



**5.4**

**Eastern  
and Southern  
Africa**

# Eastern and Southern Africa

**While the economic performance of the African region has been strong for several years, the COVID-19 pandemic has taken a heavy toll on lives and economies. Economic activity is projected to decline by 3.3% in 2020, confirming the region's worst recession in more than half a century.**

Eastern and southern African countries have been the most affected by the economic impacts of the pandemic, with heavy disruptions to tourism, domestic consumption and investment due to lockdowns and movement restrictions. This could push an estimated 40 million people into extreme poverty in 2021 if appropriate measures are not taken, erasing the gains of the last 5 years. The region is expected to rebound in 2021, although this is subject to great uncertainties from both external and domestic risks.

Despite its incredible diversity at a macro level, Africa has a greater proportion of poor people on average than any other region in the world, and the region is characterised by high levels of food insecurity and very low Human Development Index rankings. If the current trend continues, Africa will need to double its efforts to meet the United Nations' Sustainable Development Goals, including Goal 1 of eradicating extreme poverty by 2030.

Africa's urban population has been growing at a very high rate and is projected to reach 56% of the total population (currently 44% of 1.34 billion) by 2050. Africa's demand for food is expected to more than double by that time, driven by population growth, rising incomes, rapid urbanisation, changes in national diets towards greater consumption of higher-value fresh and processed foods, and more open intra-regional trade policies. This is compounded by impacts associated with climate change, which continue to hamper agricultural production, productivity and reliability and increase the demand for land and water. In addition, rural demographics continue to change. Rural populations are ageing, many farms are getting smaller, and rural youth are looking for more lucrative livelihoods in urban areas rather than in traditional farming.

These changes are helping create new opportunities for Africa's smallholder farmers. Their small farms are transforming into business operations, which in turn brings new challenges to the agricultural systems.

Agriculture typically accounts for 30–40% of the GDP of African countries and more than 70% of the continent's poor live in rural areas. While agriculture remains a key driver of the economic growth required to deliver economic transformation for the rural poor, growth in productivity and production have broadly stagnated in the past decade. Unlocking the potential of Africa's agricultural and food systems requires substantial investment in the agriculture sector and in research to provide the knowledge that underpins growth in agricultural productivity, especially for commercialising smallholder farming.

## Partner countries in the ACIAR Eastern and Southern Africa region

- » Burundi
- » Ethiopia
- » Kenya
- » Malawi
- » Mozambique
- » Rwanda
- » South Africa
- » Tanzania
- » Uganda
- » Zambia
- » Zimbabwe



Photo: Andrew Munuwa



Farmers from the Kiwere irrigation scheme have worked with researchers as part of a regional project transforming smallholder irrigation into profitable and self-sustaining systems. Photo: Andrew Munuwa. ACIAR project LWR/2016/137

## Drivers of regional collaboration

The Comprehensive Africa Agriculture Development Programme (CAADP) of the African Union, in collaboration with the Regional Economic Communities, has been at the helm of mobilising the interest and commitment of African member states and their stakeholders for the transformation of the African agriculture sector.

A major milestone was the adoption of the 2014 Malabo Declaration on Accelerated African Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods, in which the heads of states agreed to spend a minimum of 10% of their total expenditure on agriculture and pursue a target of 6% annual growth. Subsequently, the leaders noted the need for monitoring, tracking and reporting on the implementation of the declaration using the CAADP Results Framework.

In response to this, the African Union introduced a biannual review, the Africa Agriculture Transformation Scorecard, which tracks and reports each country's progress towards achieving the goals and targets of the Malabo Declaration. This important mechanism ensures that there is political will, backed by appropriate actions, to achieve agricultural growth and transformation in Africa.

The scorecard is presented at the African Green Revolution Forum, a key annual pan-African forum with a goal of accelerating progress on agriculture's contribution to economic growth and transformation, in line with delivering on the Malabo commitments. The forum has become a premier platform for leaders from across Africa and around the world to advance concrete action plans and share knowledge to tap the enormous potential of agriculture in driving equitable and sustainable economic growth across the continent. The Alliance for a Green Revolution in Africa, in collaboration with several investors, coordinates the forum and produces a report on the forum, the Africa Agriculture Status Report.

Regional collaboration is crucial to achieving economic development in Africa, and the role of regional and sub-regional organisations is key, including the promotion and protection of foreign investment.

The main regional organisations that we will continue to liaise with are the Forum for Agricultural Research in Africa and the African Union Development Agency-New partnership for Africa Development.

We also liaise with sub-regional organisations, which are mainly coordination bodies for research, policy and markets, especially the Association for Strengthening Agricultural Research in Eastern and Central Africa, the Food, Agriculture, and Natural Resources Policy Analysis Network, the Centre for Coordination of Agricultural Research and Development for Southern Africa and the Common Market for Eastern and Southern Africa.

# Southern and Eastern Africa region program 2021-22

Partner country	No. projects
Burundi	1
Ethiopia	7
Kenya	8
Malawi	4
Mozambique	5
Rwanda	2
South Africa	5
Tanzania	5
Uganda	3
Zambia	2
Zimbabwe	4

Note that a project may be conducted in several countries, therefore the total number of projects in this table will be greater than the number of projects in the region.

**22**  
projects

**19 research**  
projects

**3 small**  
research  
activities

## Research portfolio



**2**

Agribusiness projects



**0**

Climate Change projects



**8**

Crops projects



**0**

Fisheries projects



**0**

Forestry projects



**1**

Horticulture project



**4**

Livestock Systems projects



**0**

Social Systems projects



**0**

Soil and Land Management projects



**2**

Water projects



**5**

CultiAF2 projects

**Table 5.4 Current and proposed projects in the Southern and Eastern Africa region, 2021-22**

Project title	Project code	Country
<b>Agribusiness</b>		
Managing food value chains for improved nutrition for urban vulnerable populations in Africa (Africitiesfood) - Zambia (Food Loss Research Program)	CS/2021/115	Zambia
Managing food value chains for improved nutrition for urban vulnerable populations in Africa (Africitiesfood) - Malawi (Food Loss Research Program)	CS/2020/210	Malawi
<b>Crops</b>		
Mitigating the effects of stripe rust on wheat production in South Asia and eastern Africa	CIM/2014/081	Ethiopia, India, Nepal, Pakistan
Faba bean in Ethiopia: mitigating disease constraints to improve productivity and sustainability	CIM/2017/030	Ethiopia
Rapid breeding for reduced cooking time and enhanced nutritional quality in common bean ( <i>Phaseolus vulgaris</i> )	CROP/2018/132	Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda
International Mungbean Improvement Network 2	CROP/2019/144	Bangladesh, India, Indonesia, Kenya, Myanmar
Protecting Ethiopian lentil crops	CROP/2020/164	Ethiopia
Mechanization and conservation agriculture-based crop-livestock innovation in eastern Africa	CROP/2020/166	Kenya, Tanzania
Accelerating genetic gain in wheat through hybrid breeding in Bangladesh, Ethiopia and Pakistan	CROP/2020/167	Bangladesh, Ethiopia, Pakistan
Demand led plant variety design for emerging markets in Africa	FSC/2013/019	Ghana, Kenya, South Africa, Tanzania
<b>Horticulture</b>		
Developing a biosecurity system for small banana growers resilient to Fusarium wilt TR4 in southern and eastern Africa	HORT/2020/128	Mozambique, South Africa, Tanzania
<b>Livestock Systems</b>		
High quality markets and value chains for small-scale and emerging beef cattle farmers in South Africa (stage 2)	LS/2016/276	South Africa
Resilient and low-carbon livestock systems for trade and food security in the rangelands of eastern and southern Africa	LS/2020/152	Ethiopia, Kenya, Zimbabwe
Upscaling the benefits of insect-based animal feed technologies for sustainable agricultural intensification in Africa	LS/2020/154	Kenya, Rwanda, Uganda
Rapid assessment of the impact of COVID-19 on wet market reforms: case studies from Vietnam, Kenya and the Philippines	LS/2020/204	Kenya, Philippines, Vietnam
<b>Water</b>		
Transforming smallholder irrigation into profitable and self-sustaining systems in southern Africa	LWR/2016/137	Malawi, Mozambique, South Africa, Tanzania, Zimbabwe
Virtual Irrigation Academy Phase 2: from water monitoring to learning to governance	WAC/2018/162	Malawi, Mozambique, South Africa, Zimbabwe
<b>CultiAF2</b>		
Climate-smart interventions for smallholder farmers in Ethiopia (CultiAF 109038)	GP/2019/173	Ethiopia
User driven approaches to make government and farmer led smallholder irrigation in Mozambique more productive (CultiAF 109039)	GP/2019/174	Mozambique
Alien invasive fruit flies in Southern Africa: Implementation of a sustainable IPM programme to combat their menaces (CultiAF 109040)	GP/2019/175	Malawi, Mozambique, Zambia, Zimbabwe
Harnessing dietary nutrients of underutilised fish and fish-based products in Uganda (CultiAF 109041)	GP/2019/176	Uganda
Improving agricultural productivity and resilience with satellite and cellphone imagery to scale climate-smart crop insurance (CultiAF 109076)	GP/2019/177	Kenya

# Eastern & Southern Africa

 **A\$6.1** million  
Budgeted funding

 **19**  
Bilateral and regional  
research projects

 **3**  
Small projects and  
activities

**The agricultural environments of eastern and southern Africa and Australia have much in common – the wet tropics of Rwanda with northern Queensland, the semi-arid tropics of eastern Africa with central Queensland, and the arid rangelands of Ethiopia and southern Africa with the Northern Territory.**

Australian agricultural science has expertise that is directly relevant to the African context. For more than 3 decades, ACIAR has supported projects that mobilised this expertise to deliver sustainable development outcomes in the region. The free-market orientation and effective architecture of agricultural research in Australia are also relevant to African agricultural transformation.

The ACIAR program with eastern and southern Africa fills a niche not addressed by many donors: agricultural research-for-development. Our work is highly regarded and remains as relevant now as it was 30 years ago because of our focus on brokering research partnerships between Africa and Australia and our long-term commitment to addressing specific constraints in agricultural production with multiyear projects.

We currently invest 10% of our annual budget in our Eastern and Southern Africa regional program and directly fund projects in partnership with 11 African countries. However, our footprint is much broader because of our contribution to the CGIAR, which has 4 of its centres located in Africa and, until recently, spent half of its total budget in Africa.

Our program is delivered primarily through bilateral country research partnerships (linked to regional impact pathways) and regional collaborations coordinated with sub-regional organisations. We also have a strong element of engagement through the CGIAR. The portfolio of projects covers a diverse range of priorities, guided by the recommendations of the regional research coordination bodies that we collaborate with.

We also have a substantial collaboration with the Canadian International Development Research Centre that is focused on Africa – the Cultivate Africa's Future Fund (CultiAF). CultiAF is in its second phase, supporting 9 projects across 7 countries. Four projects were rolled over from CultiAF phase 1 and ended in mid-2021. This program harnesses the complementary interests and skill sets of both organisations to deliver projects researching:

- » the potential of insects as feed for poultry, fish and pig production
- » harnessing underutilised fish and fish-based products
- » scaling up the supply and utilisation of pre-cooked beans
- » gender-inclusive financing for improved fish processing technologies and youth entrepreneurship
- » climate-smart interventions for smallholder farmers
- » user-driven smallholder irrigation approaches.

## 2021-22 research program

- » **22 ACIAR-supported projects in eastern and southern Africa**
- » **18 projects are specific to this country**
- » **4 projects are part of regional projects**

The research program addresses our high-level objectives, as outlined in the ACIAR 10-Year Strategy 2018–2027, as well as specific issues and opportunities identified by ACIAR and our partner organisations. The following sections briefly describe individual ACIAR-supported projects and anticipated outputs in eastern and southern Africa. The projects are grouped according to research program. Each project description is referenced in a list at the end of this section, which provides the project title and code.



A project facilitated by the Alliance for Agricultural Research and Development for Food Security has strengthened education and training programs for plant breeders across Africa and increased capacity in demand-led variety design. Photo: Emmie Wachira. ACIAR project FSC/2013/019

## Agribusiness

Zambia and Malawi are among the hungriest and the fastest urbanising countries in the world. The number of people in acute food situations continues to rise, grabbing international attention in policy dialogues on food and nutrition security. One of the key strategies to address this hunger and nutrition challenge lies in addressing food loss along the food value chain. With the demographic shift to cities and towns, food value chains now involve many actors that influence the way that food is produced, processed, distributed, marketed and consumed. This situation has resulted in increased number of actors, raised questions of actor responsibility and inefficiency (both resulting in increased food loss), increased cost of food and reduced nutrition security. Dr Gilbert Siame of the University of Zambia and Dr Mtafu Manda of Mzuzu University of Malawi lead 2 new projects that seek to make an intervention at 4 stages of the fresh food value chain (only fresh produce) in selected cities in Zambia and Malawi to understand the drivers and implications of food loss at points of production, transportation, open-air markets and households. This project is part of the ACIAR-IDRC Food Loss Research Program (see page 8).<sup>1,2</sup>

## Crops

Demand-led plant variety design has the potential to transform plant breeding for small-scale agriculture and food security. A project facilitated by the Alliance for Agricultural Research and Development for Food Security (see page 25) and led by Professor Kaye Basford of the University of Queensland engages with plant-breeding and university sectors in many countries. Phase 1 identified skills and processes needed for breeders to obtain high-performing plant varieties to meet the demands of emerging markets in Sub-Saharan Africa. Phase 2 provided more plant breeders with access to the program and focused on the implementation of best practice in demand-led plant-breeding programs for beans and tomatoes. The project concludes in 2021 with the strengthening of education and training programs for plant breeders across Africa to build capacity in demand-led variety design.<sup>3</sup>

Stripe rust (also called yellow rust) is a common and important disease of wheat worldwide. While fungicides can be used for in-crop control, genetic resistance is more economically and environmentally sound. A project led by Professor Robert Park of the University of Sydney has established and equipped a collaborative network of key wheat improvement centres across South Asia and eastern Africa. In its final year, it will consolidate the knowledge base to enable ongoing research and development at the centres. The project has identified markers linked to effective resistance genes, which can be used in pre-emptive breeding and the development of rapid diagnostic tests. The project, which aims to reduce the vulnerability of wheat to stripe rust in South Asia and eastern Africa, also benefits wheat production across the globe, including Australia.<sup>4</sup>

Hybrid wheat has the potential to produce more grain from the same or less land, significantly contributing to food security and land sustainability. However, technical difficulties of hybrid wheat development and the high cost of hybrid seed have constrained the commercial development of new varieties for many decades. Professor Richard Trethowan of the University of Sydney leads a new project that aims to extend the benefits of new hybrid wheat systems to researchers, wheat breeders, farmers and consumers in Pakistan, Bangladesh and Ethiopia. The university has developed a novel, cost-effective and practical system to rapidly produce large numbers of wheat hybrid combinations for testing in breeding programs, and to produce large amount of hybrid seeds for sale to farmers at an acceptable cost. The project will establish the performance of the hybrids, and determine effective technical processes and business models to produce the seed in collaboration with the national programs and local seed providers in each country.<sup>5</sup>

Faba bean is the most important legume crop in Ethiopia, where pulses contribute 15% of the protein consumed. A newly established disease, faba bean gall, threatens the ongoing cultivation, viability and existence of the crop in highland areas of Ethiopia. Little is known about the disease and its management is a government priority. A project led by Professor Martin Barbetti of the University of Western Australia has defined the conditions and practices driving the spread and impact of faba bean gall. During 2021-22, the project continues crop and farmer surveys to understand the distribution of faba bean diseases and the influence of location and farming practices, and to explore integrated management options for the control of disease.<sup>6</sup>

Using new plant breeding methods, a 5-year project aims to deliver genotypes of the common bean (*Phaseolus vulgaris*) that have 30% shorter cooking time, higher zinc and iron content than current varieties, better resistance to bruchid beetle and *Pythium* root rot, and adapted agronomic traits. The project will train plant breeders in the Pan-Africa Bean Research Alliance, coordinated by the International Center for Tropical Agriculture, in a new rapid method of plant breeding, based on optimal mating designs. Led by Professor Wallace Cowling of the University of Western Australia, the project adopts recent developments in genetic data collection and analysis to speed up breeding, while maintaining genetic diversity in lines under selection.<sup>7</sup>

Mungbean is an ideal rotation crop for smallholder farmers. The International Mungbean Improvement Network, established through a project led by Dr Ramakrishnan Nair of the World Vegetable Center, helped realise the potential of mungbean to improve cropping system productivity and livelihoods by improving researchers' access to genetic material, and coordinating and providing technical support to variety development in Bangladesh, India, Myanmar and Australia. Phase 2 of the network continues variety development for another 5 years, and extends the network to Kenya and Indonesia, providing access to new genetic material characterised for important traits, and improving cropping options for smallholder farmers in eastern Africa and South-East Asia.<sup>8</sup>



Legumes hold potential for both sustainable cropping and food security in eastern and southern Africa. ACIAR is supporting research to improve cropping systems for faba beans, common beans, mung beans and lentils in 2021-22.

Lentils are one of the main pulses consumed and an essential rotation cash crop for smallholders in cereal-based cropping systems of the mid-highlands of Ethiopia. Protecting the lentil crop and increasing its productivity is a priority for the Ethiopian Institute of Agricultural Research, as previously minor viral diseases have recently become high-impact epidemics. A new project led by Professor Martin Barbetti of the University of Western Australia will mobilise the best expertise in Australia and the International Center for Agricultural Research in the Dry Areas to support Ethiopian lentil breeding and plant pathologists, provide germplasm with a high level of resistance to the target diseases and establish sustainable disease management practices, with the overall aim of restoring resilience to a farming system under threat.<sup>9</sup>

We intend to commission a new project in eastern Africa (under design at the time of publishing) to explore the costs and benefits of applying conservation agriculture methods with small, mechanised tools in mixed crop-livestock systems where farmers need to manage trade-offs between retaining crop residues on the soil and using them to feed cattle.<sup>10</sup>



Livestock are the lifeblood of rangeland farming systems and the people that thrive within them. A new project will address knowledge gaps and identify opportunities to increase livestock productivity and trade, while reducing greenhouse gas emissions. ACIAR project LS/2020/152

## Horticulture

*Fusarium* wilt tropical race 4 (TR4) of bananas is caused by a highly destructive and invasive plant pathogen, the soil-borne fungus *Fusarium* sp. The disease, also called Panama disease, was first detected in Africa in 2013, in northern Mozambique, and further spread of the disease in and beyond Mozambique would be catastrophic. In eastern and central Africa, 70-100 million people rely directly or indirectly on bananas for their livelihoods. A new project led by Mr Stewart Lindsay of the Queensland Department of Agriculture and Fisheries aims to understand the vulnerabilities of banana farming systems in Mozambique and Tanzania and work with country partners and landholders to identify biosecurity measures to reduce risks and mitigate the damage in farmer fields. The project aims to build knowledge specifically for smallholder banana production systems, which can inform research, extension, regulatory and policy decisions more broadly in Africa, Asia and Latin America, where smallholder banana producers are common.<sup>11</sup>

## Livestock Systems

Livestock management is an important source of farm-level diversification for smallholder farmers in eastern and southern Africa. Improved links between farmers and the private sector provide opportunities for smallholder farmers to improve production system sustainability, product quality and human nutrition. A project led by Dr Heather Burrow of the University of New England builds on previous research in South Africa that facilitated smallholder farmers to supply pasture-fed beef for sale at selected supermarket outlets. During 2021-22, researchers will continue to work with local stakeholders to establish commercially viable, pasture-fed beef value chains, and improve the competitiveness of small-scale beef cattle farmers through demonstration sites and development of decision-support tools. Concurrently, capacity building of extension officers will occur, with a particular focus on training as facilitators of peer learning.<sup>12</sup>

Extensive livestock systems support the majority of Africa's livestock population, but many pastoralists experience chronic food, nutrition and economic insecurity. Furthermore, livestock account for almost 80% of total agricultural emissions in eastern Africa. In the rangelands of eastern and southern Africa, sociocultural practices and climate are not conducive to crop production. Livestock are the lifeblood of these systems and the people that thrive within them. A new project, focused on Ethiopia, Kenya and Zimbabwe, will address knowledge gaps and identify emergent opportunities to increase livestock productivity and trade, while reducing greenhouse gas emissions. Dr Dawit Solomon of the International Livestock Research Institute will lead the project, which is structured around 4 key intervention areas: community-based rangeland management, small ruminant community-based breeding initiatives, animal health and increased off-take through livestock marketing.<sup>13</sup>

Through the INSFEED projects, which are part of CultiAF, the International Centre of Insect Physiology and Ecology and partners successfully demonstrated mass insect rearing on organic waste, resulting in both a proven animal protein source and organic fertiliser. Post-harvest technologies were established to ensure product shelf-life and safety, meeting national standards for the use of insects as ingredients in compounded feeds. Dr Chrysantus Tanga of the International Centre of Insect Physiology and Ecology leads a new project that starts with scaling up the production of insects and insect-based feed products through modular rearing systems. These systems are already established in Kenya and Uganda and will be assessed for Rwanda. Several storage techniques will be investigated for their potential to improve both shelf and on-farm storage conditions in Kenya.<sup>14</sup>

The animal origins of COVID-19 have again placed concerns about zoonotic diseases in the global policy limelight. Wet markets in Asia were singled out as a source of global pandemic risk and there were calls to close, ban, regulate and reform them. While some wet markets centre heavily on wild animals, many do not sell wildlife or bushmeat. More commonly, a wet market is a fresh-food market where live animals (poultry, ruminants, seafood and wildlife) are kept, slaughtered and sold to consumers alongside fruits, vegetables and/or grains. Dr Kevin Bardosh and Associate Professor Cecily Maller of RMIT University leads a rapid assessment to understand how the COVID-19 pandemic has impacted wet markets in Vietnam, Kenya and the Philippines, specifically in relation to biosecurity reforms, food security, and women's economic empowerment. This project contributes to stage 3 of the ACIAR assessment of COVID-19 impacts on food systems in our region.<sup>15</sup>

## Water

Irrigation has significant potential to contribute to food security in Sub-Saharan Africa, but many irrigation schemes are under-performing and returns on investment in irrigation infrastructure are low. This project, led by Professor Jamie Pittock of the Australian National University, has involved irrigation schemes supporting more than 15,000 farmers in Mozambique, Zimbabwe and Tanzania. Due to be completed in 2022, the project has introduced soil and water management technologies that have increased the productivity and incomes of farmers and made irrigation schemes more self-sustaining. In its final year, the project will report on the best methods for dissemination of technologies and identify the factors leading to inequity among farmers in water supply and financial benefit from irrigation schemes.<sup>16</sup>

Smallholder farmers in southern Africa require new irrigation management skills to realise the benefits and potential of available irrigation infrastructure. Phase 1 of the Virtual Irrigation Academy project in Malawi, South Africa and Tanzania developed a system of continual social and institutional learning to improve the profitability and sustainability of irrigated farming. Phase 2 of the project, led by Dr Richard Stirzaker of CSIRO, will develop the Virtual Irrigation Academy system into a water learning and governance platform to support smallholder farmers and address the information deficits at scheme to national levels. The project also supports activities with irrigation schemes in Mozambique and Zimbabwe, in collaboration with the project described above.<sup>17</sup>



Dr Makarius Mdemu inspects grain harvested from the Magozi Irrigation Scheme in Tanzania. Irrigation has significant potential to contribute to food security in Sub-Saharan Africa and ACIAR supports research that is introducing technologies that increase productivity and incomes of farmers and make irrigation schemes more self-sustaining. Photo: Andrew Munuwa. ACIAR project LWR/2016/137

## CultiAF2 projects

Climate change is causing a higher frequency of drought and crop failures in Ethiopia's dry lowlands, exposing farmers to food shortages and livestock losses due to a lack of feed. Dr Taye Mindaye of the Ethiopian Institute of Agricultural Research leads a project, which started with CultiAF2, to develop and implement technologies that reduce the risk of crop failure, increase crop productivity and create new business opportunities for women. The focus is on technologies associated with sorghum production, such as drought-tolerant varieties and small-scale threshers.<sup>18</sup>

Inefficiency constrains the performance of government and farmer-led smallholder irrigation schemes in Mozambique. A CultiAF2 project led by Dr Mario Chilundo of the University of Eduardo Mondlane, Mozambique, aims to equip farmers with the resources and skills to sustain such schemes and identify institutional strategies to support government rehabilitation and expansion programs. The project will combine technical (soil and water management practices), social (business plans and market linkages) and institutional (innovation platforms and water-user associations) innovations and compare changes in their management, productivity and profitability for farmers. Gender analysis and scenario planning will be conducted to inform the design of user-driven, equitable and gender-responsive approaches for schemes that are inclusive of all users.<sup>19</sup>

High-value horticultural crops are key drivers of economic development in Sub-Saharan Africa. Fruit crops can return a higher income than staple crops, and they provide more employment opportunities for smallholders both on and off the farm, especially women. Fruit-fly infestations reduce the quality and quantity of fruit, curtailing lucrative export opportunities and increasing the use of synthetic insecticides. Dr Samira Mohamed of the International Centre of Insect Physiology and Ecology, Kenya, will lead a project to adapt and promote the widescale adoption of integrated pest-management interventions in Malawi, Mozambique, Zambia and Zimbabwe.<sup>20</sup>

Nutritional deficiencies are widespread in Uganda's poor rural and urban communities, particularly in women of reproductive age and children under 5 years, due to limited access to animal protein and micronutrient-rich foods, especially fish. Dr Jackson Efitre of Makerere University, Uganda, leads the NutriFish project and works with the fish sector and its associated value chains to address the nutritional needs of vulnerable groups. NutriFish aims to increase the availability, accessibility and consumption of underused fish to improve sustainable food and nutrition security and improve the livelihoods of vulnerable groups. It also aims to increase by-product processing through public-private partnerships.<sup>21</sup>



High-value horticultural crops are key drivers of economic development in Sub-Saharan Africa. CultiAF projects are developing opportunities and technologies to increase incomes and provide employment for smallholders both on and off the farm, especially women and youth.

Crop insurance is an option for farmers to protect their livelihoods against losses, as climate changes and extreme weather events become more frequent. However, very few insurance schemes are suitable for smallholder farmers. The high monitoring and verification costs of traditional insurance, the low demand for index-based insurance and the lack of complementary risk-management options (such as irrigation and drought-tolerant cultivars) are constraints for farmers in Kenya. Mr Amos Tabalia of Agriculture and Climate Risk Enterprise Limited leads a project to rigorously evaluate insurance packages and promote technologies to make farming systems more resilient. This project focuses on technologies such as satellite and cell phone imagery to verify crop losses and observe management practices.<sup>22</sup>

### Regional Manager, Eastern & Southern Africa

Dr Leah Ndungu

### Research Program Managers

Climate Change: Dr Veronica Doerr

Crops: Dr Eric Huttner

Horticulture: Ms Irene Kernot

Livestock Systems: Dr Anna Okello

Water: Dr Robyn Johnston

CultiAF2: Dr Anna Okello

See page 197 for contact details.

## Current and proposed projects

1. Managing food value chains for improved nutrition for urban vulnerable populations in Africa (Africitiesfood) (Food Loss Research Program) – Malawi (CS/2021/115)
2. Managing food value chains for improved nutrition for urban vulnerable populations in Africa (Africitiesfood) (Food Loss Research Program) – Zambia (CS/2020/210)
3. Demand led plant variety design for emerging markets in Africa [Ghana, Kenya, South Africa, Tanzania] (FSC/2013/019)
4. Mitigating the effects of stripe rust on wheat production in South Asia and eastern Africa [Ethiopia, India, Nepal, Pakistan] (CIM/2014/081)
5. Accelerating genetic gain in wheat through hybrid breeding in Bangladesh, Ethiopia and Pakistan (CROP/2020/167)
6. Faba bean in Ethiopia: mitigating disease constraints to improve productivity and sustainability (CIM/2017/030)
7. Rapid breeding for reduced cooking time and enhanced nutritional quality in common bean (*Phaseolus vulgaris*) [Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda] (CROP/2018/132)
8. International Mungbean Improvement Network 2 [Bangladesh, India, Indonesia, Kenya, Myanmar] (CROP/2019/144)
9. Protecting Ethiopian lentil crops (CROP/2020/164)
10. Mechanisation and conservation agriculture based crop-livestock innovation in eastern Africa [Kenya, Tanzania] (CROP/2020/166)
11. Developing a biosecurity system for small banana growers resilient to *Fusarium* wilt TR4 in southern and eastern Africa [Mozambique, South Africa, Tanzania] (HORT/2020/128)
12. High quality markets and value chains for small-scale and emerging beef cattle farmers in South Africa (stage 2) (LS/2016/276)
13. Resilient and low-carbon livestock systems for trade and food security in the rangelands of eastern and southern Africa [Ethiopia, Kenya, Zimbabwe] (LS/2020/152)
14. Upscaling the benefits of insect-based animal feed technologies for sustainable agricultural intensification in Africa [Kenya, Rwanda, Uganda] (LS/2020/154)
15. Rapid assessment of the impact of COVID-19 on wet market reforms: case studies from Vietnam, Kenya and the Philippines (COVID-19 impacts program) (LS/2020/204)
16. Transforming smallholder irrigation into profitable and self-sustaining systems in southern Africa [Malawi, Mozambique, South Africa, Tanzania, Zimbabwe] (LWR/2016/137)
17. Virtual Irrigation Academy Phase 2: from water monitoring to learning to governance [Malawi, Mozambique, South Africa, Zimbabwe] (WAC/2018/162)
18. Climate-smart interventions for smallholder farmers in Ethiopia (CultiAF 109038) (GP/2019/173)
19. User driven approaches to make government and farmer led smallholder irrigation in Mozambique more productive (CultiAF 109039) (GP/2019/174)
20. Alien invasive fruit flies in Southern Africa: Implementation of a sustainable IPM programme to combat their menaces (CultiAF 109040) [Malawi, Mozambique, Zambia, Zimbabwe] (GP/2019/175)
21. Harnessing dietary nutrients of underutilised fish and fish-based products in Uganda (CultiAF 109041) (GP/2019/176)
22. Improving agricultural productivity and resilience with satellite and cellphone imagery to scale climate-smart crop insurance (CultiAF 109076) [Kenya] (GP/2019/177)