



## CSIRO Submission 15/545

# The role of development partnerships in agriculture and agribusiness in promoting prosperity, reducing poverty and enhancing stability in the Indo-Pacific region

## Joint Standing Committee on Foreign Affairs, Defence and Trade

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## Executive Summary

CSIRO welcomes the opportunity to provide input to the Foreign Affairs and Aid Sub-Committee inquiry into the role of development partnerships in agriculture and agribusiness in promoting prosperity, reducing poverty and enhancing stability in the Indo-Pacific region.

In summary, it is CSIRO's assessment that:

1. Technological change and innovation has been a major driver of agricultural led growth and poverty reduction and will remain critical in achieving global sustainable development goals, particularly food security, healthy diets and inclusive growth.
2. Accelerated agri-food systems development in the Indo-Pacific region requires system wide innovation. Success is contingent on the invention and adoption of component technologies across value chains AND on the creative relationships between technologies, business models, value chain and policy innovation.
3. Technological advances, public policy reforms and market developments therefore all play an important part and the dynamic between them is critical.
4. While agricultural research and food science and technology has a critical role in creating solutions to current and future food systems challenges in developing countries, research is most effective when it is coupled with the efforts of public and private agencies with responsibility and incentives to create the policy and market conditions to make use of and deliver new technologies and ideas.
5. Partnerships between governments and the private and civil society sectors present pathways for scaling development interventions and sharing costs. They also present opportunities to capitalize on technology and delivery innovations pioneered by the private and civil society sectors that specifically target poor people.
6. Given the above, facilitating development partnerships encompassing public research agencies, development organisations (including in health and education) and private sector platforms is a valuable form of aid programing.

CSIRO plays a key role as an innovation catalyst and collaboration hub in advancing Australia's interests - including in food systems innovation and development in the Indo-Pacific region. This entails deep engagement in diverse partnerships across the region and across diverse stakeholder groups. It also involves a commitment to rigorous research in understanding the science of innovation and in designing and assessing intervention options

## Introduction

Development partnerships in the food and agriculture sectors have a long tradition in Australian aid programming. In recent years there has been significant reframing of development aid globally, including in Australia. Critically, aid policy now has a stronger focus on the private sector engagement and the search for greater alignment between international development priorities and the domestic economic agenda of donor countries. The changing technological, business, policy and innovation landscape are accelerating this shift globally, but particularly in the Indo-Pacific region which is characterised by both rapid economic development and persistent rural poverty.

This trend towards more diverse partnerships in development is, at least in part, driven by:

- The globalisation of food systems which has stimulated business-enabled innovation in developing countries where local companies are often increasingly well placed to develop products, services and value chain innovation that respond to large markets of poor producers and consumers and an emerging middle class.
- The convergence of developing country smallholder sectors, supply of inputs by agribusiness, post-farm supply chains and export markets for Australian products and know-how blurring the boundaries between aid interventions and general economic activity that have been viewed traditionally as discrete and independent impact pathways.
- Growing corporate interest (e.g. the World Economic Forum 'New Vision for Agriculture') and a global shift towards public-private partnerships and inclusive agribusiness in development policy.
- The transition from 'Research for development (R4D)' as a concept to an integrated global agricultural research agenda that spans the smallholder through post-farm gate processing to multi-national agricultural endeavours motivated by profitable agriculture, sustainable intensification and enduring & sustainable food security and addressing opportunities across the value chain.

These trends change the strategic alignment of international research-for-development and provide (i) an added Australian domestic imperative<sup>1</sup> for engagement in international food and agricultural research, (ii) opportunities to market Australian scientific expertise to the developing world.

<sup>1</sup> For Australia, the food and agricultural sectors face opportunities and challenges in much tighter integration into regional value chains that benefit from the 'Asian Century of Trade'

## RESPONSE TO TERMS OF REFERENCE

### ***TOR #1 Australia's contribution and achievements to date in catalysing sustainable economic growth, improving livelihoods and strengthening food and nutrition security through partnerships in the agriculture and food sector in developing countries in the region including the extent to which these efforts support our national interest***

CSIRO Agriculture is the largest single agricultural research capability in Australia and one of the top ten in terms of science excellence (as measured by publications and citations) globally. CSIRO has a considerable track record of undertaking research and technology development in support of agricultural development and a significant portfolio of food and agricultural innovation systems activities, playing distinct roles including:

- providing technically advanced research solutions, at scale and using a participatory action research approach, that provide a quicker path to impact compared with supply led models of research and extension
- providing scientific approaches to investment decision support (e.g. water resource assessment and planning in South Asia, climate adaptation options for smallholder farmers in South Asia, livestock yield gap assessments for Africa)
- providing system-wide approaches to tackle complex systems challenges (for example the Africa Food Security Initiative (AFSI)<sup>2</sup>, the World Economic Forum's GrowAsia<sup>3</sup> public private sector platform, the Food Systems Innovation (FSI)<sup>4</sup> initiative and Applied Research and Innovation Systems in Agriculture (ARISA) project in Indonesia).

Much of CSIRO's research-for-development has been funded by Australia's Official Development Assistance (ODA). This is intended to achieve national interests by promoting prosperity, reducing poverty, enhancing stability globally and promoting Australia's global interests. Historically this has taken the form of partnerships between CSIRO and counter-part public research and technology delivery agencies in developing countries and often involved partnerships cultivated over many years.

CSIRO can demonstrate significant impact from this type of development partnership model relative to scale of investment. For example, through ACIAR, CSIRO have a 20+ year involvement in both technical and policy-related research on growing and processing of acacias and other fast-growing Australian tree species in Viet Nam. A recent review for ACIAR by Dr Neil Byron concludes that since 1990 Vietnam has, as a direct consequence, developed an Acacia sector that is:

- generating \$4.5 billion a year in exports, and over \$1 billion worth of domestic wood products;
- employing approximately 100,000 workers per year (on a full-time equivalent basis) and paying them at least 2,759 billion VND each year (\$US 132 million) and
- paying out over \$US 320 million to approximately 250000 rural households who grow much (about 70 per cent) of the plantations<sup>5</sup>.

<sup>2</sup> <http://hub.africabiosciences.org/donors/donors> ; <http://www.coraf.org/csiro>

<sup>3</sup> <http://growasia.org/>

<sup>4</sup> <http://foodsystemsinnovation.org.au/>

<sup>5</sup> The Acacia Economy of Viet Nam; An assessment. Prepared for ACIAR by Dr Neil Byron. Canberra 21 April 2014

Furthermore, there is significant evidence that research and technology partnerships have significant benefits to Australia. For example, they can lead to direct science advances or tools that can be deployed back in Australia or elsewhere, such as the world leading farming systems modelling capacity APSIM which had its genesis in ACIAR-funded work in East Africa. APSIM-based tools are now used widely by Australian farmers, advisors and researchers in farm scale decision making as well as by researchers globally. Development partnerships can also lead to enhanced partnerships with developed country R&D institutions (e.g. EU and US) via interactions on the ground in developing nations. They also provide enhanced skills development for Australian researchers and innovators working in challenging but stimulating “problem solving” environments, support national diplomacy efforts that address our national security and biosecurity concerns, and open new market opportunities for Australian industry. For example, CSIRO’s work in developing the aquaculture feed Novacq and deploying in the region has provided improvements in food security as well as markets for Australian manufacturer Ridley.

Established development partnership approaches often mirror the role of CSIRO in the domestic agricultural sector where we have operated as a national centre of scientific excellence responding to research and technology priorities set by industry and government. Domestically, there are increasing concerns about the innovation effectiveness of the Australian agricultural sector. Australia ranks favourably on the international scale for expenditure on R&D, and on the volume of research outputs but ranks poorly on translation from research to outcomes for end users. Research and innovation modalities that served Australia well in the past may need to be adapted to suit the emerging landscape of a more globally situated agricultural sector<sup>6</sup>. This will require a responsive mode of innovation to address rapidly changing consumer demands where value chain innovations are a key source of competitiveness and where social and environmental sustainability goals are of increasing importance at both national and global scales.

Many of the challenges facing agriculture in the Indo-Pacific region (resource scarcity and degradation, multiple stakeholders across public private and civil society sectors and the ability to capture of opportunities from new platform technologies) could benefit from new development partnerships in which Australian expertise and commercial technologies are packaged as part of a wider effort to develop coherence between research, farmers, business and public policy goals. For example, engagement with development imperatives at the food-energy-water nexus in South Asia provide an opportunity for Australia to combine core strengths in integrated water resource management with its expertise in agriculture and energy in this heavily contested space.

Resulting innovation can be rapid. For example, the spread of ‘conservation agriculture’<sup>7</sup> demonstrates a distributed and integrated innovation process where farmers, local research centres, equipment manufacturers and decision makers have collaborated in a shift towards more sustainable production practices. This in turn has created new service business opportunities through the application of digital agriculture technologies from CSIRO’s research<sup>8</sup>. Partnerships of this sort internationally can have commercial and technological benefits to Australia. These can help maintain the competitiveness of Australian agriculture and to enable Australian agricultural science and business to more fruitfully engage in the emerging markets and business innovation dynamics of the Indo-Pacific region.

In response to this challenge, CSIRO is positioning itself as a collaboration hub and innovation catalyst that situates Australian priorities in a global context. This role will see CSIRO build on its deep partnership across the region, allowing us to draw on the capabilities of our partners to solve the complex challenges we are working on. Our international work is based on strong national benefit considerations, such as the generation of knowledge, access to capabilities, connections into global markets and supply chains, and alignment with the Federal Government’s foreign policy objectives. We are investing in innovation

<sup>6</sup> CSIRO Submission 15/543; Agricultural Innovation. House of Representatives Standing Committee on Agriculture and Industry. September 2015

<sup>7</sup> Practices that minimise disruption to soil cover, structure and priorities

<sup>8</sup> Bellotti and Rochecoste 2014 <http://www.sciencedirect.com/science/article/pii/S2095633915300113>

systems science to investigate the effectiveness of different partnership modalities for innovation to maximise the efficacy of our research-for-development activities.

In the food sector, CSIRO has significant research capability in food science and technology coupled with regionally-recognised expertise in nutrition and health sciences. This combination supports the creation and substantiation of safe, sustainable and stable foods, diets and lifestyle programs that will promote good nutrition and health throughout life, including addressing specific health issues such as diabetes and obesity which are now becoming emerging health problems throughout many of the Indo-Pacific countries. Partnership with both the local and multinational private sectors in combination with relevant government sectors such as health and education will be critical to ensure foods that promote good health and nutrition are prioritised.

In summary, CSIRO increasingly recognises that science conducted in its current research-for-development portfolio is not fundamentally different to its other research (although impact pathways differ). CSIRO therefore seeks to engage with an integrated global agriculture and food research agenda motivated by profitable agriculture, sustainable intensification and enduring and sustainable food security that spans smallholder through to multi-national agricultural endeavours across the full value chain. This offers the potential to bring the full range of our scientific capability to bear and break out of the confines of the current research-for-development framing.

## ***TOR #2 - The role of agricultural innovation in supporting agricultural development and inclusive economic growth***

Technological change and innovation remains a critical driver of agricultural led growth and poverty reduction as well as global aspirations for sustainable food systems delivering food security, healthy diets and inclusive growth. R&D has been identified as the top source of global agricultural growth<sup>9</sup> and agriculture in turn has high leverage in poverty alleviation and economic<sup>10</sup>.

There is now considerable evidence that agricultural research is most effective in creating solutions to food systems challenges when it is coupled with the efforts of public agencies and private companies. Success is contingent not only on the invention and adoption of single component technologies by farmers for on-farm issues, but the creative dynamic between component technology, business model, value chain and policy innovation. For example, there is significant opportunity for research to support defensible and transparent decision making for trade-offs in food, energy and water security in investments in regional infrastructure.

Agricultural innovation is most usefully understood in the broad sense of putting technologies, ideas and information into productive use. Component technologies (seed varieties, animal vaccines, agro-process equipment and computer applications) are key elements of innovation. However, the productive use of component technologies usually involves wider changes in the organisation of agricultural production, business practice, value chains and policy. Research has a central role both as a source of new technologies and ideas and as a way of understanding and guiding the development of wider systems of market and policy conditions that enable innovation. This includes:

- business model innovation that involves new ways of creating value in response to technological opportunities, market demand and policy signals;
- business process innovations that involve adapting the way companies work;

<sup>9</sup> 'Sustainable Agricultural Productivity Growth and Bridging the Gap for Small Family Farms' Interagency Report to the Mexican G20 Presidency, June 2 2012

<sup>10</sup> Strategy for Australia's aid investments in agriculture, fisheries and water - <http://dfat.gov.au/about-us/publications/Pages/strategy-for-australias-aid-investments-in-agriculture-fisheries-and-water.aspx>

- organisational innovations such as new types of organisation set up to perform new roles (e.g. farmer associations, producer owned enterprises, and business intermediary companies);
- value chain innovation, new rules regulations and standards that shape how value chain operate and how value chain players relate to each other;
- and value-based innovation that involves changing the way organisations work so that they can add new types of value, such as inclusiveness (shared value), sustainability (environmental value) and equity (social value).

Using agricultural innovation to support agricultural development is therefore not an issue of science and technology alone. Rather it is an issue of coupling technology with these different types and sources of innovation in ways that create solutions and opportunities for farmers, consumers and businesses and that help move food and agricultural systems to a more inclusive and sustainable pathway. Partnerships are therefore a central mechanism in harnessing agricultural innovation by bringing together different technologies, ideas, resources and capabilities and creating the conditions needed to make productive use of them.

Ineffective linkages between public agricultural research and its clients (farmers, companies and policy makers) remains a challenge through-out the Indo Pacific region including in Australia. This has weakened demand signals for research and disconnected research from other sources of innovation needed to make productive use of technology. In most developing countries, patterns of public investment have reinforced this separation. Agricultural extension has been the main public investment in technology transfer. Irrespective of its recognised operational challenges, agricultural extension has focused on farmers and pre-harvest technologies. As a result, opportunities have been missed for building wider connections between research, agri-business, policy and society more generally. In most countries there has been an underinvestment by the public sector in mechanisms to build the links and coherence between different public and private elements of the innovation process and system. The private sector has invested in R&D on topics where it can capture value. However, despite a clear business case, there is market failure in developing wider innovation networks needed to mobilise complementary ideas and resources due to ‘free rider’ concerns.

CSIRO is exploring ways of embedding research and technology in new partnerships in its international agricultural development work. For example in Indonesia, CSIRO is piloting partnerships between public research organisations and agri-businesses that deliver solutions and market opportunities to small-holders. We are using analysis of this experience to engage key public agencies in dialogue about institutional and policy reform needed to sustain and spread this type of collaboration and innovation. This approach seeks to enable partnerships between governments and the private and civil society sectors that present pathways for scaling development interventions and sharing costs – a critical point of failure in many development investments. It also presents opportunities to capitalize on technology and delivery innovations pioneered by the private and civil society sectors that specifically target poor people. We are working closely with DFAT and ACIAR to ensure that our work is supporting Australia’s national interests, including both government foreign policy and Australian industry.

### ***TOR # 3 - Actions and approaches to agricultural development in the region that would promote gender equity, women's economic empowerment and health***

CSIRO recognises that:



- Gender equality, health and women's economic empowerment are inextricably linked – specifically, women's economic empowerment will likely be constrained if women's social roles and nutrition status are overlooked.
- Improving either agricultural productivity or income alone will not necessarily lead to enhanced empowerment of women nor improved household health and nutrition outcomes. Design and programming should be addressed through the broader food (system).
- Partnerships at policy, research and project levels are critical to create the enabling environment necessary for gender equality, health and women's economic empowerment

The role of women in agricultural production and value chains has a strong cultural dimension that varies considerably across the Indo-Pacific region. Recent capacity building exercises on women's economic empowerment in cocoa value chains in Solomon Islands and Papua New Guinea by CSIRO's Food Systems Innovation (FSI) project have highlighted that women are involved in value addition and other value chain activities but that their ability to engage in such economic activity is limited due to time constraints, limited access to resources (such as land and services, including financial and extension), and cultural barriers around decision-making and engagement. Approaches to address this focus on ways that existing roles can be strengthened rather than encouraging new roles for women that can create conflict. For example, adjusting the timing of key support interventions to match women's other role in child care, particularly tailoring interventions to accommodate both women and children so that they are more mobile, are found to be effective.

The emerging inclusive agri-business agenda suggests that there are partnership opportunities for supporting women's economic empowerment by ensuring that support and capacity building interventions associated with these partnerships strengthen existing roles and identify new economic opportunities in which women can participate to add value along the chain. Civil society organisations have developed considerable expertise in women's economic empowerment and have a long history in intervention innovation. This suggests that development partnership that include specialist civil organisations could be an important way of helping aspiring inclusive agri-businesses to transform to deeper forms of inclusive business models and practice.

Encouraging a shift to more nutritionally-sensitive agriculture and food systems will both progress women's empowerment and gender equity as well as progressing nutritional quality and security. Recent CSIRO research and advisory work with DFAT suggests that initiatives that enhance women's involvement in agriculture-based activities can strengthen women's capacity, increase their access to, and control over resources and assets, and consequently augment their power to make decisions on the purchase and allocation of food, health and care within their households, as well as decisions on how to engage in value chains to increase production and value adding processes to generate additional incomes.

CSIRO and DFAT have partnered (through FSI) to improve program designs and interventions through, for example:

- Co-designing TOMAK – To'os Ba Moris Diak – Farming for Prosperity, Timor Leste's new agricultural livelihoods program with combined goals of partnering in sustainable and profitable value chains with the promotion of year-round healthy diets.
- Development of Operational Guidance Notes on Nutrition-Sensitive Agriculture and Women's Economic Empowerment. These support program managers to integrate gender and nutrition considerations in agricultural interventions.

CSIRO is also undertaking capacity building on women's economic empowerment with research institutions, private sector and civil society. The DFAT funded Applied Research and Innovation Systems in Agriculture (ARISA) programme based in Indonesia is building partnerships between public research

organisations and the private sector to support innovation by small holder farmers. The aim is to ensure all stakeholders have a clear understanding of concepts, and how increase the beneficial impact for women of the project economic activities through of the collaborative innovation partnerships being formed. In the DFAT funded Sustainable Development Investment Portfolio (SDIP) program, CSIRO is exploring the connection between regional water management decision making, food production and livelihoods (particularly for women and girls)

#### ***TOR#4 - The current and potential role of the private sector, including small developing-country entrepreneurs and larger Australian and international businesses, in driving inclusive and sustainable development in Indo-Pacific agriculture and food value chains***

There are growing opportunities for much wider engagement of the private sector in development partnership in the Indo-Pacific region as a result of an increasingly dynamic agri-business sector in the region. This is part of a wider trend in the globalisation of food systems, including the convergence of developing countries' smallholder sectors, supply of inputs by agribusiness, post-farm supply chains and export markets for Australian products and know-how.

The emergence of new modes of agri-business that operate on principles of shared value, inclusiveness and sustainability reflects this change. Unlike corporate social responsibility, these business innovations explicitly seek to deliver social benefit as part of a profitable business model. This trend is observed among many of the global value chain players as well among large and small national companies, often in collaboration with civil society organisations. Australian companies trading in the region are starting to change business practice in this direction.

Development partnerships with this new inclusive agri-business trend provide a market-based mechanism to deliver technology, products and services to the poor as well providing them access to global value chains for produce. This provides the private sector with a way of sustaining a supply base for global value chains and strengthening social licence in key global markets. Development partnerships with inclusive businesses also present new public policy opportunities to enable the scaling of inclusive technology and delivery innovations pioneered by the private sector. These opportunities have resulted in growing corporate interest (e.g. the World Economic Forum 'New Vision for Agriculture') and a global shift towards public-private partnerships and inclusive agribusiness in development policy.

Recent research by CSIRO in collaboration with the Grow Asia Inclusive agri-business roundtable<sup>11</sup> indicates that the small and medium scale agri-business sector is a critical source of inclusive innovation. This research has identified four distinct pathways of business innovation that point to different potential future roles of the private sector in inclusive agricultural development and different ways in which public and private sector can engage in these opportunities. In summary:

- Pathway 1 - Large international and national companies engaging in inclusive agribusiness models. This has occurred in select commodity chains in South East Asia with many successful pilots. Nevertheless, penetration of inclusive agri-business models into business practice beyond pilots remains limited
- Pathway 2 - Social-enterprises and cooperative and producer-owned companies becoming more business-like. Most successful countries have a long cooperative tradition which means there is significant potential for upgrading existing practices and organisational innovation from social enterprises and cooperatives

<sup>11</sup> <http://inclusiveasia.org/>

- Pathway 3 – Engaging traditional business practices embedded in communities. This is a large and often semi-formal sector characterised by small players and a lack of research and technical support and capacity. This sector is largely invisible in inclusive agri-business dialogues but has significant potential
- Pathway 4 - Small scale enterprises pioneering inclusive business models, products and services providing a very diverse source of innovation dealing with many commodities, products and services. This pathway is challenging for current policy instruments and lacks effective financing, research and other innovation supports services.

This research suggests public investments are needed to address market failures in financing and innovation exchange and collaboration between small and large companies and science and technology support and capability. This suggests a mode of development partnership in the inclusive agri-business sector that resembles an innovation support facility that couples private impact investing finance from local and global sources, business to business deal-brokering with national and global partners, research support and policy engagement.

Finally, disruptive technologies, particularly ICT's are likely to play a large role in these inclusive agri-business led innovation processes going forward. For example, market information systems and smart phone enabled financial and advisory services have become a key way of connecting small-holder farmers to market opportunities. Web based computer information on water availability can also enable better decision making on crop management by small landholders. However these disruptive technologies will only achieve pervasive social impact if they are coupled to appropriate business and policy innovations. Once again development partnerships will key to unlocking this innovation potential.

CSIRO has a long history of working with Australian large and small business as well as multinational business and we have separately worked with development partners in a developing country context. Looking forward, CSIRO is seeking to help connect these two communities to lift private sector involvement in inclusive and sustainable development along agri-food value chains.

### ***TOR #5 - Innovative modalities and practices that would enhance the contribution of all relevant stakeholders in supporting agricultural development, better nutrition and inclusive economic growth in the Indo-Pacific region***

Convergence of a number of related agendas and trends point to a potentially critical role for development partnerships. These include:

- An aid-for-trade perspective in development policy focusing on enabling the private sector;
- Stronger business and trade links between Australian food and agribusiness and growing market opportunities in the Indo-Pacific region and the new economic opportunities this opens up both domestically and regionally
- The spread of inclusive agri-business models in key global agricultural commodity value chains with wider disruptive effects on other parts of the food system at national and global levels; and
- Innovation and integration at the nexus of agriculture, food science, disruptive food and digital technologies and nutrition.

Innovation in its broad sense sits at the heart of this opportunity and will be contingent on the creation of an appropriate architecture of partnerships to enable synergy between both private and civil society sectors and between business, research and policy.

Appropriate potential partnership modalities include:

- Support to global corporates and national companies in their transition to inclusive business innovation by providing technical expertise, capacity building support and policy and sector analysis.
- Brokering innovation support through the establishment of facilities that couple 'impact investing', business-to-business deal brokering, research and policy engagement
- Establishment, support or co-investment in regional and global multi-stakeholder alliances, partnerships and platforms targeting critical agricultural and food systems solutions and opportunities.
- Creating opportunities for innovation exchange between key Australian agricultural and water management sectors and regional counterparts, for example in the food processing sector.
- Trade-aid-business brokering to widen the opportunities for Australian primary producers and allied service provider to engage in regional value chains and markets
- Strengthening innovation in development partnerships practice (at the business-development interface) by facilitating information exchange and learning through knowledge management and networking investments.
- Strengthening the secondary processing sector in countries like Indonesia to help in translating specifications (from food manufacturers) into raw material requirements (from farmers) via intermediates and food ingredients.

CSIRO is making specific investment to explore this unfolding scenario and define new modes of operation under the theme of 'Preparing Australian Agriculture for the Asian Century' and through developing partnerships with private companies in the food and nutrition sectors in the region. This is part of wider strategic shifts in CSIRO as it positions itself as an innovation catalyst for the Australian economy with a global outlook.