



Inquiry into the strategic effectiveness and outcomes of Australia's aid program in the Indo-Pacific and its role in supporting our regional interests

Submission from the Crawford Fund

Summary

The Crawford Fund uses a model that adds value to the internationally focused work of major agencies like ACIAR and CSIRO by the judicious support of capacity building activities. We use the experience of a nationwide network of senior scientists, complemented by a similar network of early career individuals. The Crawford Fund's ethos has, for long, been that the best aid we can give to improving regional food security is to develop the scientific expertise within the agricultural science, management and farming communities in the developing world. This pays off for Australia in terms of ongoing scientific and industry linkages, further education demand, biosecurity considerations and soft diplomacy outcomes.

We argue that many food and nutritional problems in developing countries will only be solved by cross disciplinary work that integrates gender, governance, youth and health issues.

We present a number of examples of low cost, small scale, targeted training and mentoring activities and focused projects that demonstrate excellent outcomes and impacts that benefit aid recipients and Australia. These complement and add value to the larger programs of ACIAR, who we argue plays a critical role in ensuring our production systems benefit from international scientific innovation and who have demonstrated that Australian expertise has significantly aided food security and thus greater prosperity, biosecurity and security in many developing countries. Similarly ACIAR's work has promoted very strong linkages between overseas institutions and the Australian tertiary education sector, CSIRO and state departments of agriculture.

Introduction

In our submission we focus, in particular on the following terms of reference:

- increased emphasis on outcomes for women and girls; and
- innovation in Australia's aid program

We also make comments relevant to the role, implementation, efficacy, impact, outcomes and/or evaluation of:

- Australia's aid program in terms of strategic and development goals;
- The role Australia's aid program plays in building influence as a trusted development partner;

- Australia's aid program in fostering confidence, stability, sustainability, capacity, community-determined goals and best outcomes, particularly by utilising local procurement and smaller/local entities; and
- The Australian Centre for International Agricultural Research (ACIAR) in delivering development outcomes, particularly with regard to the linkages between food security, biosecurity and national security issues.

The Crawford Fund

The Crawford Fund is a not-for-profit organisation that raises awareness of the benefits to Australia and developing countries of Australia's engagement in international agricultural research and development; supports training programs for developing country and Australian scientists and farmers, drawing on Australian experience; and encourages and supports young Australians in their careers, studies and volunteering in agriculture for development. We receive part of our funding from the Australian Centre for International Agricultural Research (ACIAR) and work closely with it to add value to its projects by training and mentoring activities. Approximately one third of our budget comes from state and territory government support and private donations.

The Crawford Fund operates on the principle that by training overseas scientists in bio-physical science and supporting disciplines including economics, leadership, biometrics and communication, we are helping poorer nations develop approaches, solutions and innovations with respect to their own agricultural problems. In the 30 years since our founding we have trained over 12,000 individuals from 54 countries. We fill a niche in terms of training that adds value to ACIAR projects, and builds capacity at home and overseas via short, non-degree/diploma courses and individually tailored programs in areas generally not covered by tertiary institutes. Recently, we have also been ramping up our efforts to enthuse and train younger Australians which equip them to continue this tradition of supporting overseas counterparts in agricultural R&D. These approaches relate directly to the required outcomes of Australia's aid programs mentioned in the inquiry background material.

Increasing the effectiveness of aid via international agricultural research

"It's been proven that of all the interventions designed to reduce poverty, improving agricultural productivity is the best."

– Bill Gates, chairman of Microsoft and founder of the Bill and Melinda Gates Foundation

Our fundamental premise in supporting agricultural research, development and extension (RD&E) is that World Bank and other studies have demonstrated conclusively that improving agricultural production in lower developed countries is the best way to raise gross domestic product (World Bank, 2007), thus helping poor farmers and the economy in general.

Although the Crawford Fund is relatively small, we offer a particularly attractive value proposition in terms of the way we operate that draws on experience and enthusiasm. We have an extensive, nationwide network of highly experienced agricultural, fisheries, forestry and natural resource management scientists, economists, managers and policy makers to draw on to support aid related activities. Some of these individuals are members of our state and territory committees and others contribute as mentors and trainers. All give their time free-of-charge, or for small honoraria and contributions to travel expenses. Many of these individuals have worked on ACIAR projects earlier in

their careers and collectively they have a wealth of know-how with respect to international agricultural development.

Complementing this group of senior experts are the 660 student and early-career individuals who are members of our RAID Program (Researchers in Agriculture for International Development). Some of these individuals have volunteered to work in agricultural development overseas under the DFAT funded Australian Volunteer Program and some of these have gone on to careers in universities, government agencies and the private sector, with an enhanced understanding of development issues.

Recently, we have produced a new strategic plan (www.crawfordfund.org/news/changing-our-strategy-for-a-changing-environment-the-crawford-fund-strategic-plan-2018-2023/) that sets out some key issues and directions for our organisation over the next 5 years. This plan is complementary to ACIAR's plan and DFAT's broader objectives. The Crawford Fund strategic plan highlights some key issues highly relevant to improving outcomes and effectiveness of Australia's foreign aid. Key issues include:

- Food and Nutritional Security: There is a growing global obesity epidemic. If we look to the causes of this obesity epidemic, clearly increasing wealth and access to cheaper, processed, high calorific foods along with lack of exercise are implicated. For agricultural scientists involved in international development, the mantra for many years has been predominantly to increase yields to tackle a perceived deficit in food production. This predicated the Green Revolution of the 1950s-70s which undoubtedly prevented up to 2 billion starving. Today, however, enough food is grown globally to feed everyone. The 815 million under-nourished people, and instances of food riots such as occurred in some countries during the 2007-08 food crisis, are really symptoms of lack of access to food due to inequality and inadequate distribution systems that drove prices up. Indeed, continued striving for greater yield has put extra pressure on global land and water resources, ecosystem services and environment in general, not to mention the fact that agriculture is already a large and growing greenhouse gas emitter. Whilst, with a growing global population forecast to reach 9.7 billion in 2050, we do need to maintain work on food security with an emphasis on systems' sustainability, it is evident that we also need to direct more resources into nutritional security. This should be with a perspective of improving the nutritional balance of both the under-and over-nourished. Consequently, agricultural aid has to focus in the future on both food and nutritional security
- Gender inequality: In many developing countries a critical issue is the lack of gender equity and empowerment of women in access to land and water resources and in decision making on farms. Both women and men play a central role in the farming, food and health, and natural resource management systems of low and medium income countries. But women's contribution is often undervalued or unrecognised and in some developing countries they are increasingly responsible for agricultural production when their partners leave the farm to seek employment in the cities —and they are often disproportionately affected by poverty. Consequently, we have to promote greater access for women to training programs, as well as trying to ensure gender issues are included in determining pathways to successful implementation of change and innovation.
- Governance: Similarly, governance and institutional support systems in many countries do not promote either greater gender equity, or the enhancement and uptake of innovation, cooperation and market access. We see a major need to improve understanding of the

positive outcomes of better policy, regulation and institutional support structures by training early to mid-career researchers and managers as well as senior policy makers.

- Youth: Both in Australia and overseas, another major gap is the inadequate way agriculture is promoted to the young as a career choice. We have to do better in this regard and attract some of the brightest into careers along the entire food value chain. Whilst our RAID Program caters for early to mid-career scientists, there is much more to be done to attract high schoolers and undergraduates into careers in agriculture. These young scientists are the next generation who will contribute Australian agricultural know-how overseas. We are also actively encouraging and supporting senior researchers to mentor overseas younger counterparts and Australian volunteers across the spectrum of agriculture, forestry and fisheries.

Given the above set of key issues, we argue that future aid support in agricultural development should give greater emphasis to multi-disciplinary work that integrates gender, governance, mentoring and youth and involves more interaction with the private sector. Similarly, where food and nutrition security are important, approaches should involve agricultural and health sectors.

The effectiveness of the Australian Centre for International Agricultural Research

We strongly believe that the provision of aid that enhances food security helps promote peace and prosperity in our region. Helping countries achieve improved production and enhanced wealth via agricultural know-how and technology is an ideal way to do this. ACIAR is at the forefront of this approach. Consequently, we strongly endorse ACIAR's new strategic plan, which emphasises many of the issues mentioned in this submission.

The Crawford Fund was established by ATSE (Australian Academy of Technological Sciences and Engineering) and was initially funded with a Federal Government Grant provided by DFAT. More recently, this grant has been provided from ACIAR's budget. Whilst we are independently governed and managed we do have a MoU with ACIAR which enables us to develop a strong, synergistic relationship around our training programs and conferences. We also help support international visitors to Australia in terms of organising contacts with ACIAR and other government agencies.

In our view ACIAR's work and recent strategic realignment makes an invaluable contribution to food and nutritional security, regionally and globally. Through ACIAR's multilateral funding of the international research centres of the CGIAR¹, Australia joins a much larger network of international agricultural science and is in a better position to benefit from the introduction of new plant varieties (e.g. wheats) and be better prepared to deal with invasive pests and diseases. ACIAR's funding of projects in individual countries or regionally has also built very strong linkages between overseas scientists and Australian research agencies and universities. These linkages not only enhance Australia's reputation as a quality provider of research training, but also build further ties between the individuals trained and Australian entities including the private sector. Perhaps, most crucially, ACIAR investments have been repeatedly assessed as having significantly positive benefit to cost ratios. For example, annual benefit flows, largely derived from the use in Australia of germplasm from just three CG centres, is estimated at nearly \$100 million (Crawford Fund, 2013).

¹ CGIAR (formerly the Consultative Group on International Agricultural Research) invests around USD\$1 billion annually through 15 International Agricultural Research Centres (IARCs), employing more than 8,000 scientists.

Internationally, Australia punches above its weight with respect to agricultural R&D and its application. This is particularly evident in areas associated with dryland agricultural systems, irrigation, plant sciences, sustainable intensification, fisheries, forestry and natural resource management. This is partly due to ACIAR's proactive involvement in these areas. This involvement undoubtedly not only benefits overseas recipients of knowledge and expertise, but allows our scientists to gain deeper insights into issues, which can then be applied in Australia. Further details of the benefits arising from Australian involvement in international agricultural research are itemised in "Doing Well by Doing Good" (2013) published by the Crawford Fund.

Crawford Fund Projects

The following examples of how the Crawford Fund's *modus operandi* has delivered significant outcomes. Many of them also indicate how they build and add value to ACIAR R&D projects. We have included both generic and specific project examples to exemplify how they are particularly effective in terms of aid delivery.

Master Classes: The Crawford Fund has in the last two years focused efforts on delivery of new Master Classes in Agricultural Research Leadership and Management (ARLM) and Market Access and Biosecurity (MAB). These are aimed at mid-career scientists, predominantly from developing countries. ARLM has had 50 individuals participate to date and focuses on giving them a better understanding of strategic planning, program management and human resources management that will lead to better project implementation and outcomes. Each Master Class costs about \$50,000 - \$70,000 to conduct. The Crawford Fund usually contributes about half of this and leverages funding from international agencies and the private sector for the remainder. As well as individual learning outcomes, the Master Classes help to build an international community of practice linked back to Australian institutions and individuals. MAB has recently been piloted in Indonesia around plant biosecurity (based on interaction between our ACT Committee and the Plant Biosecurity CRC) and will be followed up with potential Master Classes on animal biosecurity focused on exporters and importers of Australian livestock. It is hard to value the benefits of our biosecurity training, but every year a major pest or disease is kept out of Australia (even if it eventually gets here) saves millions. Our front line defence is SE Asia and PNG where our training and visits are targeted.

Mentors: The Crawford Fund has for several years maintained a mentoring group working in Vietnam and more recently in Laos on plant health and associated market access and food security issues. For a very small cost, this network has helped counterpart staff and agencies identify and manage significant plant disease and biosecurity issues. There has also been significant support into Cambodia for sustainable intensification of agriculture, especially livestock forage and rice production and diversification from cassava monocultures. Australian volunteers have assisted with this important work which has also been complementary to ACIAR projects. The mentoring model is now being expanded into other areas in Vietnam (forestry), Cambodia (food value chains) and Timor L'este (improving human nutrition through supporting women farmers in healthier village chicken production). Mentors may cost as little as \$10,000 per annum to support and whilst time on the ground is limited, effective relationships can now be maintained by electronic communication.

Student training awards: All our state and territory committees give student awards. Our funds are used to support individual students attend specific training courses that enhance their capabilities,

or in some cases effectively support the central component of the formal research training undertaken by the student. In other instances, with PhD and Masters awardees, our funding enables an international component to be added to their formal postgraduate research training, and /or adds a valuable international agricultural research experiential component which they would otherwise not experience. Helping Australian students develop necessary skills and tools is fundamental to ensuring that we have an emerging generation of researchers and managers with understanding of our wider region and its challenges.

Safe Use of Pesticides: Empowering Women Specialists and Farm Workers of Myanmar - a project delivered by CSIRO with Crawford Funding from South Australia: Pesticides are essential for modern agriculture and they play a crucial role in emerging economies such as Myanmar, which is predominantly agrarian based. In Myanmar agriculture contributes to about 50% of national GDP and employs the majority of the labour force. According to ACIAR, more than 70% of the population are subsistence-level farmers. More than 10,000 tons of pesticides are imported annually in Myanmar. According to UN FAO resource statistics pesticide use in Myanmar is increasing rapidly in recent years. For example, the use of herbicides alone increased from 294 tons of active ingredients in 2010 to 1950 tons in 2014, a more than sixfold increase in four years. About 2220 tons of insecticides were used in 2014 and about two thirds (1429 tons) belonged to organophosphates and carbamates class known to be highly toxic to human and environmental health. It is not surprising that largest numbers of acute poisoning cases relate to organophosphates (e.g. 216 cases out of total 413 in 2003). The dangers of acute pesticide poisoning are well known to farmers, but the need is to highlight the chronic exposure which can cause many neurological diseases. The current need is to address the awareness for long term moderate exposure.

A group of 30 participants were carefully selected by the Myanmar Government's Plant Protection Division from the Shan state for the training workshop. Women work on the farms in this region, both as owners of the farm as well as farm labourers. Some women also directly carry out the task of pesticide spraying, as pointed out by the participants themselves. In addition they are exposed to pesticides as farm workers as well as being nearby residents. One of the key criteria used in selection of trainees was women who advised on the farms, but also those who worked in the farms and who were potentially exposed to pesticides either directly (while personally spraying the pesticides) or indirectly (while working on the farm) where pesticides are being used. Specifically the training achieved the following objectives

- (a) Offered a balanced understanding of costs and benefits of pesticides use in Myanmar.
- (b) Enhanced awareness about the risks of pesticides to human health and environment.
- (c) Empowered women farm-workers with knowledge and tools to protect themselves and their family from pesticide residue exposure, both in terms of human as well as ecosystem health.
- (d) Demonstrated personal protection and safe handling of pesticides and their disposal of any unused spray solution and used containers.
- (e) Distributed personal safety kits (developed by BASF Germany) which included face mask, gloves, safety glass
- (f) Enhanced technical capability of the staff (three women and one man) of Plant Protection Division of Myanmar.

The Impact of Women in Small Holder Beef Production in Vietnam: A project commenced in 2011 to investigate production and market constraints affecting small holder beef production in the NW highlands of Vietnam (ACIAR LPS/2008/049). The establishment of a number of farmer interest groups was one output of the project, which included group training on issues such as governance and animal husbandry. Train the trainer activities were also undertaken with the local Department of Agriculture and Rural Development (DARD) in Điện Biên Province to increase their capacity to deliver extension services in the region. A follow on project (ACIAR LPS/2015/037) is making use of the farmer interest groups as a conduit for innovative production practices to intensify beef production in the highlands of Vietnam and improve market linkages. An unexpected outcome or impact of the first project was that when visiting a commune close to Điện Biên Phủ, the research team met with a newly established cattle raising interest group. The group had approached the local DARD who subsequently provided training in various aspects of animal husbandry and forage production (another output of the first project). Knowing that the group started as a consequence of the previous project was a good outcome, but finding that of the 26 members in the group, 21 were women, was an amazing, yet unexpected, outcome. The role of women and their impact in beef cattle production is now the subject of a PhD study that commenced at the beginning of 2018.

A companion beef project in the South Central Coast of Vietnam (ACIAR LPS/2012/062) used a peer to peer learning activity to enable and empower project farmers to adopt new technologies. The process involved taking project farmers who had been shown the new technologies to visit farmers who had already adopted new technologies – otherwise known as ‘champion’ farmers. This strategy was the focus of an honours project that was supported by the Tasmanian Crawford Fund, which also supported another honours project in the NW Highlands investigating Cassava root silage as a food resource for cattle. The Crawford Fund provided further support to two undergraduate students to participate in a market linkage activity of the NW beef project. Fortuitously, but unintentionally all recipients of Crawford Fund support were women, which further demonstrates the impact that women have on and in agriculture, and the value of collaborations with partners such as the Crawford Fund.

Improving soil productivity in Asia and Australia – A Crawford Fund Masterclass on Soil Productivity, co-hosted by NSW DPI and the University of Sydney, was held in NSW in May 2016. It brought together early- to mid-career research leaders from several South-east Asian countries, PNG, India and China, to learn about practical soil productivity improvement programs being implemented by NSW DPI and about world-leading digital soil mapping techniques being developed by Sydney University. Separately, the NSW Crawford Committee has co-funded with Sydney University several studies and skills development on remote mapping of peatlands in different parts of Indonesia, from Sumatra to Papua. Better digital mapping of these areas will allow them to be protected from deforestation, which causes huge risks of forest fires and methane emissions,

Crawford Fund supported training for improved fisheries management in Indonesia: In April 2012, CSIRO in collaboration with partner agency Research Institute for Marine Fisheries (RIMF) in North Jakarta ran a training workshop at RIMF on the techniques associated with fish ageing, which is important in the management of fish populations to ensure that the breeding cycle is maintained. The majority of the operating costs for this workshop were covered with support from the Crawford

Fund (AU\$8.4K). Seventeen scientists, drawn from RIMF and three other marine and freshwater research institutes, received 5 days of training from Fish Ageing Services (Victoria, Australia) and CSIRO in methods of preparation of otoliths (fish 'ear-bones') and the reading of otolith sections for age determination. This training proved both highly timely and beneficial, with many of the participants having since employed their new knowledge and skills to age-based assessments of various fisheries. RIMF, and the Research Institute for Tuna Fisheries in Bali, both have since developed fully operational fish ageing labs in their respective institutes, as a direct outcome from the workshop. This has proved particularly important in Indonesia's current development of Harvest Strategies for tuna and other fisheries. The Crawford Fund support was a partnership between the WA and Tasmanian Committees and our Master Class Program.

Also beneficial to Indonesia's current Harvest Strategy development and objectives of improved management for its marine and freshwater fisheries was the Crawford Fund supported (AU\$20K) Master Class, "Methods for assessing data-poor fisheries", conducted in Bogor (West Java) in August 2015. This 5 day Master Class, with 39 participants, was a collaboration between Bogor Agricultural University, Indonesia's Ministry of Marine Affairs and Fisheries, Murdoch University, and CSIRO (as activity of ACIAR Project FIS/2009/059). The participants came from the government research institutes, government fisheries offices, universities, NGOs and fishing industry associations. Key outputs from this Master Class were short scientific papers, prepared by the participants, as assessments for a selection of the fisheries, including tunas, sharks, coral reef fish, crabs and lobsters.

Both the abovementioned training activities towards improved fisheries management will yield benefits to Australia's tuna fisheries because of shared stock issues. This is particularly so for southern bluefin tuna (SBT), Australia's most important commercial tuna species. The spawning and nursery ground for SBT lies close to Indonesia and is fished heavily by the Indonesian longline fleet.

Training in GM regulation: in particular three key scientists from Africa, involving the Federal Government's Office of the Gene Technology Regulator (OGTR). One, Dr Rufus Ebegba, is now Director General/CEO of the National Biosafety Management Agency of Nigeria, a country about to release its first GM crop, namely Bt cowpea, developed in Canberra at CSIRO by the team led by ACT Crawford Fund Committee member T.J.Higgins. Another training event brought 18 GM regulators from SE Asia to the OGTR for a week with the collaboration of the International Food Policy Research Institute based in Washington, D.C. This field can only become more important, as more of our neighbours move to release GM food crops: Bangladesh and The Philippines are now doing this and more are likely to gradually follow, so more OGTR training is a sensible objective.

Training in using soil testing to improve fertiliser impacts in Uganda: Soil testing was used by David Collins and scientists from Curtin University to assess effectiveness of cattle manure as a fertiliser for smallholder farmers in Uganda and more recently in Ethiopia. Crawford Fund supported training in 2012, in 2015 and in 2017. Each visit allowed further assessments of the effectiveness of earlier additional fertiliser treatments. Yield increases of 20 to 400% have been obtained allowing the mainly female farmers to spend extra income on children's education, on clothing, health and business development. At each visit, more farmers became involved and now local lead farmers are helping with the training. These trials were extended on the latest visit when new trials were set up in Ethiopia. This model has demonstrated successful adoption of technologies.

Conclusions

The above examples are all activities that have been supported by limited budgets (generally between \$3000 - \$50,000 each), that have added significant value to larger agency funded projects via training and extension, or that have been commissioned to deal with an emerging issue or problem in an aid recipient country. They demonstrate that we are an agile organisation that can respond quickly to emerging issues, can draw on very significant national expertise, and operate in a range of different modes. The outcomes and impacts demonstrated in the examples include tangible increases in yields and profitability and means of combatting plant and animal diseases for poor farmers, significant increases in capabilities in overseas agencies and less tangible benefits associated with improved linkages to Australia and other soft diplomacy outcomes.

Reference

Crawford Fund. 2013. Doing Well By Doing Good: International Agricultural Research – How It Benefits Australia As Well As Developing Countries. Dr Denis Blight, Dr Eric Craswell and Professor John Mullen. www.crawfordfund.org/focus/doing-well-by-doing-good/

World Bank 2007. World Development Report 2008 – Agriculture for Development. The International Bank for Reconstruction and Development. The World Bank, 1818 H Street NW, Washington DC 20433