Documentation of proven practices, tools or policies that promote resilience and help farmers to address the challenges posed by climate change." A more comprehensive peer-reviewed account of these stories will be published by CTA in 2016 (Ajayi *et al.* 2016).

In the meantime, readers can learn more about climate-smart agricultural practices from two booklets, jointly published by CTA and the CCAFS:

- *Climate-smart Agriculture: Success Stories from Farming Communities Around the World* (CTA 2013)
- *Evidence of Impact: Climate-smart Agriculture in Africa* (CTA 2014)

1 Stories from the field

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Technical Centre for Agricultural and Rural Cooperation ACP-EU (CTA)

P.O. Box 380
6700 AJ Wageningen
The Netherlands
www.cta.int