Crop health capacity-building in least developed countries: a unique approach

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ABSTRACT: Agriculture employs over 70% of the workforce in Laos, one of the least developed countries in the world, and provides approximately 27% of total GDP. Intensifying vegetable production will increase plant pest and disease pressure and significant on-farm losses for the majority of subsistence and smallholder cooperative farmers. Intensification is likely to happen if Laos is to meet the World Trade Organization Agreement on Sanitary and Phytosanitary Measures (the 'SPS Agreement') requirements for exports to the ASEAN economic community and international markets. This will be a major challenge in the horticultural production areas of Savannakhet and the Bolaven Plateau because there is little capacity in crop health there to support farmers. In collaboration with Provincial Government authorities and the Australian Government volunteer program (AVID) managed by Scope Global, the Crawford Fund has committed to a long-term program to build capacity in crop health, biosecurity and food safety in Laos since 2009. Engaging volunteer early-career scientists to deliver insect and disease diagnostics training has increased the capacity of local counterparts to provide crop protection advice. Placements provide context-specific training and longer-term sustainability through gradual training, while also giving volunteers an opportunity to engage in a career in international agricultural development. Crawford e-mentors support volunteers in five countries with advice and pro-bono laboratory services – a unique feature of the program. Crop management strategies have already been implemented on key farms with the help of local staff, leading to reduced crop loss and increased yields. This long-term commitment will contribute to rural economic development of the smallholder farm sector in Laos, and facilitate trade in rural commodities.

Keywords: crop health, early career scientists, pest and disease diagnosis

I have been involved in the Crawford Fund's Capacity-building Program in the Lao People's Democratic Republic (Laos) for over three years: first as an Australian volunteer for international development, based in Savannakhet in southern Laos, working as an entomologist and Integrated Pest Management (IPM) Officer; now in a research role, providing support to our Lao colleagues and volunteers in country.

With a population of 7,000,000 people, Laos relies heavily on agriculture for domestic use, export and trade and subsistence living: 4% of the total area of Laos is under vegetable production. Many people in rural areas live below the poverty line. However, in recent years, Laos has made large strides toward lifting people out of this situation, largely through improved agricultural production.

This is an edited transcript of the presentation, with some of the powerpoint slides shown.

Laos is a full member of the World Trade Organization, and aims to be an equal ASEAN economic partner. To achieve that, the Lao Government recognises the need to increase agricultural trade and productivity. The Government will push for more intensive vegetable production to meet export demand, putting enormous pressure on growers, the majority of whom are subsistence farmers and smallholders. Routinely there is 20–50% loss of yield through pests and diseases, and increased production is expected to add to this burden. However, there are very few crop protectionists available in Laos to deal with these issues, and many of those are based in the capital city Vientiane, which is far away from the major agricultural production areas of Savannakhet and Champasak in the south of the country.

Since 2009, the Crawford Fund has been committed to a long-term capacity-building program in Laos. In a collaborative approach, a low-cost program was designed to deliver training in integrated pest and disease management strategies in horticulture. The program engages with national and provisional governments in Laos including the Provincial Agriculture and Forestry Office (PAFO), and with Australian Volunteers for International Development (AVID) managed by Scope Global.

A key feature of this program is its unique approach to volunteer placements. Rather than placing individual plant pathologists or entomologists in the provisional offices of Savannakhet and Champasak, the program builds clusters of placements, and this means that the volunteers' skills complement each other. The arrangement also encourages collaboration and networking between the provincial offices. Throughout the placement, the volunteers are provided with professional and personal support by Crawford e-mentors.

The program's main aim is to increase knowledge and understanding of pests and diseases by local colleagues in the provisional offices. It provides hands-on participatory learning in laboratory, classroom and field, and allows for context-specific training through field surveys for pests and diseases and by curating collections and conducting field and laboratory diagnostics.

"Farmers have visited other farmers who have been assisted (by AVID/PAFO). When they hear about improvements and greater productivity the word passes this way"

Farmer, Ban Don Xeng

During the learning process, information is used to develop and apply integrated disease and pest management strategies. Key problems are identified in the field and regular visits with growers ensure that the channel of communication is kept open and we can target major on-farm issues.

There is also an emphasis on conducting small-scale local research. Everyone involved gains experience in facilitating and implementing research, including publishing their findings in peer-reviewed journals, which increases the scientific validity of the work that we do in Laos. Good examples are our research into improved seedling production techniques (Turner *et al*. 2013), and into *Fusarium* wilt of watermelon (Callaghan *et al*. 2016). There are permanent research sites and on-going monitoring.

Growers are always involved, so research is targeted at issues identified by them, directly targeting their needs.

Through local growers' attendance at our trainer workshops, farmer field days and regular on-farm visits, our work is reaching the people who need the information, and improved integrated pest and disease management strategies have been observed on-farm.

- Checklists:
  - > 50 crops surveyed
  - 250 disease identified by symptoms
  - > 150 insects collected
- Specimens lodged in Australia, New Zealand & Italy
- Plant health policy
- Trade & food security

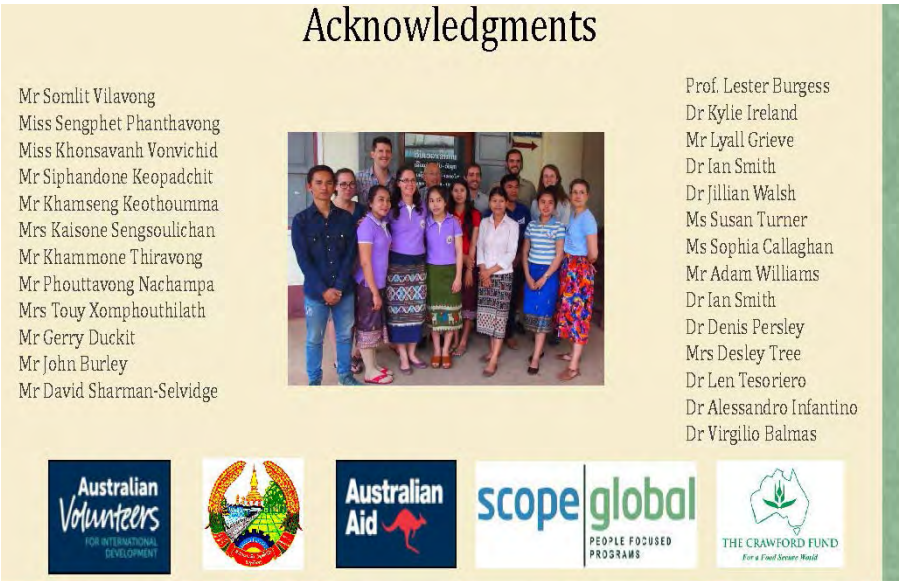
Many growers are practising crop rotations and including fallow periods into their regimes. Some are producing disease-free seedlings, raised in home nurseries, and practising on-farm hygiene by removing weeds and crop residues, all of which is resulting in reduced on-farm crop losses through fewer disease and pest incidents. We also now have farmers contacting our staff, seeking advice and help.

With the increase in trade and export, the Government recognises the need for better plant health and quarantine resources, so our work has progressed to encompass these needs. In the provincial offices, quarantine border staff are being trained in technical inspections to oversee import and export activities. We currently have an AVID working with the Plant Quarantine Division as a bio-security adviser in Vientiane, and he is working directly with colleagues on developing risk analysis and policy aid, to meet international food safety and quality export standards.

The work that we are doing is unique in that it integrates the enthusiasm of early career researchers with the support of highly experienced experts. While colleagues improve their capacity to diagnose pests and disease and provide management advice to growers, volunteers are provided with the opportunity to engage in a career in international agricultural development.

Delivery is low-cost, which means that the chance of long-term uptake is higher. Our colleagues are often operating with staffing limitations and budgetary constraints.

Before I conclude, I would like to acknowledge the many dedicated people that are involved in this program. A big acknowledgment goes to Scope Global and the Crawford Fund – in particular Professor Lester Burgess who has mentored and supported so many of us in the Laos and Australian teams. He has been the driving force behind this project and continues to lead and coordinate its success.



Through this program, our colleagues have gained the skills and confidence to conduct diagnostics and to deliver crop health advice to local vegetable growers in southern Laos. Alongside our Lao colleagues, we aim to see continued reduction of on-farm crop loss through better management and advice at the farm gate and we expect to see further rural economic development of the smallholder farm sector.

We aim to continue to work towards the improved scientific credibility and capacity of Laos, to engage with and meet international export standards, not only increasing national income generated through horticultural export, but also providing further food security from a local to a regional level.

Reference

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Madaline Healey is an entomologist and PhD candidate with Central Queensland University and a researcher at the University of the Sunshine Coast. Her research focus is population dynamics of agro–forestry ecosystems and development of integrated pest management (IPM) programs. Other research areas of interest include the biology and ecology of thrips, and forestry and horticulture research, particularly in South East Asia. Madaline is involved in international forestry and agricultural development research in South East Asia. She is passionate about working with local growers to enhance pest diagnostic skills and develop sustainable control programs.

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