



Australian Government
**Australian Centre for
International Agricultural Research**

SUBMISSION

Inquiry into Australia's trade and investment relationships with the countries of Africa

ACIAR is Australia's specialist international agricultural research for development agency. An independent statutory agency within the foreign affairs portfolio, ACIAR's mission is to achieve more productive, resilient and sustainable agriculture in developing countries through international agricultural research partnerships.

Over the past 35 years, ACIAR has brokered partnerships between researchers from Australia and the developing world to build healthier, more equitable and more prosperous societies. The Australian Government's policy on development assistance informs our research agenda.

ACIAR's ten offices in partner countries — including its Africa regional office in Nairobi, Kenya — facilitate linkages between Australian research organisations and research agencies in developing countries. Our country office staff play an important role managing negotiations between ACIAR, in-country governments and officials, and Australian scientists.

ACIAR's research portfolio covers crops, horticulture, livestock, fisheries, forestry, natural resources, water and climate, economics, policy and social sciences. Australian agricultural science and capacity building helps the countries in the Indo-Pacific region improve their food security by increasing sustainable agricultural productivity, improving inclusive market access, and developing new markets for poor smallholder farmers. Our work aims to contribute to poverty reduction and improved regional security.

ACIAR's strategic approach to eastern and southern Africa is to focus on areas where Australia has unique strengths to contribute to joint innovation, and where strong networks exist for achieving effective results. For example, the University of Queensland and International Centre for Maize and Wheat Improvement (CIMMYT) have joined hands with eight national research organisations to test better farming and marketing innovations for maize and legume smallholders which have demonstrated impressive improvements in productivity and household food and nutrition security across eight African countries.

ACIAR has also co-invested in Africa with like-minded organisations such as Canada's International Development Research Centre to leverage complementary skillsets and to share risk. ACIAR's Africa program focuses on increasing agricultural productivity through dryland farming systems intensification, agricultural diversification including agroforestry, and improved biosecurity and market access. ACIAR invests 15 percent of its annual administered appropriation of about \$96.8 million to projects in 11 countries in eastern and southern Africa.

c. Barriers and impediments to trade and investment;

Biosecurity threats, such as plant pests and diseases, restrict agricultural production and rural development, and contribute to food insecurity in Africa. They present serious impediments to trade between countries in Africa and trade between Africa with the rest of the world. To assist with overcoming these barriers and impediments to trade and food security, ACIAR developed the Australia–Africa Plant Biosecurity Partnership (AAPBP). Established in 2014, the first phase of the AAPBP was a three-year \$1.7 million investment. Harnessing Australia's world-class biosecurity expertise and led by the Plant Biosecurity Cooperative Research Centre, the AAPBP has directly enhanced plant biosecurity capacity in Africa by sharing Australian expertise with African colleagues through a program of capacity building activities and knowledge exchange. Longer-term benefits to Australia's plant biosecurity and market access interests should also accrue due to

improvements in pest management and certification processes for plant products, such as cut flowers, exported from Africa to Australia.

The AAPBP involved ten countries in eastern and southern Africa: Burundi, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia and Zimbabwe. African National Plant Protection Officers (Fellows) were placed in Australian universities, government quarantine departments, and research centres. The Fellows developed action plans for a particular pest, disease or quarantine issue affecting trade and/or food security in their respective countries. They also undertook capacity building in areas of diagnostics, risk analysis, emergency response, surveillance, early warning systems, management, negotiation and governance.

The program has contributed to the Australian Government's focus on aid for trade and economic growth, improved agricultural productivity and sustainability, and strengthened agricultural value chains — while building capacity for greater market access in Africa. For example, in Tanzania, post-harvest loss in mangoes due to fruit fly was reduced from 50% percent to less than 3% and led to new markets opened up in Saudi Arabia and Oman.

The project participants have built a strong professional network that has already provided a boost to regional and international trade outcomes. The network has helped to facilitate a regional response to phytosanitary emergencies such as to fall army worm (FAW) in 2017. FAW is the larva of a moth (*Spodoptera frugiperda*) that is native to the Americas and is a serious pest of maize and other crops. FAW was first detected in Central and Western Africa in early 2016, then in parts of southern Africa, and in eastern Africa in 2017. It is expected to spread further and requires a coordinated regional response.

Regional trade and market bodies and the Food and Agriculture Organization (FAO) of the United Nations are now using the expertise within the network. The aim of building capacity for sustained impact has been achieved and will be facilitated further through the appointment of a Network Coordinator, based in the Common Market for Eastern and Southern Africa (COMESA) organisation.

Another set of barriers relates to the challenging environment for private investment in the region, particularly in agriculture. Gradually the policies and institutions are becoming more business-friendly, and ACIAR projects cooperate with many local SMEs for seed supply, seedling nurseries and irrigation equipment. As one example, a company formed by central Queensland farmers to breed better food crop cultivars participated in a conference organised by the ACIAR maize and legume farming project in order to assess market opportunities for investing in the African crop breeding and seed sector.

f. The role of Australian-based companies in supporting sustainable development outcomes, and lessons that can be applied to other developing nations

On opposite sides of the Indian Ocean, the agricultural environments of 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. Accordingly, Australian agricultural science has expertise that is directly relevant in the African context and for more than three decades ACIAR projects have used this expertise in its research for development to deliver sustainable development outcomes in eastern and southern Africa. Although ACIAR does not work exclusively with Australian companies, ACIAR plays a role in taking Australian expertise and technological innovations to developing countries through their application in ACIAR projects throughout eastern and southern Africa with great success.

Examples of these innovations and potential commercial engagements include:

- **Australian Vaccine Development:** Veterinary scientists at the University of Queensland with ACIAR funding developed a thermotolerant vaccine for Newcastle disease, a significant problem for

smallholder poultry farmers in Africa. The initial field work on the vaccine was undertaken in Mozambique. The vaccine did not require a cold chain and has had a huge impact on survival of chickens, leading to improved nutrition, food security and livelihoods. Chicken and eggs provide high quality protein and micronutrients such as vitamins, zinc and iron. ACIAR projects using the vaccine in other countries such as Tanzania and Zambia have led to improved incomes for women and improved household food security and nutrition outcomes.

- **Resilient Farm System Model:** The Agricultural Production Systems SIMulator (APSIM) was developed in Australia by a consortium including CSIRO, UQ and QDPI, and is an internationally recognised computer simulation of agricultural systems. Several ACIAR projects apply APSIM. The Sustainable Intensification Program has modeled environments Under ACIAR's Trees for Food Security Project, CSIRO scientists worked with the World Agroforestry Centre (ICRAF) to develop APSIM Agroforestry Next Generation — a computer model to simulate tree–crop interactions. The model was used as part of a wider study of detailed monitoring of trials that proved the significant benefits of the integration of trees into cropping systems in Burundi, Ethiopia, Rwanda and Uganda. For the first time, there is a widely accepted model that can be used to predict the impacts of agroforestry systems at the landscape level — presenting opportunity to promote the practice into other development projects, as well as Australia. This work will underpin the development of more climate-resilient agricultural systems.
- **The Happy Seeder:** Triangular relationships between Australia, India and Africa can open doors. The Happy Seeder story begins with an ACIAR research partnership between Charles Sturt University in Wagga, Punjab Agricultural University, two Indian machinery manufacturers and Indian farmers who developed a special type of small scale farm equipment to plant wheat seeds directly under rice straw in un-ploughed soil, also known as direct sowing or zero-till. Australian wheat farmers are fully familiar with direct sowing without ploughing — so-called zero tillage or conservation agriculture — and lead the world in this way of farming.

After the success of conservation agriculture practices in north-west India, Indian researchers joined the formulation of an ACIAR small mechanisation project in East and southern Africa and subsequently hosted and trained 19 senior African agriculturalists in better machinery use practices. Now, the ACIAR mechanisation project in Africa is working closely with African machinery import and distribution companies and there is potential for Australian equipment part suppliers to engage. Moreover, Australian staff of the Syngenta Foundation are working with the ACIAR mechanisation project in Zimbabwe, developing local versions of the Happy Seeder for walking tractors.

- **Improved crop cultivars:** As noted above, a company formed by central Queensland farmers, Radicle Seeds, to breed better food crop cultivars in Australia participated in a ACIAR conference organised by the ACIAR maize and legume farming project in order to assess market opportunities for investing in the African crop breeding and seed sector. They were favourably impressed with the opportunities and established good networks with local companies in the seed sector.
- **Farmer to farmer linkages:** The ACIAR maize and legume project, together with the Crawford Fund, is supporting contacts between the Birchip Croppers Group and African farmers, with a view to African smallholders developing similar croppers groups to test better farming practices and learn from one another. This will expose African farmers to modern farming practices and farmer group management, with potential commercial benefits to both parties.

- **The Chameleon Soil Water Sensor:** This sensor is another Australian innovation and is helping small-scale irrigators in southern Africa achieve food security. The Chameleon is a simple monitoring tool that smallholder farmers can use to monitor soil water, nitrate levels and salt levels. The device is used to inform optimal irrigation and fertiliser application practices to avoid wastage of these scarce resources and to optimise crop productivity through avoiding over-irrigation. An unexpected but welcome outcome has been reduced community conflict over water access.