

## Helping Africans solve agricultural challenges

Larelle McMillan

**Australian and African scientists have formed a new partnership to help address the challenges of sustainable agriculture and food security across Sub-Saharan Africa.**



Credit: Edward Okoth - Beca/ILRI

We are frequently reminded of the complex challenges Africa faces when it comes to feeding its population, particularly in the Sub-Saharan region. Dealing with hunger and famine – let alone broader food security issues – is paramount and needs a global effort. Overcoming these challenges in the longer term is equally important, but more complex, and requires increased efforts in research and development.

To foster a long-term sustainable improvement in African food security, the Australian government, through AusAID, has increased its investment into Africa via the [Africa Food Security Initiative \(AFSI\)](#). AFSI is focused on lifting food security and agricultural productivity in Africa through joint research, working with and building the capacity of African agricultural organisations, and by enhancing community resilience. The agricultural productivity component of AFSI leverages Australia's unique agricultural and scientific expertise by engaging the [Commonwealth Scientific and Industrial Research Organisation \(CSIRO\)](#) and the Australian Centre for International Agricultural Research (ACIAR) to help African research institutes and farmers address their national food security challenges. This partnership is one initiative within AusAID's broader Africa Program.

‘Australian scientists offer important skills in Africa, because of the very strong similarities in terms of climate and soils between Australia and the sub-humid, semi-arid zones of Sub-Saharan Africa,’ says Dr Brian Keating, Director of CSIRO's Sustainable Agriculture Flagship. ‘Many leading farming systems research scientists at CSIRO have spent considerable time working in Africa, and have a deep understanding of the challenges faced by African colleagues.’

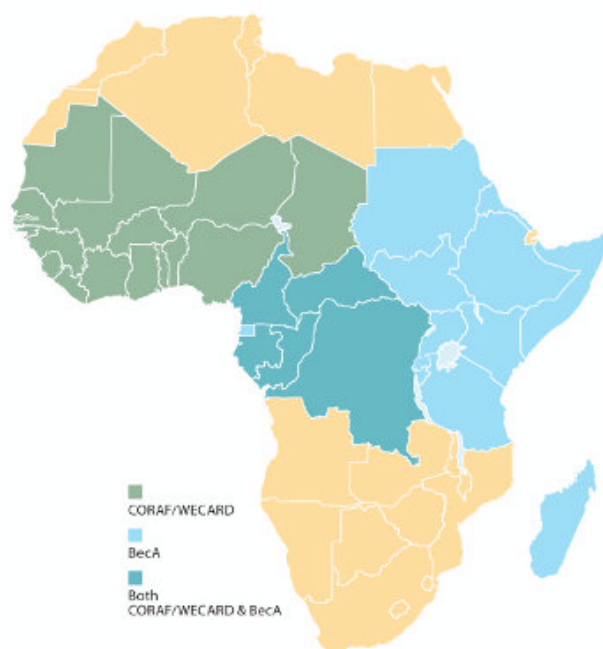
CSIRO is leading one part of AFSI together with two African institutions: CORAF/WECARD<sup>1</sup> in West Africa, and the Biosciences Eastern and Central Africa (Beca Hub)<sup>2</sup>. The research focus has been designed by African scientists and research institutes, incorporating CSIRO's world-class expertise in biosciences and tropical farming systems.

‘Working with the CSIRO means we African scientists get to share the experience and knowledge of our Australian colleagues – to help us solve particular issues,’ explains Dr Harold Roy-Macauley, Director of Programmes at CORAF/WECARD. ‘We are really working to deliver relevant agricultural output in West/Central Africa and to boost the skills and experience of our scientists through this partnership. This is a critical element to underpin long-term sustained change in African agriculture, which will lead to the production of more food and increased income for Africans.’

The green revolution breakthrough in cereal yields, which propelled agricultural and overall economic growth in Asia and Australia, has yet to take hold in most African countries. While the last five years have seen a new momentum towards a transformation of African agriculture – driven by national governments and multilateral institutions, and supported by specialised civil society organisations – enormous challenges still remain.

Through CORAF/WECARD and BecA, CSIRO’s scientists are supporting more than 30 African institutions across 17 of the 35 countries that CORAF/WECARD and BecA represent.

Thirteen projects are underway, which align with the priorities of the Comprehensive Africa Agriculture Development Programme (CAADP): a framework that outlines the African agriculture agenda derived from the New Partnership for Africa’s Development (NEPAD<sup>3</sup>). The projects reflect farmer and community needs, as well as the importance of agricultural systems, human nutrition and animal health.



Credit: CSIRO

### West to east food projects

In West and Central Africa, AFSI is addressing agricultural issues in Senegal, Mali, Burkina Faso, Niger, Nigeria, Chad, Cameroon, Benin, Ghana and The Gambia. The focus is on the whole farming system at the smallholder scale and from the paddock to the consumer, improving yields to reduce poverty and provide opportunities for diversifying household incomes.

CSIRO is working with national research institutes, nongovernmental organisations and farmer groups to improve production by assessing potential innovations in cropping, livestock and markets. The projects include examining crop-livestock farming systems, opportunities for strengthening seed systems, and integrated control of ticks and tick-borne diseases.

In the east, research is focused in Tanzania, Kenya, Uganda, Burundi, Cameroon and the Democratic Republic of the Congo. These projects are focused on improving the nutritional qualities of foods such as amaranth (used as a leaf vegetable and a grain), mushrooms and caviés (guinea pigs). These crops and livestock are traditionally grown and bred by women in and around the home, and provide important income for families.

The largest project in East and Central Africa is focused on improving the safety and quality of maize in eastern Africa, by reducing aflatoxin contamination of Kenyan and Tanzanian varieties. Aflatoxins are fungal metabolites (mycotoxins) that contaminate food and feed. They are an under-recognized threat to the health of African populations and a barrier to agricultural and economic development. Aflatoxins are carcinogenic and damaging to the liver, can suppress the immune system, and cause hormonal imbalance and stunted growth in children. Acute exposure can lead to death. In Kenya alone, more than 2.3 million bags of maize were declared unfit for human consumption due to aflatoxin contamination in 2010.

In Kenya, Uganda and Tanzania, the animal health projects focus on better understanding and vaccine development for some significant diseases in pigs, goats, and cattle, to improve production, and increase household income.

## **SIMLESA**

**SIMLESA** stands for ‘Sustainable intensification of maize-legume cropping systems for food security in eastern and southern Africa’. This component of the AFSI partnership, which is led by ACIAR, aims to increase maize and legume productivity by 30 per cent and reduce the risk of poor harvests for at least 500 000 farmers in Ethiopia, Kenya, Malawi, Mozambique and Tanzania in the next decade.

Collaborating in the program is the International Maize and Wheat Improvement Centre (CIMMYT), the Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), and national agricultural research systems in each country – with input from Australian researchers.

SIMLESA is increasing farm–household food security and productivity by promoting:

1. nitrogen-fixing legumes in rotations or intercropped with maize
2. more sustainable farming practices and use of improved seeds
3. farmers working with each other and experimenting with more productive practices
4. farmers, agribusinesses and policy makers working together to improve farmers’ access to markets
5. capacity building through short-term training courses and post-graduate degrees for Africans.

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## **Applying conservation agriculture**

‘My name is Christine Ogola from Lignwa village farmers group in Western Kenya. I have been testing conservation agriculture (CA) practices in my third of an acre maize plot for the past four seasons.



Christine Ogola with her intercropped plot of maize and beans. Tesfaye Legesse

‘I used to harvest not more than a bag of 90 kg of maize before the CA. After using the CA practice, intercropping the maize with beans and leaving maize stover [crop leftovers] on the ground, in the last crop season I harvested five bags of maize and also beans from the same plot. This makes a huge difference to contributing to my family food needs.

‘This year is a hunger season, so I will conserve my produce for family rather than selling it, even though the price has leapt to KES 5000 for a bag from KES 2000 in the area due to hunger in other districts.’

## Understanding the roadblocks to more grain for West Africa

‘My name is Dr Lamissa Diakite from Mali. I’m an agro-economist at the Institut d’Economie Rurale, based in Bamako, Mali. I am also a farmer.

‘In West and Central Africa, there have been lots of new, improved varieties of maize, sorghum, millet and groundnut developed over the years. In all our research trials, these new varieties yield well above the conventional ones.

‘Unfortunately, most farmers do not use these improved varieties, or when they do, they don’t know the best way to grow them, so they don’t get much of a yield improvement, and they quickly go back to their old varieties.

‘This project is going to try and find out the reasons why the adoption of these new varieties is very low. It could be because the seeds are not easily accessible to farmers, or they don’t know what fertilisers they need to apply to get the best out of them. Maybe, it could be as simple as they don’t like the taste of them.

‘So, the project is looking at every point along the value chain (from the breeding programs to the farmers to the consumers) and identifying the main roadblocks to higher adoption of improved seed varieties. Once we can understand what these roadblocks are, we’ll be able to work out what we need to change to remove them. Hopefully, then, farmers are more likely to adopt the improved varieties and have the best chance for their crops to succeed, so they can make more money from their farms.

‘As part of this project, we will be conducting a number of variety trials with farmers to work out the best environments and practices for the improved varieties. These trials will also act as demonstration sites so that our African science institutions can showcase the improved varieties to local farmers.

‘We are working closely with CSIRO scientists, and learning how to use farming system models like APSIM<sup>4</sup>. There is potential for improvements in the commercial aspect of seed sales too – we want to understand the role small rural supplies shops can play in improving the uptake of improved varieties.

‘A really important part of the project is not just about working with farmers and rural supply shops; it’s also about the way we’re running the project. It is operating in four countries with more than 15 African agricultural scientists being trained and mentored, and that’s a powerful step towards sustainable production of more food for West Africa.’



Madame Coulibaly Maïmouna Sidibe is the CEO of Faso Kaba Seed Company in Bamako, Mali. She is just one of the private sector representatives involved in this project. Private sector involvement in selling seeds and farm inputs will be important to increasing the adoption of improved crop varieties. Tony Webster, CSIRO



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#### More information

**Australian International Centre for Food Security.** On the 28 October, as this article went to publication, the Australian Government announced it was funding the establishment of the [Australian International Centre for Food Security](#) to further support the provision of Australian agricultural expertise to Africa.

<sup>1</sup> Translated from French these are: 'Conference of African and French leaders of agricultural research institutes' (CORAF) and 'West and Central African Council for Agricultural Research and Development' (WECARD).

<sup>2</sup> The Biosciences East and Central Africa (BecA) Hub is part of the International Livestock Research Institute.

<sup>3</sup> CAADP is the agricultural development framework of NEPAD, which is the implementing agency of the African Union and is responsible for driving economic integration in Africa.

<sup>4</sup> APSIM is an advanced software-based simulator of agricultural systems. Its suite of modules allows the simulation of systems that cover a range of plant, animal, soil, climate and management interactions.

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