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IN VIETNAM

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Front cover photo: An irrigation for coffee experiment in Central Highlands. Photo: WASI
Back cover photo: Plums grown in Moc Chau district, Son La province. Photo: ACIAR

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Editorial note

Dear Readers,

Welcome to the November 2021 'ACIAR in Vietnam' newsletter.

With the theme 'Creativity and resilience in the context of the pandemic and climate change', we are delighted to share with you a series of positive results from the projects, stretching from Vietnam's northwest mountainous region to the Mekong Delta. These are achievements of projects under the Agribusiness, Soil and Land Management, and Fishery research programs. While the COVID-19 drags on and causes many difficulties for people across the country, we appreciate more than ever the relentless efforts of all ACIAR partners in Vietnam and overseas who are working with our farmers every hour, every day to overcome challenges and complete the project goals.

In this issue, ACIAR is particularly pleased to announce the John Dillon Fellowship 2021's official start in Vietnam. This cohort is the first ever that focuses solely on Vietnam, with 19 Vietnamese fellows who are eminent researchers and managers and expected to have many breakthroughs in career development.

In addition, don't miss other interesting news on the United Nations Food Systems Summit or the latest research projects supported by Australia to help Vietnam's economic recovery and development after COVID-19.

Happy reading!

Best regards,

ACIAR Vietnam team

Dr Tran Minh Tien (right), Director of Soil and Fertiliser Research Institute (SFRI) and John Dillon 2016 fellow, is doing evaluation of an ACIAR project in Northwest Vietnam. Photo: SFRI

John Dillon Fellowship: a whole cohort for Vietnam

The Australian Centre for International Agriculture Research (ACIAR) has announced the cohort of 18 Vietnamese agricultural scientists, researchers and managers joining its John Dillon Fellowship (JDF) 2021 this October.

Established in 2002 in recognition of Professor John L Dillon's life-long commitment to agricultural research, the JDF aims to develop mid-career professionals' leadership and management skills, particularly targeting scientists, researchers and economists working in agriculture research for development from ACIAR partner countries.

In response to COVID-19, ACIAR has changed the program focus to country-specific instead of global. Therefore, the JDF Vietnam 2021 presents the largest and most diverse selection of Vietnamese fellows compared to all previous years. These fellows are nominated by 13 participating organisations and thoughtfully selected by ACIAR and the Ministry of Agriculture and Rural Development.

'Capacity building for Vietnamese agriculture researchers has always been an essential part of the 28-year collaboration between ACIAR and Vietnam. It is recognised as one of the most critical and sustainable results of our partnership. Many Vietnamese researchers have developed their professional capacity and networks after joining the JDF and become leaders and change drivers at work. We trust that the JDF Vietnam 2021 will help address research and scientific management challenges and help us take our agriculture and rural development to the next level,' said Dr Le Quoc Doanh, Vice Minister of Agriculture and Rural Development.

'Agriculture has been a key part of Australia's cooperation with Vietnam since the two countries established diplomatic relations in 1973. The ACIAR program places capacity building of individuals and organisations to perform agricultural research effectively at the heart of our bilateral cooperation for agricultural development. This year, we are very glad to see a unique group of emerging Vietnamese agricultural leaders from the research community involving the Ministry of Agriculture and Rural Development, the Ministry of Science and Technology, and the Ministry of Education and Training,' said H.E. Ms Robyn Mudie, Australian Ambassador to Vietnam.

Another new feature of the 2021 JDF program is the design and implementation of collaborative projects by groups of fellows. The project is a vehicle for the fellows to apply what they learn from the program to solve a pressing challenge within research, extension, policy, or management. In doing projects, they will also interact with relevant industry professionals to expand their network.

'This initiative will empower them to be more innovative and collaborative in identifying and tackling challenges in agriculture, not only at individual and group level but also at institutional and inter-institutional level,' added Ambassador Mudie.

The new cohort will start with online training in early November 2021, design and implement their collaborative projects throughout 2022, and conduct a study tour in Australia in late 2022 when international travel is allowed.

Australia supports Vietnam to develop sustainable food systems

Global food systems are facing many challenges. Since 1960, the world's population has doubled, and although food production has also quadrupled, 690 million people around the world still go to sleep every night with an empty stomach. Emerging risks such as climate change or pandemics are becoming increasingly apparent; increasing resource scarcity for agricultural production and threatening global food security. In this context, the world needs a food system that ensures safety and security for everyone, and at the same time, maintains a low-emission agricultural production to provide long-term benefits for the next generations.

To identify priorities and solutions to food systems-related problems, the United Nations (UN) Secretary-General Antonio Guterres convened the UN Food System Summit on 23 September 2021. The conference aims to help us better understand how the world is producing, consuming, and thinking about food systems, and prioritise actions to change the old and insecure practices.

In Vietnam, in June and July 2021, the Ministry of Agriculture and Rural Development (MARD) hosted many national and sub-national dialogues to identify issues and solutions towards transparent, responsible, and sustainable Vietnamese food systems. Former Deputy Australian Ambassador to Vietnam Mr Andrew Barnes and ACIAR CEO Professor Andrew Campbell participated in these conferences and confirmed Australia's supports for Vietnam's food systems development. ACIAR Vietnam Country Manager Nguyen Thi Thanh An also attended and shared some remarkable results from ACIAR's research projects in Vietnam. Many ACIAR projects in Vietnam have helped develop sustainable agriculture businesses that consider economic shocks, produce more with fewer natural resources, adapt to climate change, and ensure food nutrition and safety for everyone.

During this time, ACIAR, in collaboration with the International Development Research Centre of Canada (IRDC), also launched a A$3 million food loss research program. The program aims to raise awareness about food loss before reaching consumers due to inefficiency in production and processing in many food sectors. Among the line-up projects under this program, a research project will study food loss in the catfish value chain in Vietnam, Laos, and Cambodia.

ACIAR has also organised dialogues to share innovations in Australia's food systems and develop a roadmap to expand further these innovation programs, an important part of which is building effective partnerships between countries to serve the global food systems' transformation. These are consistent with the message of Vietnam's President Mr Nguyen Xuan Phuc during the summit, in which he called for increased multilateral cooperation to solve food systems-related issues.

New research for Vietnam's economic recovery and development

Since June 2021, 4 new projects receiving the Vietnam Economic Development Fund (EDF) have been launched to help boost Vietnam's economic development. ACIAR manages the project implementation in collaboration with the Department of Foreign Affairs and Trade (DFAT).

All 4 projects address at least one of the 3 priorities in the Australian's development assistance in Vietnam: health security, stability, and economic recovery for Vietnam in response to COVID-19. Three of 4 will study potentials for Vietnam to grasp the post-pandemic economic opportunities while the remaining one focuses on strategic directions for the long-term national economic growth.

Addressing non-tariff measures to the export of Vietnam's agriculture product under the new generation of free trade agreements and in the context of COVID-19

Commissioned agency: Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD)

Non-tariff measures (NTMs) are causing considerable impacts on Vietnam's agriculture export. These NTMs include stricter regulations on trade protection under the new generation of free trade agreements that Vietnam has joined recently, and the ongoing measures that countries have applied on agriculture products due to the high risk of pathogens transmission. IPSARD will lead this research project to assess the ability of Vietnam's agricultural production to comply with these NTMs, IPSARD will also propose practical solutions to improve the understandings and compliance of NTMs for different actors along the agricultural value chain, including producers, traders, and exporters.

This research will prioritise fishery products and rice, which are key exporting products of Vietnam and highly exposed to NTMs. Small-scale producers and exporters, especially female-dominated, will be targeted because the constraints on efficient production and trade they face are more severe than others.

Enhancing market access for Vietnamese fresh fruit products in the next normal state of COVID-19 pandemic: A case study of the mango industry

Commissioned agency: Institute of Policy and Strategy for Agriculture and Rural Development (IPSARD)

Fresh mango is Vietnam's key fruit export produce, providing livelihoods for thousands of smallholder farmers in the Mekong Delta and the northwest mountainous region. But the industry is suffering serious impacts caused by COVID-19. The pandemic has caused supply chain disruptions, delivery delays, and higher freight rates in the short-term. In the medium and long-term, once the pandemic is under control, the next biggest difference between before and after COVID-19 is the rise of the contactless economy, which will create both opportunities and challenges for market access of Vietnam's fruit sector.

To help the mango industry overcome the new market access challenge, IPSARD will conduct research to understand market access changes and assess the sector's capacity to cope with such changes. IPSARD researchers will also review international best practices for fresh fruit products to access markets during COVID-19 and propose practical strategies for stakeholders in Vietnam's fresh mango supply chain to enhance market access in the short and long terms.

Communicating the new economic growth model for Vietnam

Implementing agency: Institute of Agricultural Market and Institution Research (AMI)

To help Vietnam escape the middle-income trap and complete its modernisation goals, the Central Theoretical Council of the Communist Party of Vietnam (CTC)—the advisory body for the Secretariat of the Party Central Committee—has directed a team of researchers led by AMI to review the current economic growth model and propose a new model for 2021–2030. As a result, the research has presented an inclusive economic development, prioritising multi-regional development based on the economic advantage of each region.

To support the post-research advocacy, in 2020, ACIAR supported a small research activity for AMI to collaborate with an Australian National University expert group to develop an equilibrium modelling to assess the impacts of the above-mentioned economic development model. This framework, co-developed by Vietnamese and Australian researchers, considers the multi-regional factors which will be helpful for policymakers in measuring the economic development policies' impacts on each region.

CTC accepted the works of both research groups in January 2021 and has shared the key findings as inputs for Party Congress Meeting, which will also be held in Jan 2021.

To continue generating practical outcomes with the newly granted EDF, the researcher will broaden their communication efforts to key decision-makers. For instance, the research has identified the distortions in current resource allocation and how the reallocation can result in inclusive and sustainable development in the future.

Improving the business of grouper farming smallholders in Vietnam by engaging with aquafeed companies to produce commercial feeds

Implementing agency: James Cook University

Hybrid grouper farming is Vietnam's most profitable marine aquaculture due to its high market price, good growth performance, and relative tolerance to environmental stressors. An estimated 414 smallholders specialise in either the hatchery stage or the grow-out stage of hybrid grouper farming.

However, grouper aquaculture has depended on wild-caught low-value fish, commonly called 'trash fish', to feed the higher value aquaculture breed. The inconsistent supply of trash fish, depending on the seasonality of stocks, limits the viability of the grouper industry since interruptions in feed supply limit growth, health, and feed efficiency—and therefore smallholder profits.

An ACIAR-supported scoping activity investigated bottlenecks to hybrid grouper aquaculture in Vietnam in February 2020, followed by a comprehensive literature review of current knowledge about the nutritional requirements of grouper and barriers to the implementation of formulated feeds to replace trash fish. This study revealed that grouper farmers are not opposed to formulated feeds but prefer those made specifically for grouper rather than the generic fish feeds commonly sold, resulting in poor growth rates. The study also identified priority nutrients for further research, both for grouper in general and hybrid grouper specifically. Focusing on these priority nutrients will lead to the commercialisation of species-specific feeds that offer improved growth and feed efficiency for grouper aquaculture, thus increasing profit for SMEs and enhancing livelihoods for farming communities. Feed companies are keen to work with ACIAR in developing grouper feeds as the size of the rapidly growing grouper sector promises good commercial returns.

Dr Peter Horne and Dr Le Quoc Doanh, MARD Vice Minister in ACIAR–Vietnam partnership health check. February 2019. Photo: ACIAR

Vietnam and ACIAR share the vision and drive for mutual benefits

Dr Peter Horne is our first honoured guest of ACIAR Talk–a new column in our newsletter aimed at better connecting ACIAR House in Canberra with our partners and other key stakeholders in Vietnam. Each talk will bring you closer to the vibrant, continuous works in Canberra and Vietnam for the shared goals of Australia and Vietnam in agriculture and rural development, seen through the perspectives of ACIAR people.

Dr Horne is ACIAR Country Partnership General Manager and a member of the ACIAR Executive Board. Before that, he was ACIAR Livestock Research Program Manager and has worked closely with many Vietnamese agriculture scientists since 2005.

Hello Peter! Thank you for joining our first ACIAR Talk today. Let's start by sharing something about yourself. How do you start your day?

I always start my day with a homemade coffee. I buy freshly roasted coffee beans every weekend from the roaster at a nearby farmers' market.

Sometimes we have long days when we need to motivate ourselves. What tricks would you use?

I'll get out into nature. That, and another cup of coffee!

That's a recipe for motivation! Now, we know you've been with ACIAR for a long time and in different positions. What is it like to move from being a research program manager managing specific projects to your current role managing country partnership?

It was not easy, but it was rewarding. I loved being involved in the details of the research projects from design and right through implementation. But there is one big common thing between the two roles–the framing and management of the international partnerships, which I loved most and have been long interested in since I just started as a young scientist. I still remember when I was doing my PhD in Indonesia. I would often look over the fence from my research site inside the research station to where the farmers were working and think about what science could do to bring real benefits to the smallholder farmers like them. Right there, I knew the answers lay in working directly with them in partnership. Farmers are the experts in their own social, cultural and economic systems, and no matter how much we study their systems, we can never fully understand them. That is why we need to work with them as partners in research so that they can bring this expert knowledge to the table. We have a lot to learn from them, and collaboration is the key. So, I can say that the role change for me was natural, and the part I love most–doing research with farmers–stays unchanged.

How do you see the difference and similarities in managing partnerships between Vietnam and other countries?

There are common principles between all countries involving commitment to partnership-shared goals, identification of the value added by each partner, and the importance of regularly checking the partnership's health.

But the cooperation between Vietnam and ACIAR is unique in several ways. We have a long-standing partnership. Some senior leaders from both sides have known each other since they were young scientists working together in the field decades ago. We have built trust through these long-standing relationships, which gives us the confidence to advance our partnership. We must always refresh these partnerships by supporting new young researchers to revive the relationships continually.

Secondly, Vietnam has a fast-growing agriculture sector, rapidly transforming from a low-input, low-output system towards high-value products. ACIAR's current strategy with Vietnam has pivoted to support our Vietnamese partners in commercialising the smallholder agriculture sector, connecting agricultural scientists and farmers better with the business. Agribusiness is currently the biggest program of ACIAR in Vietnam. We're exploring new ways to engage business better, such as through the Agribusiness Reference Group. We aim to connect researchers with businesses to make our research outcomes better meet market needs. At the same time, we need to focus on the needs of those smallholder farmers who may have been left behind and are still the most vulnerable in the agricultural supply chains, with many still living in poverty.

How do you see the partnership with Vietnam evolve in the future, especially during and after COVID-19?

In the long term, I see the centre of gravity in how we work together moving more and more towards Vietnam. We have seen the level of confidence and capabilities rise rapidly among Vietnamese scientists and institutions. I would particularly emphasise this change at the institutional level, where our institutional partners are increasingly participating in multi-partner, international research projects.

Though COVID-19 has hit us all hard, it has also given us a chance to pause and think about the ways we work together. Knowing that we will be living with COVID, we have some key questions to answer: What aspects of the ways we worked together before do we not want to lose? What can we change? What forms of working together that we trialled during COVID might become normal for the future? For example, in some cases, we see the increased confidence and growing responsibilities of the in-country partners in implementing projects without the direct support of international experts in the field due to current travel restrictions.

Many project teams have efficiently shifted their collaboration to online platforms. Can this change be a new mode of operation in the future?

And increasingly, I see great benefits flowing from working with Vietnam in south-south collaborations. Vietnamese scientists are increasingly playing leading roles in regional research collaboration. For instance, Vietnam has expertise in lobster culture and feed formulation which we were able to mobilise to a project in Indonesia that benefitted from that expertise. We look forward to expanding this model where third countries see value in working with both ACIAR and Vietnam.

What are key next step activities you're looking forward to working with our Vietnamese partners?

(MARD's) Vice Minister Doanh has very helpfully suggested it is time for us to review our partnership. I hope we can use that opportunity to take our 10-year strategy to the next level by creating a long-term formal partnering agreement. Such an agreement would focus on why and how we work together to achieve shared goals. This agreement would be a platform for us to review our collaboration portfolio and adjust it annually as needed.

What do you think are the key challenges ahead? And what are possible solutions to these challenges?

The main challenge is ensuring that the vision and drive for a strong partnership of co-invested research collaboration for mutual benefit are embedded in institutions in both countries, not just individuals.

Thank you for sharing with us the big picture and next steps, with lots of insights. Can you share with us some memories you have in Vietnam?

It would be of my experiences working with Vietnam colleagues between 1997 and 2005.

We had such enjoyable and stimulating times researching forages and livestock systems, from beef cattle systems in Daklak and Hue to fish and buffalo systems in Tuyen Quang and Ha Giang.

But overall, what has impressed me the most is the drive, the passion, and the irrepressible spirit of the Vietnamese researchers with whom I worked.

What will you do first if you visit Vietnam again?

Go to a street café in Hanoi and have a bowl of *phở*! I love the vibrancy of the street life in old Hanoi...and the food.

Thank you, Peter! We wish you and your family good health and success. And we look forward to inviting you to some specialty coffee in Vietnam soon!

Dr Peter Horne, Australian Ambassador to Vietnam Ms Robyn Mudie and Minister of Science and Technology (MOST) Mr Chu Ngoc Anh and staff of ACIAR and MOST. February 2019. Photo: MOST.

Expanding agriculture market access between Vietnam and Australia

Former Australian Deputy Ambassador to Vietnam Mr Andrew Barnes (third from right) and the Department of Agriculture, Water and Environment team from the Australian Embassy in Vietnam and MARD's International Cooperation Department's senior officers.

Australia and Vietnam share a strong, vibrant and multifaceted agricultural partnership based on complementary production profiles and long-standing cooperation. For the year to 30 June 2021, two-way rural trade between Vietnam and Australia was around A$3.35 billion, having grown significantly over the past decade.

Our bilateral agricultural relationship was reaffirmed and deepened at the recent meeting of the Vietnam–Australia Agriculture Forum on 30 June 2021, with both countries committing to expanding bilateral market access. This commitment will mutually benefit our respective farmers, agri-processors and consumers and underpin strong future expansion in two-way trade.

Vietnam has highly productive fisheries and vast aquaculture capacity. In the first part of this year, the country accounted for around 60% of Australia's imported shrimp and shrimp products. For the 12 months to 30 June 2021, more than A$250 million worth of shrimp and shrimp products were sold by Vietnam into the Australian market.

In addition, Vietnam has specialised in a wide variety of horticultural products suited to tropical production systems. Australian consumers continue to enjoy the delights of Vietnamese dragon fruit, mangoes, lychees, and longans in increasing volumes. Indeed, fruit exports from Vietnam to Australia have increased 240% over the past 4 years. Australia also imports significant quantities of cashew nuts, fish, coffee, and rice.

Most of Vietnam's rural exports to Australia take the form of consumer-ready products that require minimal processing once in Australia. In contrast, Australia's extensive landmass, variable climates, contrasting soil types, and concentration on temperate agriculture lends itself to producing the feedstock commodities that fuel premium Vietnamese agrifood supply chains. This includes barley for beer brewing, wheat for noodles and bread-making, live cattle that help supply Vietnam's beef needs, and cotton, transformed into garments by Vietnam's ever-expanding textile industry.

Australia is proud to supply many of the raw ingredients for Vietnam's high-value food and fibre supply chains, which generate jobs, income and prosperity in Vietnam and play a vital role in supporting rural livelihoods. The Vietnam–Australia agricultural partnership continues to grow stronger with each passing year.

Contact:
Tony Harman, Agriculture Counsellor,
Australian Embassy in Vietnam.

Global agritech solutions kickstart Vietnam's agricultural innovation

Vietnam's agriculture sector is at an inflection point. Rapidly evolving environmental issues, consumer concerns, and macroeconomic pressures place new demands on smallholder farmers and actors across agrifood value chains. At the same time, increased government and private investments into agriculture and rural connectivity have made fertile ground for new ways of doing business. The sector is primed for a new wave of innovation.

GRAFT Challenge Vietnam, sponsored by the Australian government's AUS4Innovation program that tests models for public-private partnerships, is the region's first agritech 'land and launch' program. It was built to establish meaningful partnerships between agrifood industry leaders in Vietnam and market-tested scale-ups with proven solutions from around the world. In doing so, GRAFT intends to bring transformative solutions to the most pressing challenges facing the agricultural sector in Vietnam and enhance support for the mature agritech companies that provide these solutions.

The GRAFT Challenge draws its roots from the Mekong AgriTech Challenge (2017–2018), the region's first agritech accelerator designed and managed by the Mekong Business Initiative for Innovation Challenges (MBIIC), in partnership with Australia-based agrifood innovation agency, Beanstalk. These entities observed the need for an expanded platform to bring global solutions for Vietnam's agriculture problems during the program. After piloting a similar concept with GRAFT Challenge India in 2019, focused on climate resilience in Indian agriculture, they joined the Vietnam Digital Agriculture Association (VIDA) to initiate GRAFT Challenge Vietnam 2021.

Beanstalk, MBIIC, and VIDA began work on GRAFT in Vietnam earlier this year by collaborating with Vietnamese agrifood industry leaders to identify challenges in the country's crops and plantations, fisheries and aquaculture, and livestock businesses. GRAFT then launched an intensive global search for agritech entrepreneurs with solutions for these challenges.

GRAFT Challenge Vietnam 2021 selected its final cohort of 9 agritech scale-ups this August, from many global innovative solutions. The selected solutions vary from AI-driven software-as-a-service that brings transparency to the agriculture value chain, digital platforms that leverage data analytics to help farmers improve productivity and reduce carbon footprints, to precision data-powered farm management tools that improve feed livestock efficiency and health outcomes.

One selected agritech scale-up provides a precision farm management solution that improves feed efficiency and health outcomes in the fisheries and aquaculture industry. Photo: CSIRO.

These scale-ups will receive tailored support from industry leaders and technical advisors to refine product-market fit, giving them the confidence to enter the Vietnamese market and form business relationships with agribusinesses that need solutions. This workflow will simultaneously scale-up the ability of Vietnam's agribusinesses and other industry stakeholders to source solutions from the global innovation ecosystem.

Learn more about the 9 best agritech business in GRAFT Challenge Vietnam 2021 and their journey to access Vietnam's market at: https://graftchallenge.com.

Contact:

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Data modelling to revamp transportation for agriculture supply chains in Vietnam

By Chris Chilcott, Caroline Bruce, Adam McKeown, Rodd Dyer, Nga Le and Huan Le Huu. ACIAR project: AGB/2017/036

In Vietnam, the ability to transport products to markets in a timely and reliable manner has always been a major challenge in agriculture and food systems, largely because of the country's underdeveloped infrastructure and long supply chains. **These weaknesses in transport and logistics that connect food to markets are further exposed** when pandemics, floods, and other natural disasters happen, dramatically increasing the logistics cost for actors in the supply chains. At the same time, the emergence of the agrifood sector as a crucial economic drive has also further exposed this delicacy—with growing demand on timely delivery of high-quality products for both growing domestic markets and rapidly developing export opportunities. If not addressed, these gaps will continue to impact farmers' livelihoods and hinder national economic development.

To overcome this challenge, access to good quality supply chain infrastructure is now a regular feature of Vietnam's political discourse, national government policy and investment from large donors. In the Socioeconomic Development Strategy 2021–2030, one of the key tasks of the Vietnam Government is *Development of regional infrastructure, economy, marine economy, taking urban areas as the driving force for regional development and promoting the construction of new rural areas*. There will be a focus on investing in key national infrastructure projects—especially in transport, energy, and digital infrastructure—to fundamentally overcome bottlenecks for development and strengthen connectivity with the region and the world. Improving infrastructure connectivity of regional and rural value chains to urban and international markets is also a priority.

In this context, CSIRO and its in-country partners are resolved to better understand and map complex movements of agricultural products in Vietnam, from individual farms through the supply chain to markets. **Our goal is to create a knowledge base and provide advice to industry, government, and**

investors on increasing efficiency and improving the resilience and reliability of supply chains.

Through the ACIAR-supported project *Enhancing smallholder linkages to markets by optimising transport and logistics infrastructure*, we applied a combination of methods to gain understanding and build knowledge: key informant interviews and direct observations in the field, stakeholder consultations, secondary data compilation and analysis, statistical and GIS analyses, and optimisation modelling. We adapted a tool called TraNSIT—the Transport Network Strategic Investment Tool—that allowed us to map the supply chains and test different scenarios for associated impacts. TraNSIT was developed in Australia and has been extensively validated and adopted to reduce costs to industry, support investment decisions, and optimise supply chains to improve market access to domestic and export markets.

In Vietnam, the research focused on Son La province in the Northwest of Vietnam. Our approach was to apply and evaluate TraNSIT through a set of scenarios at different administrative scales: province, district, and commune-level. Son La province was chosen because it is an important agricultural hub for maize, cassava, sugarcane, and higher-value products such as fruit, vegetables, coffee, tea, and dairy. It is relatively remote, with limited road infrastructure creating challenges for connecting agricultural products and rural populations (including ethnic people) to markets and services. In addition, there is considerable existing knowledge, data, and experience about key agricultural supply chains from past and ongoing research in the province, much of it supported by ACIAR, and with that, well-established relationships with provincial and district governments, local farmers and industry.

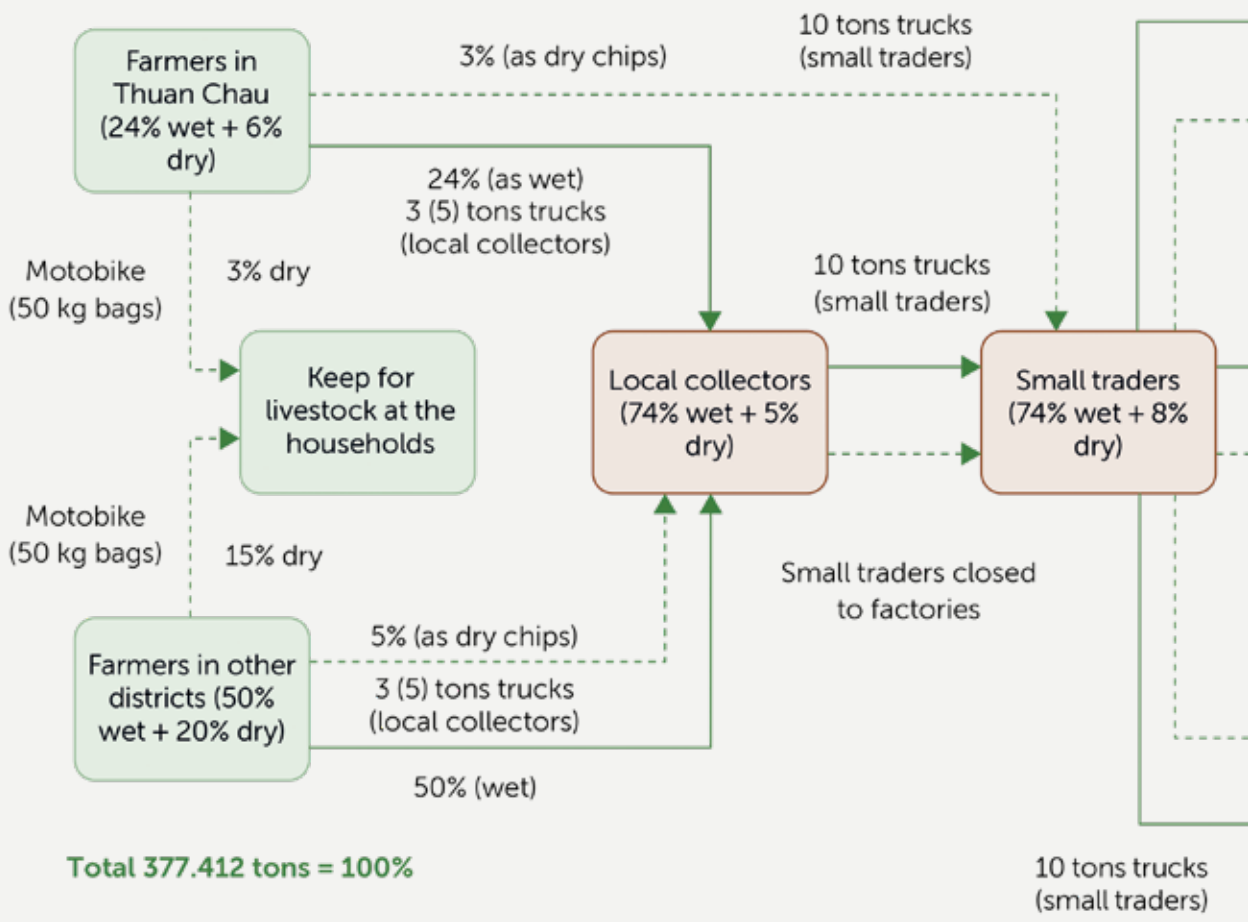


Figure 1: Cassava supply chain map in Son La province

KEY FINDINGS

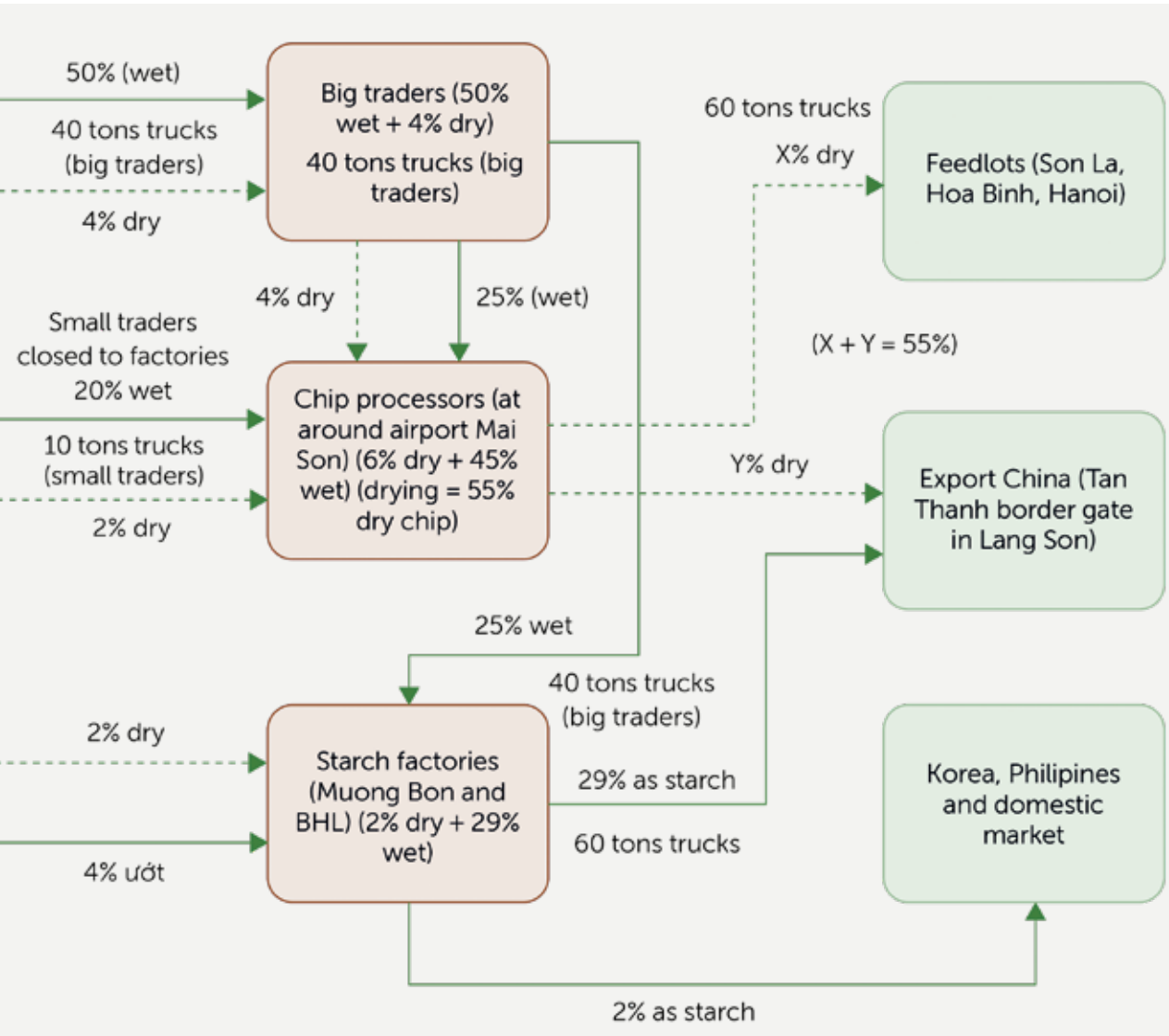
Supply chain mapping to find the choke points and constraints

Using information from various data sources, field visits, and local intelligence, we mapped the movement of sugarcane, maize, cassava, coffee, and vegetables between different parts of the supply chains in Son La province. The largest production and most moved crops are sugarcane, maize, cassava, and coffee. The production was concentrated in the Mai Son district, with over 600,000 tons of exported agricultural commodities. For each item, we described detailed supply chains maps. An example for cassava is provided in Figure 1.

Using the flow of commodities along their supply chain from the baseline analysis, the project answered important questions: Where are the choke points and network constraints causing inefficiencies in transport? What parts of the network are overused and make the supply chain vulnerable? And what is the cost of transporting agricultural products, and who is paying?

Figure 2 (page 16) shows the cassava production by districts in Son La province and the simulated road usage (in 20-tons truck equivalents) that transports cassava from farms via traders to processing facilities and then on to land and seaports for export. The map highlights a **convergence of road usage into processing facilities** and the outbound transport of starch and chips along National Highway 6 to the border gates near Lang Son to China.

Combining the cassava supply chain with other key commodities exported from the region reveals the intensity and extent of road usage. The heavy reliance on National Highway 6 between Mai Son District and Hoa Binh town as the main



link of products to end markets is also revealed. Aggregated production (of cassava, maize, sugarcane, and coffee) at a district level, such as for Mai Son and Moc Chau districts (Figure 3, page 17), again demonstrates the location and density of truck traffic due to agricultural product transported, with high volumes, particularly around the Coi Noi trading and processing hub. Highlighted in Figure 3 (page 17) (in yellow) are lower-class road segments with very high usage. **These segments are likely to be freight bottlenecks and could be targeted for road network upgrades to enhance all-weather access, use by larger trucks, or increased average speeds.**

The total cost of transport for the main commodities was calculated to be US$17.6 million per annum, with 62% of those costs associated with transportation between farm and trader, 26% between trader and processing factory, and 12% during post-processing. The high proportion of costs further upstream in supply chains is typical, especially in supply chains characterised by scattered small-scale production in remote locations, as typified throughout much of Son La Province.

Scenario testing to measure impacts

With a comprehensive understanding of the key commodities supply chains, it was then possible to examine impacts due to disruption and the effectiveness of infrastructure investment to improve connectivity. With local collaborators and decision-makers, the project identified and modelled several scenarios:

- Predicting impacts of proposed Hoa Binh to Moc Chau expressway on agricultural transport costs, travel times, and competitiveness.
- Determining agricultural transport cost and connectivity benefits of proposed provincial road upgrades (Routes 3 (3. PR 104 QL6 (Chieng Sang–Cho Long-Na Cai) and 10 (PR110 Mai Son-Na Bo-Muong Bu).
- Determining the economic impact of road closures and disruptions from a landslide.

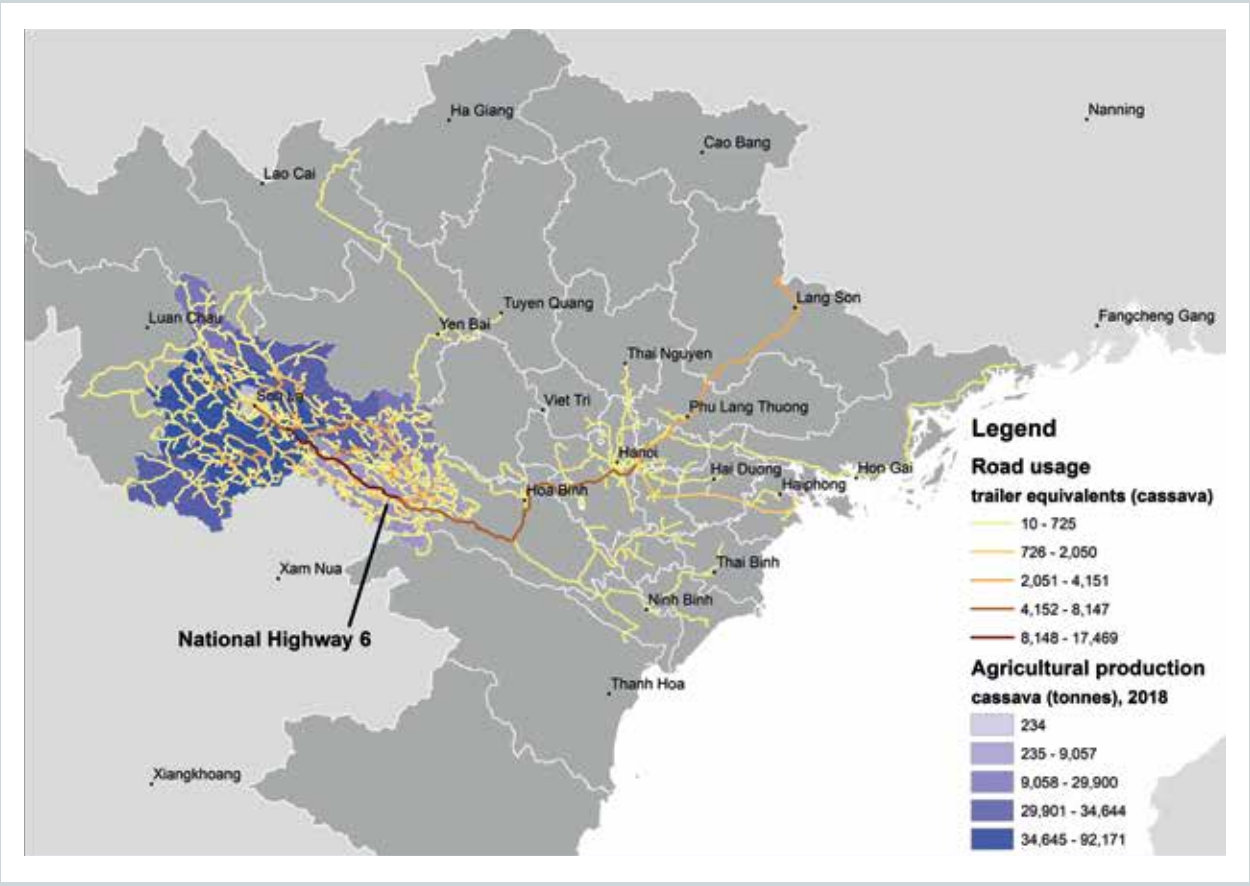


Figure 2: Cassava production and road usage for the Son La province supply chain

- Improving the connectivity of disadvantaged remote communes with main economic corridors, markets, and services.
- Identifying road segments where upgrading will produce the greatest outcomes.
- Identifying where transport and procurement costs can be most efficiently reduced along the farm-market supply chain, how, and who will benefit from these changes.

The results from the scenario examining a hypothetical landslide are outlined here.

Localised flash flooding and landslides are regular occurrences throughout Son La Province each year. Extreme rainfall and cyclone events are often associated with landslides that result in human casualties, destruction of rural homes and property, damage and prolonged closures to roads, and loss of agricultural land. These impacts are compounded by the mountainous terrain, widespread deforestation, and cropping on steeply sloping lands. Some of the direct transport-related economic costs caused by landslides include road damage and repairs, road congestion and delays, and the additional time and distance associated with finding alternative routes 'hotspot' on truck routing and transport costs of the main agricultural commodities. Road segments in the landslide area were modified so trucks could not pass, forcing an alternative route.

Figure 4 (page 18) shows the modelled vehicle densities and travel routes for these commodities' combined baseline on the left, and impact due to the landslide on the right. Figure 5 (page 19) more clearly shows the differences in vehicle movements after the landslide, highlighting increasing (red) and decreasing (green) freight density.

The simulated impact of the road closure caused by the landslide results in an annualised A$1.2 million increase in commodity transport costs due to re-routing throughout the network. Most of these costs (63%) is associated with transport from traders to factories, 36% incurred between factory

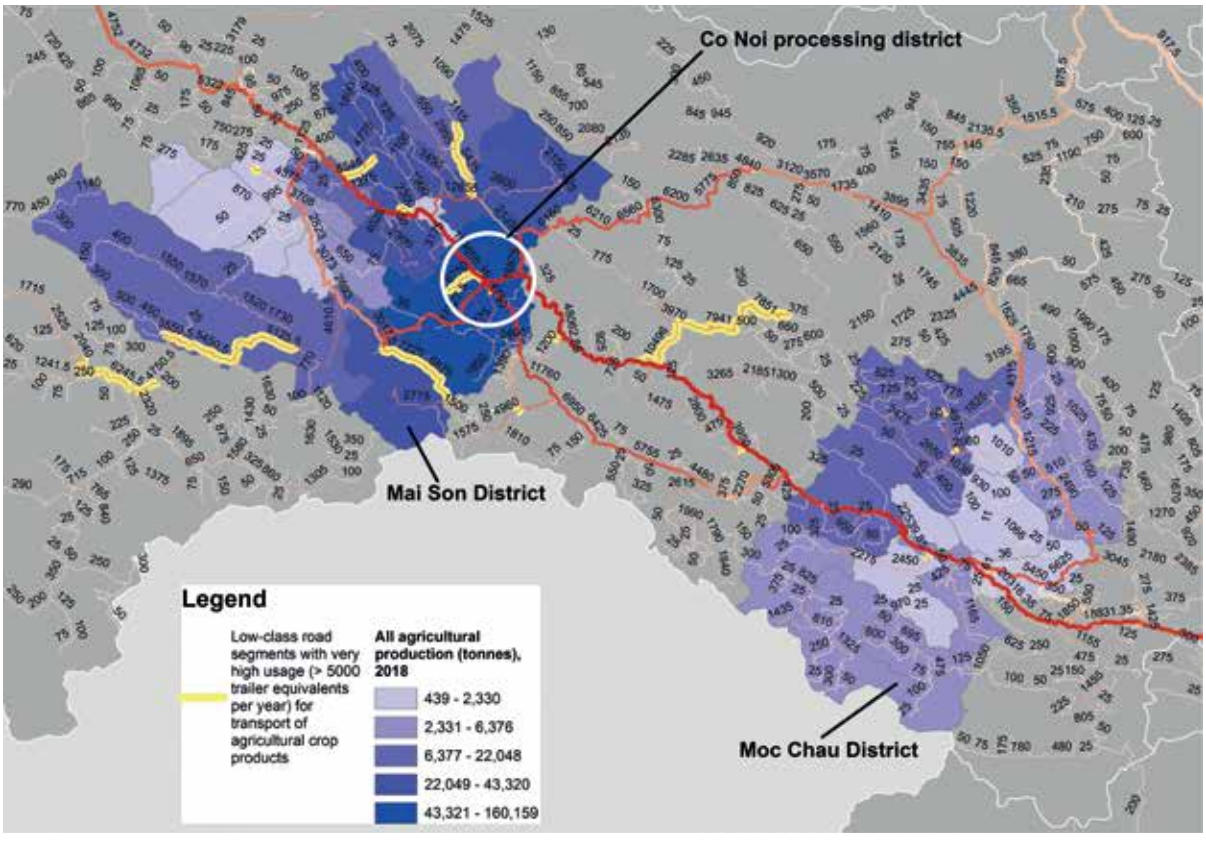


Figure 3: All production and road usage for all mapped supply chains, Mai Son and Moc Chau districts, with line colour showing the density of usage for different road classes: light usage (pale pink) -> heavier use (dark red); line thickness shows road type: major roads (thick) -> minor roads (thin), and yellow showing very high use on low-class roads

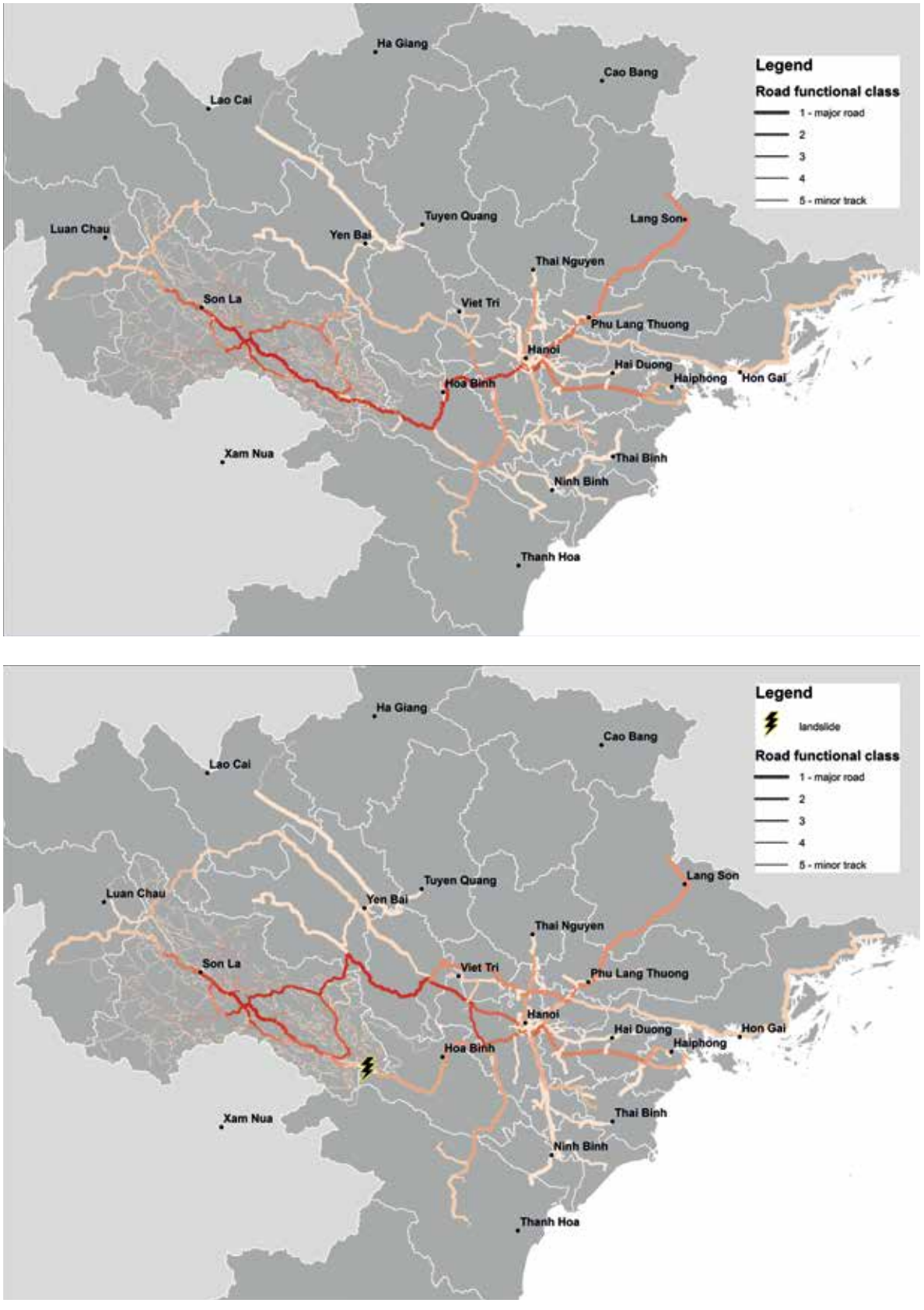


Figure 4: Road usage before (above) and after (below) landslide for the major commodities (cassava, maize, sugar, coffee), Son La province, with line colour showing the density of usage for different road classes: light usage (pale pink) -> heavier use (dark red).

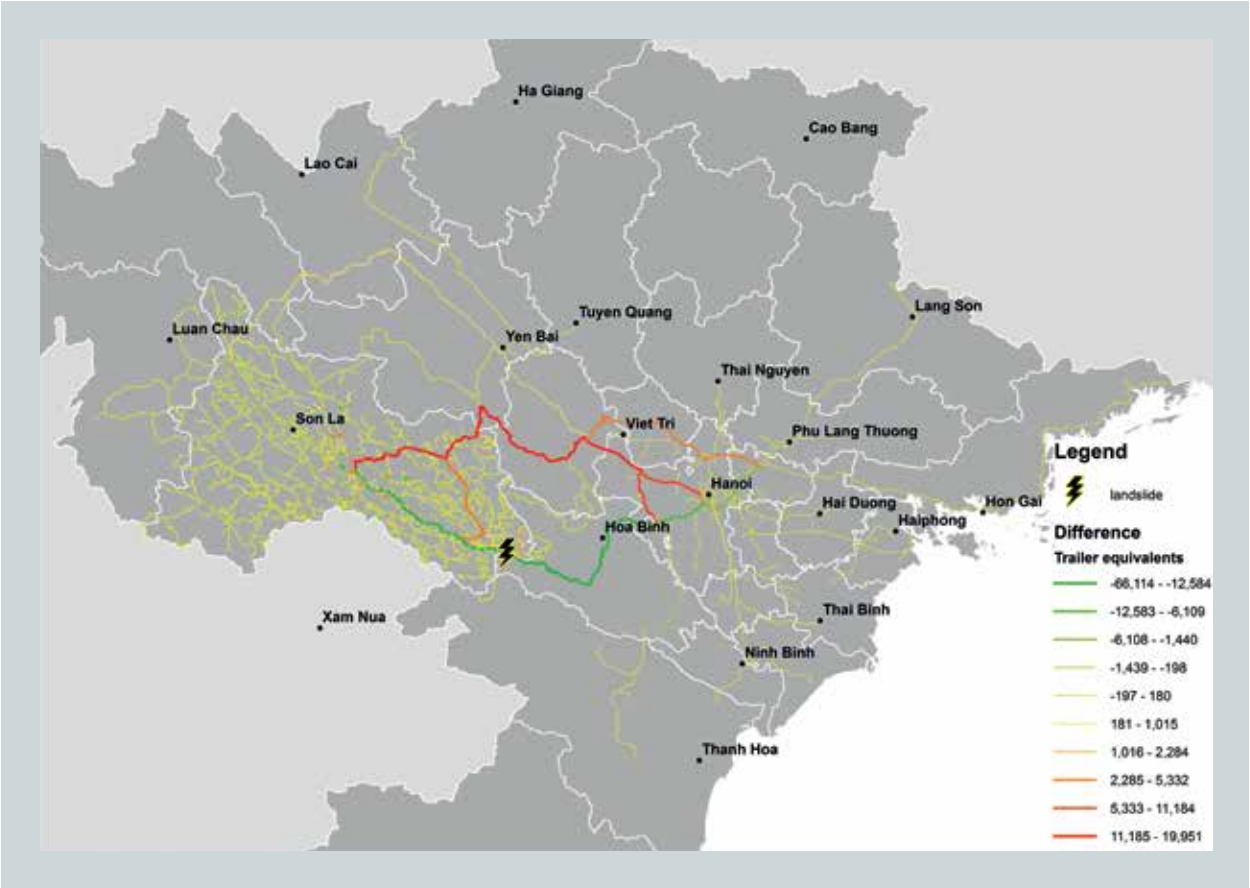


Figure 5: Difference in road usage (before/after) for all mapped commodities (cassava, maize, sugar, coffee) in Son La province for landslide scenario, with line thickness showing road type: major roads (thick) -> minor roads (thin).

and destination markets. There is little impact on transport costs from farms to traders.

In this example, TraNSIT was used to explore the impact of only one landslide location on transport costs for 4 important agricultural products. A more comprehensive analysis could better account for total economic costs by including other agricultural and non-agricultural products and passenger transport. It could also compare impacts for multiple sites at risk of landslide.

CONCLUSION

The project demonstrated how spatial data analytics and optimisation modelling could be applied to real-life transport modelling and investment planning. The TraNSIT model was successfully applied to Son La province in Vietnam, showing the technical feasibility of using the tool in a range of real-life case studies, such as assessing the impacts of natural disasters, prioritising infrastructure investments, and optimising the placement of processing facilities. One of the challenges that remains is how to take insights and turn them into decisions. We see the need for ongoing work to build capacity with our collaborators. More work is also needed to understand the institutional arrangements associated with transport planning in rural and agricultural settings and improve individual and institutional capacity to use tools like TraNSIT in decision-making. A particular focus should be on strengthening local capacity and application of spatial and GIS data and analytics, optimisation modelling, and the capture of emerging opportunities to interrogate big data.

Through a new, 2-year project being undertaken through DFAT's Australia–Vietnam Enhanced Economic Engagement Grant Pilot Program, we are extending the work undertaken through this SRA project. The new project aims to support Vietnam's efforts for digital transformation in the transport sector by leveraging existing partnerships, digital tools, unique data sets and achievements of CSIRO, the World Bank and local partners. TraNSIT and Vietnam's Commercial Vehicle Tracking System (CVTS) will be used to analyse potential bottlenecks in export supply chains important to both countries, thereby aiming to transform connectivity in the agriculture, transport and logistics sectors in Vietnam, with benefits for the Australian trade.

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Soil management for salinity-affected areas in Mekong Delta

By Jason Condon and Chau Minh Khoi. ACIAR Project: SLAM/2018/144

Effect of soil cover on the growth of maize in the dry season. Left: Maize plants without mulch; right: maize plants are grown with rice straw mulch. Photo: Tran Duy Khanh, Can Tho University.

Climate change has worsened salinity and scarcity of fresh water in the Mekong Delta, which is becoming increasingly serious in dry season and reducing farmer's income. To have stable income, farmers are seeking soil and water management solutions and new crop options to replace rice production in the dry season.

Farmers in the Vietnamese Mekong Delta are looking for profitable dry season crop options as an alternative to fallow or risky rice production as they grapple with the effects of climate change.

The 5-year project *Farmer options for crops under saline conditions (FOCUS) in the Mekong River Delta*, Vietnam aims to provide farmers with soil management and crop options that can be profitable in a system feeling the effects of climate change. These options will help farmers cope with the decreasing available fresh water during the dry season due to decreased freshwater flow upstream and sea-level rise making the delta's waterways saline.

The project activities include characterising the impact of saline water intrusion on crop-based farming systems, developing and evaluating crop diversification and soil management options

Huynh Mach Tra My (CTU) displays successful watermelon production where rice straw mulch was used (left) compared to crop failure in the absence of mulch (right) at the 2021 field experiment at Long Phu, Soc Trang. Photo: Tran Duy Khanh.

Red beet gives high productivity even in the dry season when rice mulch is used.
Photo: Tran Duy Khanh, Can Tho University.

for saline-affected areas, and identifying market opportunities and policies for adaptive transformation of cropping systems in the Mekong Delta. These objectives combine to provide the information required to develop and promote spatially targeted management practices that build adaptive capacity and optimise farm livelihoods in a changing environment.

A training program for local Department of Agriculture and Rural Development staff and lead farmers to measure soil and water salinity is underway. Participants are happy to develop the skills required to monitor and analyse water and soil salinity changes through the dry season. Farmers particularly can now use handheld salinity monitors provided by the project to measure salinity in real space and time. Therefore, they can better understand the problems facing them and know the water salinity before doing irrigation.

Crop screening has commenced selecting crops for attributes of salinity and water logging tolerance, water use efficiency, and short harvest duration. Glasshouse studies examining the suitability of quinoa to conditions in the delta are underway in Australia.

Soil science researchers of Can Tho University, led by Associate Professor Chau Minh Khoi, conducted 2 field trials to test the effectiveness of rice straw mulch on crop yield of a small group of upland crops. Mulch was found to be highly effective in increasing the output of red beet (3 times), watermelon (4 times), and maize (1.5 times). The profit for trial farmers varied depending on access to the market, a factor being studied by the socioeconomic project team using case studies of successful local businesses to identify key elements of successful markets for the new selected crops.

The field trials have created great interest by local farmers who can see the production benefit of crop selection and soil management. Though challenges relating to potential risks associated with changes in cropping calendars and the need for stable, profitable markets remain, the FOCUS project team is busy conducting the research required to understand better and meet these challenges.

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Conservative farming practices and crop diversification creates better income

By Ngo Duc Minh, Hoang Xuan Thao, Tran Minh Tien, Luu Ngoc Quyen, Oleg Nicetic and Michael Bell. ACIAR project: SMCN/2014/049

Before 2015, maize production on sloping lands increased rapidly in areas and productivity driven by high cattle feed demand and the potential of region-wide maize production. However, maize monocropping quickly caused severe soil erosion, runoff, and decreased maize yield. Commencing in 2018, the ACIAR-funded project *Improving maize-based farming systems on sloping lands in Vietnam and Lao PDR (SMCN/2014/049)* has conducted annual agronomic experiments to evaluate diversification options for maize-based farming systems. These options aim to reduce soil degradation and improve smallholder livelihoods in Son La province, one of Vietnam's largest maize production hubs.

During this period, many sloping lands in Son La province that once grew maize have shifted to perennial crops, especially fruit trees. This transition was in response to falling maize prices due to high competition with imported rice, African Swine Flu reducing cattle feed demand, increasing maize production costs, and local government support to develop the fruit industry. However, there also have been many examples of widespread soil erosion during this period of change, and the lack of income while the tree crops establish have presented economic challenges for farmers.

In this context, the project saw an opportunity to adapt conservation cropping practices developed for maize farming systems to the transition from maize into fruit tree-based systems to increase income for farmers and reduce soil erosion.

Ms Vang Thi Hoa and Mr Vang A Doanh, H'Mong, smallholder farmers in Chieng Di village, Son La province, have participated in the project since 2019. The family previously had a low economic status and had become dissatisfied with growing maize because of the high cost of inputs, reduced income, and land that was fallow for all but the 4-month maize growing wet season. They also found that several years of cultivation of maize on steep slopes had resulted in severe erosion

Maize, fodder grass and fruit tree intercropping in the dry season in Son La province. Photo: Ngo Duc Minh.

Hoa's mother-in-law collecting grass for the family's cattle. Photo: Ngo Duc Minh.

and declining soil fertility. They wanted to start growing fruit trees and tea, but they saw the lack of short-term income while the perennial crops were established and matured as a key constraint to changing their land management.

Hoa's family and other farmers learned soil conservation management such as contouring, mulching, minimum tillage, and hedgerows. They have also seen demonstrations of cropping practices, such as relay cropping maize with food legumes and strip cropping maize and forages for cut-and-remove livestock fodder. The project supported them to explore alley cropping a range of complementary crops such as legumes, upland rice, and tuber crop and forages between rows of newly planted fruit trees and tea. This intercropping has proved very successful, creating regular short-term income from the produce and forages during the transition phase and encouraging Ms Hoa's family to adopt these practices as they expand their fruit trees and tea area.

Ms Hoa reported that during the early stages of the crop transition process, using the tree inter-rows to grow annual crops enabled the family to maintain household cash flow and protect the soil while fruit trees and tea grew to harvestable age. They earned an extra income of A$360–600 per year from these complementary activities. The family particularly acknowledged the value of grass strips sown across the slope, with 'cut and carry' forage used to provide supplementary feed for their 5 cattle. The strips reduced erosion and helped to improve soil fertility by minimising and filtering runoff.

Compared to annual cropping, livestock-raising and fruit-growing are considered high value agricultural activities with the potential to improve livelihoods in Son La. These activities can also increase farmers' income resilience to extreme weather events, compared to annual cropping.

After nearly 3 years of technical support from the project, farmer Ms Vang Thi Hoa reported that the conservation cropping principles developed for maize farming on steeply sloping lands can be easily adapted during transition to perennial crops, not just for fruits but also for tea. Her family was confident to move completely to fruit trees, tea, and fodder grass on her 0.6 hectare.

The adaptability of these techniques to changing land uses is one of the exciting outputs of the project, as these conservation cropping practices have a huge potential to help increase annual crop productivity, enhance environmental sustainability, and improve economic viability of smallholder farmers in Son La.

In 2020, the project promoted the conservation cropping practices to many other small farmers across the communes in Moc Chau, Yen Chau, Mai Son and Van Ho district, Son La province. The project team will capture progress in 2021 and develop recommendations for the local government on how to support the expansion of these practices and develop outreach activities

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Climate-smart irrigation system in Central Highlands

By Clément Rigal and Pham Thu Thuy, World Agroforestry (ICRAF)
ACIAR project: AGB/2018/175

An irrigation experiment at Western Highlands Agriculture and Forestry Science Institute (WASI)–a key partner in V-SCOPE project. Photo: WASI

The Central Highlands of Vietnam, known as Tay Nguyen in Vietnamese, enjoys a tropical savanna climate and fertile basalt soils ideal for industrial crops, with huge potential for coffee and pepper production. However, there are numerous challenges associated with climate change and unsustainable agricultural practices. In the 2016 drought in Tay Nguyen, hundreds of reservoirs ran dry and over 165,000 hectares of coffee plantations were badly affected, resulting in farmers losing around 40,000 hectares of coffee. A strong El Niño, coupled with the wasteful irrigation system, hit supply chains when global coffee consumption grew 1–3 % a year. The scenario for pepper production was slightly different but no better. It is precisely a call for a high-efficiency irrigation system to replace outmoded and inefficient systems and address increasing water shortages.

Starting in June 2021, the V-SCOPE project, funded by ACIAR and led by World Agroforestry (ICRAF), will carry in-depth experiments analysis, and thus innovate sustainable farming practices, including climate-smart irrigation. The project aims to enhance the smallholders in Tay Nguyen livelihoods and strengthen the value chains of coffee and black pepper.

One of the very first steps is to improve water-use efficiency for the two commodities. The implementation team will collaborate with private business partners to establish experiments and carry out in-depth analyses of irrigation systems. Two technical committees are in place: one will study pepper agricultural practices with McCormick Global Ingredients Limited (MGIL), Pearl, and Simexco, while the other will work on coffee with Jacobs Douwe Egberts, Tchibo, LDC, ECOM and Simexco.

Research by the International Water Management Institute (IWMI) and Western Highlands Agriculture and Forestry Science Institute (WASI) indicated that current water volumes used for Robusta

coffee irrigation exceed the crop's physiological requirements. Currently, the water volume is 700 litres per tree per round (L PTPR), which far exceeds the 400–500L PTPR for adult trees as recommended by WASI, and the maximum of 400L PTPR as recommended by IWMI. Over-irrigation combined with the multiplication of wells have already resulted in water shortages during dry seasons. As a result, farmers have to pump water at increasing depths to meet their needs while the changing climate worsens the situation. Additionally, a preliminary experiment conducted by WASI indicated that young coffee trees need only around 100L per month and adult trees around 200L per month, showing a high potential for further reduction of water input.

In the first year, the expert groups will design a new irrigation schedule that will be tested in the following years, adjusted to water infiltration rates and coffee trees' response to evapotranspiration and yield.

Specifically, three coffee plots located in Dak Lak province have been equipped with sap-flow systems, sensors of which will measure real-time evapotranspiration of the trees, providing information about actual water consumption. In parallel, soil-moisture sensors will measure soil-water content at different depths, providing information about water availability. A weather station will link crop water consumption data with climatic conditions. Lastly, coffee yields and quality will be measured at harvest to link irrigation practices and water use to production. Besides the monocultural coffee plot, the project team also plans to study a variety of plots that combine coffee with fruit trees. At the beginning of 2022, the researcher will study another plot of coffee intercropped with pepper and fruit trees.

The acquired knowledge will be used to accurately model the response of coffee and pepper under different climatic conditions, including various temperatures and humidity levels, to design a climate-smart irrigation system for coffee and pepper in the Central Highlands.

The V-SCOPE project (2020–2024) contributes to improving the livelihoods of smallholders by increasing the sustainability of coffee and pepper farming systems and value chains. The main activities of the project include: inducing changes in the farm, market and policy environment; producing improved technologies and guidelines and encouraging adoption by farmers; developing methodologies on participatory value chain and business model upgrading; piloting value chain innovative to help smallholder farmers shift their practices towards more sustainable and cost-effective approaches; developing and deploying soil-borne pest detection technology and soil remediations strategies; designing integrated farming systems to address sustainability issues simultaneously; and improving suitability mapping for coffee and pepper and designing adaptability maps under forecasted climate data.

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Left photo:
Soil-moisture sensors, part of an irrigation experiment at Western Highlands Agriculture and Forestry Science Institute. Photo: WASI

Right photo:
Phillippe Girard (left), a crop irrigation expert from CIRAD, is establishing measuring instruments for calculating the amount of water required to grow coffee and intercrops. Photo: Clément Rigal, ICRAF

Formulating Vietnam's agricultural development strategy in the next decade

By Tiho Ancev, Nguyen Dang Diem Chi and Vu Hoang Yen
ACIAR project: AGB/2019/185

Vietnam's agricultural sector has developed strongly over the past decade, with production volumes and values growing robustly. The sector remains an important source of GDP growth and employment. Nevertheless, existing structural problems in agriculture and emerging domestic and international trends constitute critical challenges and opportunities for the sector in the years ahead.

In this light, Vietnam's Ministry of Planning and Investment (MPI) has made contributions to the Agricultural and Rural Development Strategy in 2021. ACIAR project AGB/2019/185 assisted MPI with the research needed to formulate this strategic plan. In this project, the University of Sydney researchers (Tiho Ancev, Chi Nguyen, and Gordon MacAulay) partnered with Vietnamese researchers (Yen Vu Hoang, MPI; Duc Minh Nguyen, Vietnam National University of Agriculture; Phạm Ngọc Trụ, Academy of Policy and Development) to propose a framework, a strategic vision, and a set of strategies in pursuit of specified strategic goals.

At the outset, we compiled the scholarly literature on strategic planning and reviewed several international case studies in strategic planning in agriculture to distil the important elements of an effective strategic plan and its successful

implementation. A review of Vietnam's previous strategic planning exercise in agriculture (2011–2020) identified the achievements and gaps and shortcomings that the new strategic plan will seek to address. Next, we identified the domestic and international trends in food production and consumption that will shape agriculture over the next 10 years. We also conducted workshops and surveys to canvas the views of public and private sector stakeholders on strategic planning in agriculture.

Based on these findings, we proposed a strategic vision of Smart, Safe, Sustainable and Resilient Agriculture for Vietnam in 2030. A set of strategic goals were then formulated to guide policymakers in developing effective policies and strategies that can address the strategic directions. We recommend that in addition to the focus on growth figures, such as production targets and contribution to GDP, the government should put greater emphasis on rural development goals: improving physical and social infrastructure, advancing nutritional and health status, and improving educational, environmental and sustainability outcomes in rural areas.

Consequently, we defined corresponding strategies that will lead to achieving the goals. Key recommendations for policymakers from our project are:

- Establish agricultural technology innovation hubs that will promote development and application of digital and advanced agricultural technologies.
- Refocus existing or implement new policies/regulations that target agricultural financing, supply chain management, and smallholder support.
- Develop and implement policies/programs focusing on environmental and natural resources management and improvement. The existing regulations are poorly enforced, which also needs to be urgently addressed.
- Implement policies/regulations that specifically target agriculture's climate change adaptation. The effects of climate change have already been felt quite drastically by Vietnamese farmers.
- Implement policies/regulations that specifically address the issues of food safety standards, quality control, and food and nutritional labelling.
- Develop and implement programs promoting Vietnamese agricultural products to build and protect the 'Product of Vietnam' brand.
- Develop comprehensive regulations and programs that target quality of life in rural areas, such as education, sanitation, access to health services, and improved infrastructure.
- Develop and implement programs that promote entrepreneurship and business skills among the rural population.
- Develop and implement programs for girls' and women's empowerment in rural areas.

The years 2020 and 2021 have been challenging for everyone, particularly for the most vulnerable groups, including farming and rural communities. The COVID-19 pandemic has reminded us of the precariousness of the natural and built environments we live in and the consequences of failing to anticipate risks and plan accordingly. We hope that this project illustrates the principles of good policy planning and implementation. Policymakers in Vietnam can harness the opportunity given by the new Strategy for Agricultural and Rural Development to build a better agricultural system for the next decade.

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Agricultural value chain finance in Vietnam

By Kate Ambler, Alan de Brauw, Nguyen Hoa and Truong Trang
ACIAR project: AGB/2016/163

The Inclusive Agricultural Value Chain Finance (IFS4Ag) project has recently produced reports analysing the prospects for agricultural value chain finance in Indonesia, Myanmar, Vietnam.

Fruits en route to market, Ha Noi, 6 December 2019. Photo: Alan de Brauw

In Vietnam, agricultural finance is dominated by the Vietnam Bank for Agriculture and Rural Development (Agribank) and the Vietnam Bank for Social Policy (VBSP). Other banks, cooperatives, and microfinance institutions play a much smaller role, which is partly because of agriculture's risk profile and the banks relative lack of understanding of agricultural businesses.

The government provides subsidised financing to the agriculture sector through Agribank. But such financing may not reach many smallholders, as administrative requirements to receive government support are burdensome and upfront costs for obtaining subsidies are high. Perhaps due to this lack of available finance, agricultural growth has lagged overall economic growth. And Vietnam's smallholders in remote provinces continue to struggle to participate in agricultural value chains; most of them have neither access to formal banking services nor formal credit sources.

Yet domestic demand is growing rapidly, and Vietnam is well placed to increase exports of high-value commodities (animal source products, fruits, vegetables, spices) as the world recovers from the COVID-19 pandemic. To help reduce poverty, policy should help smallholder farmers overcome risk and financing constraints so they can take advantage of these opportunities.

Agricultural value chain finance can help make finance more widely available. Agricultural value chain finance refers to financial products or services allowing value chain participants (input suppliers, farmers, traders, processors) to address and alleviate constraints to business activity.

Agricultural value chain finance models use relationships within the value chain to provide needed finance and alleviate risk both among value chain actors and to financial institutions.

Several recent policy changes in Vietnam have aimed to support agricultural entrepreneurship and can help facilitate agricultural value chain financing:

- Decision No. 899/QD-TTg in 2013 approved a restructuring of the agricultural sector towards enhancing added value and sustainable development, affirming the importance of credit policies for agriculture and rural areas.
- Decree 116, also issued in 2018, increased the maximum loan size credit institutions can provide without collateral to agricultural producers or businesses, and promotes high-tech agriculture by stipulating that loans for high-tech agriculture projects can cover up to 70% of the project value.
- The 2013 Land Law extended the Land Use Rights Certificate ('red books') titles to 50 years for annual crops, enabling farmers to use red books as collateral.

The IFS4Ag's recent report on the prospects of agricultural value chain finance in Vietnam has found that:

- Limited participation by formal financial institutions in agriculture constrains access to finance. The varied needs of actors along different value chains can be met by traditional financial institutions if loan products are structured and underwritten appropriately. Developing these products in collaboration with other chain actors could create opportunities to support smallholder farmers and enhance their livelihoods.
- The digitisation of both agriculture and finance data could play a greater role in facilitating agricultural value chain growth. Digitisation of red books and financial records can help to ensure that state banks operate more efficiently while facilitating the flow of information and finance between actors within a value chain.

The report further argues for the following broad policy changes:

- Consider allowing banks further freedom in agricultural lending, in terms of interest rates, credit amounts, and lengths of loans, as agricultural needs are different from those of manufacturing or service firms. The government could also foster competition by allowing more microfinance institutions and non-traditional lenders to operate within agriculture.
- Digitise information about plots including but not limited to red book certificates. From an agricultural value chain finance perspective, digitised certificates would streamline the use of red books as collateral. Ensuring more farmers can use an already acceptable form of collateral can facilitate financial flows from traditional and nontraditional lenders
- Consider making alternative forms of collateral legally acceptable, such as warehouse receipts
- Foster the development of business skills among farmer groups, particularly in high potential areas. A relatively cost-effective method of doing so could be to develop 'rules of thumb' related to business practices in value chains to facilitate widespread promotion.

Researchers discussed with mango farmers in Son La. Photo: Viet ED.

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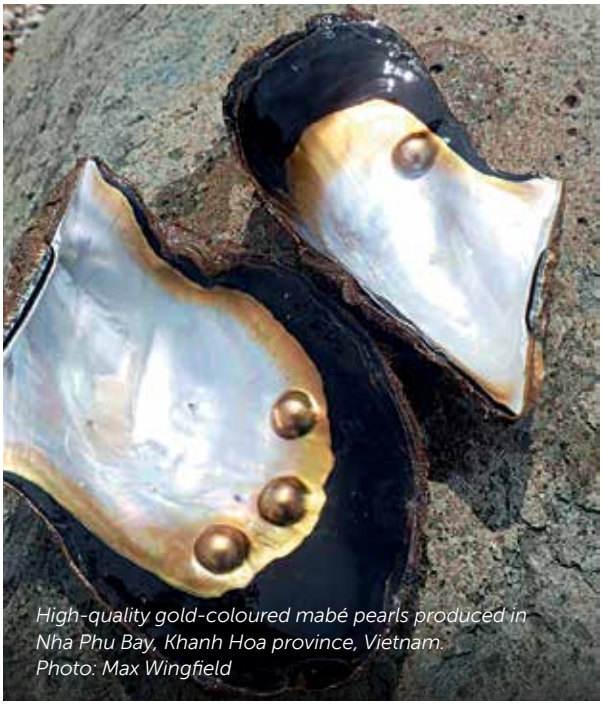
A promising start for mabé pearl farming

By Max Wingfield and Phung Van Bay.
ACIAR project: FIS/2016/126.



High-quality gold-coloured mabé pearls produced in Nha Phu Bay, Khanh Hoa province, Vietnam. Photo: Max Wingfield

An ACIAR-supported project has assessed the feasibility for developing community-based mabé pearl farming in Vietnam and the value-adding livelihood opportunities provided by mabé pearl and mother of pearl handicraft production.

Growing half-pearls, also known as mabé pearls, has provided an effective form of income diversification and livelihood support within coastal communities of many Pacific island nations such as the Kingdom of Tonga. Besides growing the pearls for sale, mabé pearl farming also opens up a second livelihood pathway—where artisans and carvers use the mabé pearl, or pieces of mother-of-pearl shell, to create jewellery and handicraft products that greatly increase both marketability and production value. This second opportunity has potential for women who commonly undertake most farming, artisanal and marketing activities.

After successful development of these livelihood opportunities in other countries, ACIAR has continued to invest to test similar potential in Vietnam. Professor Paul Southgate of the University of the Sunshine Coast has partnered with Mr Phung Van Bay, Head of Mollusc Section of the Research Institute for Aquaculture No3 (RIA3) at Nha Trang, to assess the potential of mabé pearl farming within the fishing and oyster farming communities of Nha Phu Bay.

The oyster species used for mabé pearl production is the winged oyster *(Pteria penguin)*. It is endemic to Vietnam and is regularly consumed, but it is not generally farmed or propagated in Vietnamese aquaculture hatcheries. Therefore, when the project started in 2017, Bay and his experienced RIA3 team focused on adapting their existing hatchery practices to produce winged pearl oyster juveniles.

Hatchery production at RIA3 initially began at a small experimental scale. As they became familiar with the culture requirements of the winged pearl oyster, the RIA3 team scaled-up hatchery production. They recently produced over 100,000 juvenile pearl oysters (3–6 mm) from a single spawning event.

While refining the hatchery production process, the project team undertook nursery and grow-out production trials at several edible oyster farming sites to identify the most suitable locations and

optimise pearl quality and culture methods. Hatchery-produced pearl oyster juveniles were recently transferred to six oyster farms in Nha Phu Bay. They have been monitored for growth rates and survival and used to familiarise farmers with the cultural needs of the winged pearl oyster.

Other research is focussed on local tourist markets and maximising potential economic benefits that local mabé pearl farming could generate. A team of multi-lingual survey assistants, speaking Russian, Chinese, and English, undertook a consumer survey with 250 participants assessing tourists' aesthetic preferences for mabé jewellery. Feedback from this survey will guide future local handicraft skills training activities.

The COVID pandemic has delayed planned artisanal training in pearl carving and handicraft production. A focus group for handicraft skills training has been developed based on the existing skills and training needs of wives and family members of partner oyster farmers in Nha Phu Bay. The first introductory handicraft skills training workshop, to be attended by 10 women from Nha Phu Bay, was scheduled for March 2020 but was unfortunately postponed because of COVID restrictions.

Beside photo: Winged pearl oysters tied to ropes are now cultured at 6 oyster farms in Nha Phu Bay for mabé pearl production.
Photo: Max Wingfield

Below photo: With appropriate training, local people can master mabé pearl production. Here RIA3 staff receive training that they will later disseminate to partner oyster farms and communities.
Photo: Max Wingfield

Once the pandemic is resolved and normal economic activity and international travel resume, these important aspects of artisanal training and value adding can resume, and the marketing of locally made mabé pearl and pearl shell jewellery and handicraft items can begin.

Initial experimental mabé pearl production has confirmed the success and quality of mabé pearls produced in Nha Phu Bay and Van Phong Bay. As the full production cycle, from hatchery production to mabé pearl harvest, takes approximately 3 years, oyster farmers are eagerly awaiting their first commercial harvest of mabé pearls.

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Transforming the fall armyworm insecticide-resistance management in South-East Asia

By Wee Tek Tay, Dao Thi Hang, William James, Rahul Rane, Nguyen Van Liem and Thomas Walsh.
ACIAR Project: CROP/2020/144

Fall armyworm larva feeding on the maize leaf in the field in Ninh Binh province, March 2019.
Photo: Dao Thi Hang, Plant Protection Research Institute

ACIAR and the Grain Research and Development Corporation (GRDC) are co-investing in a small research activity to develop a genetic approach to characterise fall armyworm (FAW) populations to help improve insecticide resistance management of the pest in Vietnam and across South-East Asia.

Native to the Americas, the notorious crop pest, *Spodoptera frugiperda*, also known as the fall armyworm (FAW), established significant populations in Asia, South-East Asia (SEA), Africa, Oceania and the Pacific from around 2016. In the literature, two different forms of *S. frugiperda*, either 'corn' or 'rice' (preferred plant hosts) are known, although differentiating these two forms required molecular DNA characterisation. The FAW was widely believed to have arrived in western Africa from the Americas and then spread eastward[1]. However, genomic evidence supports a more complex invasion pathway via multiple introductions[2] including SEA countries. Significant damage and losses have been observed, particularly in maize production, as this pest established new populations in these areas.

In Vietnam, the Ministry of Agriculture and Rural Development (MARD) officially recognised FAW on 24 April 2019[3]. However, outbreaks on grasses in

[1]*Goergen G, Kumar PL, Sankung SB, Togola A, Tamò M. (2016) First Report of Outbreaks of the Fall Armyworm Spodoptera frugiperda (J E Smith) (Lepidoptera, Noctuidae), a New Alien Invasive Pest in West and Central Africa. PLoS ONE 11(10): e0165632. https://doi.org/10.1371/journal.pone.0165632.*

[2]*Tay WT, Rane R. Padovan A, Walsh T, Elfekih S, Downes S, Nam K, d'Alencon E, Zhang J, Wu Y, Negre N, Kunz D, Kriticos DJ, Czepak C, Otim M, Gordon KHJ. Global FAW population genomic signature supports complex introduction events across the Old World. bioRxiv 2020.06.12.147660; doi: https://doi.org/10.1101/2020.06.12.147660, and Yainna S, Tay WT, Fiteni E, Legeai F, Clamens A-L, Gimenez S, Frayssinet M, Asokan R, Kalleshwaraswamy CM, Deshmukh S, Meagher Jr RL, Blanco CA, Silvie P, Brevault T, Dassou A, Kergoat GJ, Walsh T, Gordon K, Negre N, d'Alencon E, Nam K. Genomic balancing selection is key to the invasive success of the fall armyworm. bioRxiv 2020.06.17.154880; doi: https://doi.org/10.1101/2020.06.17.154880.*

[3]*United States Department of Agriculture Foreign Agricultural Service, Global Agricultural Information Network. Fall armyworm damages corn and threatens other crops in Vietnam. Report Number: VN2019-0017. October 11, 2019. 7pp. Available from: <https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Fall%20Armyworm%20Damages%20Corn%20and%20Threatens%20Other%20Crops%20in%20Vietnam_Hanoi_Vietnam_10-02-2019>, accessed 07 December, 2019.*

Damage caused by fall armyworm in the field in Ninh Binh province, 29 March 2019. Photo: Dao Thi Hang, Plant Protection Research Institute

Hanoi had been reported since March 2008[4], while the simultaneous detection in several provinces in early 2019 suggested it was already widespread[5].

Like many agricultural insect pests, FAW can rapidly develop resistance to insecticides. Furthermore, invasive FAW populations are known to exhibit different insecticide resistant traits for widely used, cheap, broad-spectrum insecticides such as pyrethroids, organophosphates, and carbamates[6]. This complicates their control, especially if the insecticides used were those that they were already resistant to. Excessive usage and misuse of insecticides can also cause outbreaks of secondary insect pests, increase environmental pollution, and increase crop production costs. For effective control, it is therefore **important to understand the proportion of pest populations that are carrying known resistance genes and to monitor for their increase in frequencies** over time so that effectiveness of insecticides can be prolonged. Unfortunately, management of FAW in many affected countries has relied on insecticides without first taking into consideration the resistance status of the pest.

As a result, damage to maize from FAW continues to represent a significant economic burden especially to small scale maize farmers in Vietnam. Some current solutions to reduce crop damage severity are through increasing awareness of the pest, crop rotation and intercropping such as combining maize with rice, beans, vegetables, through early detection and targeted insecticide applications at the insect's early life stages, as well as planting of genetically modified maize. These modified maize crops incorporate genes from common soil bacteria from the genus *Bacillus* including *B. thuringiensis* (Bt) that are known to produce insect-specific toxins. The Bt maize crops are therefore able to resist insect pests including the FAW if the FAW do not carry any Bt-resistant genes.

To help farmers manage this pest more effectively, including selecting the most effective insecticides, minimising the impact on beneficial insects,

[4]Vu, T. P. Insect pests of turf grass, biology, ecology and the control of Herpetogramma phaeoptralis (Guenée) in Hà Nội in Spring Summer 2008 Masters thesis, Hà Nội Agriculture University, Vietnam, (2008), and Nguyen Thi Kim Oanh, Vu Thi Phuong. 2009. Checklist of turfgrass insect pests, morphology, biology and population fluctuation of (Herpetograma phaeopteralis (Guenee) (Lepidoptera: Pyralidae) in Ha Noi, in spring-summer 2008. The 3rd National Conference of Ecology and Natural Resources, Ha Noi, 10/2009.

[5]United States Department of Agriculture Foreign Agricultural Service, Global Agricultural Information Network. Fall armyworm damages corn and threatens other crops in Vietnam. Report Number: VN2019-0017. October 11, 2019. 7pp. Available from: <https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Fall%20Armyworm%20Damages%20Corn%20and%20Threatens%20Other%20Crops%20in%20Vietnam_Hanoi_Vietnam_10-02-2019>, accessed 07 December, 2019.

[6]Boaventura, D.; Martin, M.; Pozzebon, A.; Mota-Sanchez, D.; Nauen, R. Monitoring of Target-Site Mutations Conferring Insecticide Resistance in Spodoptera frugiperda. Insects 2020, 11, 545. https://doi.org/10.3390/insects11080545, and Guan F, Zhang J, Shen H, Wang X, Padovan A, Walsh TK, Tay WT, Gordon KHJ, James W, Czepak C, Otim MH, Kachigamba D, Wu Y (2021) Whole-genome sequencing to detect mutations associated with resistance to insecticides and Bt proteins in Spodoptera frugiperda. Insect Science 28(3), 627-638, and Yainna S, Negre N, Silvie PJ, Brevault T, Tay WT, Gordon K, d'Allencon E, Walsh T, Nam K (2021) Geographic monitoring of insecticide resistance mutations in native and invasive populations of the fall armyworm. Insects 12(5), 468.

Insecticide resistance bioassays conducted in Ha Noi, Vietnam. Photo: Nguyen Thi Hong Van, Plant Protection Research Institute

reducing environmental pollution due to insecticide overuse, and reducing production costs by lowering excessive insecticide usage, there must be an understanding of the **resistance level and tools to monitor increases in resistance allele frequencies**. Alleles are variant forms of a gene, such as observed in an insecticide resistant gene, where the variant forms either result in insecticide resistance or insecticide susceptibility in the individuals carrying them. The greater allele frequencies could signal emergence of insecticide-resistant FAW populations and therefore potential chemical control failures. While directly measuring insecticide resistance though bioassays remains key, resistance allele testing allows landscape-scale monitoring.

For these reasons, ACIAR and GRDC supported a 1-year project to build understanding of insecticide response of FAW through laboratory bioassay experiments in Vietnam, and the development of a next generation sequencing (NGS) approach to survey FAW population-wide genetic profiles to **estimates the pest's organophosphate and carbamate resistance allele frequencies** and their corn and rice-preference profiles.

As a trial, the NGS approach concurrently profiled 160 FAW from 10 populations sampled from across Vietnam, and 240 FAW from 15 populations sampled from Western Australia, representing a total of 400 corn/rice DNA markers and 800 copies of organophosphate/carbamate resistance genes being surveyed.

Key findings

From the initial results, the NGS approach has demonstrated the potential to develop and improve insecticide resistance management strategies for the FAW by measuring the frequency of resistance alleles. It provided **molecular evidence that over 50% of the individuals tested had resistance alleles** in both Vietnam and Australia, suggesting that **long-term efficacies of organophosphate and carbamate insecticides for management of this pest could be impacted.**

The NGS approach has demonstrated that concurrent estimates of the FAW's organophosphate and carbamate resistance allele frequencies and their corn and rice-preference profiles can be readily achieved and will contribute to saving significant time and cost for managing this formidable pest.

Besides, because molecular monitoring of the corn and rice varieties can also help to identify novel invasive populations that could introduce unwanted novel genetic traits such as new insecticide resistance genes, including resistance to Bt maize grown in Vietnam, the NGS approach can be also be further adapted to detect any other type of resistance allele such as those involved in Bt resistance, in pyrethroids, and diamides.

For novel invasive species that have recently established in the landscape, detection can be difficult due to the initial small population sizes. Their detection could be improved through a molecular approach and by increased sampling size and concurrent surveying of multiple regions. The NGS platform developed through this project has the capacity to **significantly increase sampling size and therefore improve detection sensitivity of novel exotic agricultural pests** such as sap-sucking species that could also transmit plant pathogens.

The NGS platform is species agnostic and could be modified to detect any allele of agricultural significance, such as the potential presence of plant pathogens within the pest populations to enable early intervention and preparedness for the farmers, resulting in significant cost-saving outcomes.

With support from the ACIAR to help facilitate and establish collaboration partnerships, this project demonstrates how researchers from different countries are exploring transformational strategies and adopting cutting-edge tools to solve shared pest challenges and benefit farmers and growers with transnational boundary implications.

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Coffee grown in Central Highlands. Photo: ACIAR

ACIAR alumni network: a robust playground for agriculture development

By Associate Professor Dr Nguyen Xuan Ba, Hue University, John Dillon 2007 alumnus

High-quality human resources are the goal and drive for sustainable development of agriculture and the country and society in general. The ACIAR Vietnam Alumni Network was established to create a playground for scientists who have received ACIAR scholarships. This is a place for them to share knowledge and experiences, strengthen understanding and friendship between Vietnam and Australia, and create opportunities for networking and capacity building for scientists from various backgrounds. All serve to further the sustainable development of the country's agriculture.

In April 2021, ACIAR collaborated with the alumni to organise a series of activities to develop an effective, sustainable network and build capacity for alumni.

On 9 April 2021, 32 ACIAR alumni—recipients of John Allwright, John Dillon, and Meryl Williams scholarships—met in Hanoi to participate in various planned network activities. These included visiting the Soil and Fertiliser Research Institute (with a warm welcome from Director Tran Minh Tien, a John Dillon Fellowship alumnus, and his officers), and enjoying a cosy atmosphere and friendly Gala Dinner together.

On 9 April 2021, ACIAR Vietnam alumni were pleased to be able to welcome the Australian Ambassador to Vietnam. Ambassador Ms Robyn Mudie provided valuable information on cooperation and friendship programs between Australia and Vietnam and Australia's continued support for the network's activities. ACIAR alumni also learned about ACIAR's ongoing projects in Vietnam and its strategic directions in research and development through a presentation by ACIAR Vietnam Country Manager Ms Nguyen Thi Thanh An and via a video opening speech by ACIAR CEO Professor Andrew Campbell.

In the evening of the same day, a special Gala Dinner program took place with the participation of Australia's former deputy ambassador to Vietnam Mr Andrew Barnes, leaders of agriculture-related departments at the Australian embassy, and many close partners and Vietnamese agricultural scientists who have worked with ACIAR for many years. Mr Barnes congratulated 3 John Dillon alumni who had recently been appointed new leadership positions at their agencies.

During the exchange session on the morning of 9 April, all alumni shared their recent achievements in scientific research and agricultural development, thanks to what they have learned from Australia and applied in practice in Vietnam. This sharing session has opened many new opportunities for learning and research collaboration, especially those involving many regions and disciplines. The alumni also shared success stories and good memories of studying in Australia. These are valuable lessons for young scientists preparing to study in Australia.

All alumni confirmed that their current career success and life-changing knowledge and skills gained–such as approaches to scientific research and development, teamwork, logical thinking, systems management, and leadership skills–is thanks to study in Australia. The alumni's non-stop research, upgraded academic level, and work promotion have demonstrated this acknowledgment. The alumni committed to always studying and dedicating themselves to Vietnam's agriculture development. At the end of the discussion, there was a draft alumni action plan for 2021–2022, including interesting training topics for alumni.

At the end of the networking and training activities, alumni were full of emotion about the reunion day, saying goodbye to friends who studied in the same university in Australia, receiving the same ACIAR scholarships, having the same interests in research fields, and happy to see how the younger researchers were motivated to 'keep the fire burning'. Together, they will continue to build an ever-growing and effective network committed to contributing to Vietnam's sustainable agriculture development and nurturing the friendship and cooperation between Australia and Vietnam.

Alumni visited Soil Museum at Soil and Fertiliser Research Institute. Photo: ACIAR.

Building capacity of project monitoring and evaluation for alumni

By Nguyen Huu Nhuan and Duong Nam Ha,
Vietnam University of Agriculture

Professor Chung discusses the project's logical framework with alumni researchers in the offline training on 11 April 2021. Photo: ACIAR.

Monitoring and evaluation is highly important in agricultural research for development projects. The training course on 'Monitoring and Evaluation of Research for Development Projects' (8 April–14 May 2021), organised by ACIAR Vietnam, created a valued learning opportunity for more than 30 Australian alumni, including ACIAR alumni and friends who received other Australian Government scholarships in Vietnam. We are researchers, university lecturers, and senior government officials who actively contribute to national and international agriculture development. The course lecturer is Professor Do Kim Chung from the Vietnam University of Agriculture, a senior expert in monitoring and evaluating development projects.

In response to the COVID-19, this course combines face-to-face and online training. The course content was designed to meet learners' needs and focus on effective project evaluation and monitoring knowledge and skills. Outside of class time, students are divided into groups to do homework on specific projects and then share and discuss in the next class. This was our longest e-learning experience, but the impression that remains is the highest professionalism and practicality.

Since the course, many alumni have continued to share the knowledge and skills learned in their work. The good news is that ACIAR Canberra has invited two alumni who graduated from this training course to participate in the final assessment of two ACIAR projects, one in the Northwest and the other in the Mekong Delta. With ACIAR's continuous support for alumni, we hope to continue contributing more to agriculture development in general and agricultural and rural development in Vietnam in particular.

Interview with our researcher

Dr Nguyen Mai Phuong works for WorldAgroforestry (ICRAF). She has participated in two consecutive ICRAF-led agroforestry projects funded by ACIAR to address environmental issues and support smallholder livelihoods.

Hello Phuong! After nearly 10 years of participating in both AFLI projects, what impressed you the most?

I was most impressed with the agroforestry landscape model developed under the AFLi project that intercropped fruit trees with corn and grass stretching along the hills in Hat Lot commune, Son La province. A few years ago, when I came here in the dry season, the soil from the foot to the top of the hill was a sandy colour with very deep erosion tracks. Now, mangoes and plums cover the land and the fodder grass forms stairs on the slopes. People also no longer burn their fields before the new crop. Farmers took me to visit the agroforestry models they implemented and happily shared the initial results that are better than the previous maize or sugarcane monocropping. Seeing these practical results gives me joy in continuing to develop my work.

Speaking of joy, can you share with ACIAR readers a happy memory of this project?

I have many happy memories, but one of the best is managing group discussions on agricultural issues with Hmong and Thai women. They were very shy at first but became active and enthusiastic after a few days of working together. They could even stand confidently in front of many people to present their group's problem using photos they took themselves. A few years later, when I visited them again, those photos were still displayed proudly in the middle of their house, and they still talk about that session. It makes my job more meaningful.

When supporting people to do agricultural research, do you notice any difficulties that people face? And what is the solution to these difficulties?

Since agroforestry includes perennial trees, the main challenges for smallholder farmers are labour-intense and the high cost of the initial investment. They must wait 3–4 years to harvest the trees, and agroforestry farming techniques are more difficult than monocropping. Besides, there is no quality certification or price advantage for agroforestry products compared to monoculture.

Also, through some research and project activities with ethnic minority women, I find that they rarely participate in technical training activities due to limitations in language, education and time, because they are so busy farming and taking care of the family. Rural women should have more opportunities to participate in technical learning. Their difficulties in participating need to be addressed because they play key roles in agroforestry, from planting to harvesting and selling products.

In the long-term, to help support people to be effective in agroforestry, we need to find a market for agroforestry products, standardise technical documents on the cultivation of agroforestry models, and raise people's awareness of the benefits of agroforestry compared to monoculture. If they see the long-term impacts, people will do it themselves and do it very quickly because Vietnamese farmers are highly skilful.

We hear that your doctoral thesis is also related to agroforestry. Can you tell us about this?

My research focus is on the potential to develop agroforestry for Vietnam's northwest smallholder farmers. I have developed a theoretical framework that combines many supporting factors for expanding agroforestry in this region, including natural conditions and social factors such as ethnicity, people's awareness, and ethnic women's roles in the agroforestry implementation. When applying this theoretical framework, agricultural innovations should be customised for each specific context. We cannot have one formula for the entire Northwest region. For example, farming improvement interventions for the Hmong must consider their farming conditions, practices, and limitations on access to information compared with other ethnic groups. When introduced to the people, agricultural interventions in general and agroforestry need to be tested and adjusted to suit the context before being replicated.

COVID-19 has had a great impact on the lives of farmers. What do you think we can do to help farmers at this time?

I have heard desperate stories of 'agricultural product rescues', where people have been encouraged to buy products to help farmers get out of market failure, especially during COVID-19. To avoid this, small farmers need to shift to professional production by joining cooperatives, registering trademarks and certificates for product quality, and increasing sales and marketing activities through multiple traditional and online channels. Ecological agriculture, including agroforestry, will help people improve product quality and increase resilience to market risks and climate change.

COVID-19 has also been affecting all of us, not only farmers. Do you have any 'tricks' to overcome difficulties during the prolonged lockdown in Hanoi?

The most important thing to me is maintaining a positive mindset, seeing this as an opportunity to spend time with family and do interesting things such as reading, watching movies, exercising, or trying out new dishes. I have been practicing yoga regularly, which I rarely did before because I always travelled for work.

So, what do you like to do normally, in your free time?

I love to travel, take pictures, learn about the cultures of different regions and countries where I've visited. Even on every business trip, I also enjoy talking with the people and learning about their traditions. When I have time, I write down the memories, rearrange the photos of each trip, read more about that place, maybe try to remake some of the dishes from that land. These things help me have a deeper sense of where I've been to.

What are your plans for the near future?

I will continue developing my previous research in agroforestry projects in the Northwest and a project related to sustainable coffee and pepper in the Central Highlands, funded by ACIAR. I am lucky to have the opportunity to work with these projects to contribute more scientifically and practically meaningful works to the people.

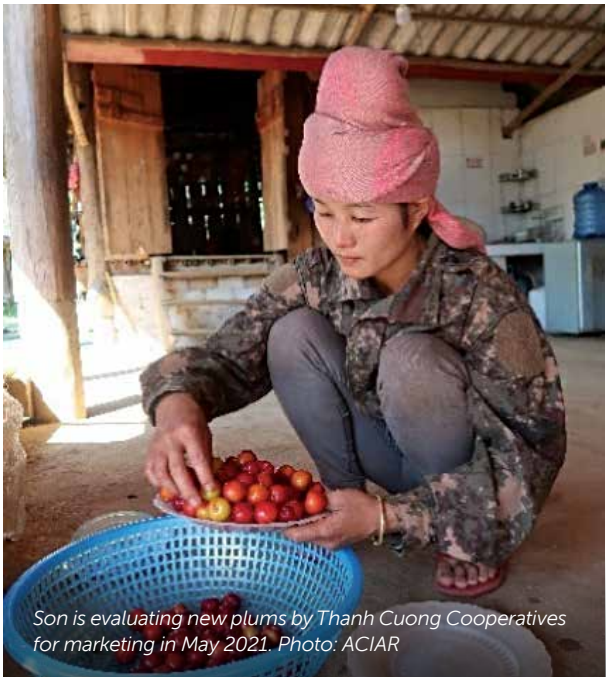
Thank you, Phuong, for sharing. You have given us a lot of motivation. We wish you good health and success in life!

**Hanoi applied many strict restrictions during the 4th outbreak of COVID-19 from the end of July 2021 until the time when we did this interview. Most of Hanoian had to work from home during this period.*

Interview with our farmer

Ms Lo Thi Son, Co Noi commune, Mai Son district, Son La province

Farmer Lo Thi Son and her husband are 2 founding members of Thanh Cuong Cooperative based in Co Noi commune, Mai Son district, Son La province. Thanh Cuong Cooperative was established in 2018 and currently has 34 members who are Thai ethnic people. Most of them practise agroforestry on their sloping lands. Son's husband, Mr Leo Van Cuong, is the deputy director of the cooperative. The couple participated in 2 ACIAR agroforestry projects led by World Agroforestry that are Agroforestry for livelihoods of smallholder farmers in northwest Vietnam (AFLI-1) and Developing and promoting market-based agroforestry and forest rehabilitation for northwest Vietnam (AFLI-2).



Son is evaluating new plums by Thanh Cuong Cooperatives for marketing in May 2021. Photo: ACIAR

Hello, Ms Son! Thank you for joining this interview with ACIAR. Can you introduce yourself?

I am Lo Thi Son, aged 26. I am a Thai person.

How did you join ACIAR projects?

I have joined AFLI projects since 2013. Before, I planted rice, maize, and cassava on sloping lands and vegetables in our home garden. But eventually, we could no longer plant maize due to severe soil erosion. The maize could only grow as high as my waist and only produced small corn. Since joining the project, we shifted to intercropping macadamia and coffee in one land and mango, longan, and plums in other areas.

What do you like most about ACIAR projects?

I now know about new models and techniques to grow trees on the most damaged lands thanks to this project. I couldn't grow maize and cassava on these lands, but I could plant macadamia, which has brought me extra income. We've earned money from macadamia and coffee for 3 or 4 years, about 30 million dong (A$1,800) each year.

Soil erosion has reduced a lot since I applied project-guided techniques like growing fodder grass and planting trees in contour lines. Before, I could see the cracks caused by soil erosion, which was growing wider and wider. But now, the fodder grass stops the soil from further eroding. Also, we can use the Ghine grass to feed our two buffaloes which is another good source of labour and income. My parents also joined this project; they grow plums, coffee, and tek-wood.

I also love the learning opportunity the project has provided. My husband and I took turns for these study tours. I've been to Moc Chau district (Son La province) and Na Ban district to visit other agroforestry models developed under this project. When I could not join the tours, my husband would go and share with me what people were doing there. Then we would discuss how we could learn from them.

After visiting the nursery house in Moc Chau, we saw how successful the model was, so we felt motivated. We've decided to contribute financially to build a nursery house for Thanh Cuong Cooperative. This is an important decision, and we are both happy about it.

How do you feel yourself grow and change after a long time participating in this project?

I have learned a lot. I've seen how other people are doing things, and I've learned good practice from them. I've learned that I don't have to do what my parents and grandparents did. I do not need to do maize or sugar cane forever. Maize and sugar cane monocropping is very labour-intensive. I do not have time to rest. With the agroforestry options, I was only busy in the beginning. Because the trees grow steadily, I can slow down and wait for harvesting. I have more time for myself and my daughter, which is very important.

Can you share your plans?

We will continue with agroforestry. We will plant more fruit trees, keeping the fodder grass to prevent soil erosion on sloping lands, and grow vegetables on flat areas.

Grilled oyster with scallion lard mix

Photo: Vu Bao Khanh

Recipe by Mr Pham Hong Nhiem from ACIAR project 'Enhancing bivalve production in northern Vietnam & Australia' (FIS/2010/100), refined by Chef Nguyen Manh Hung.

Ingredients

- 6 oysters
- 2 tbsp lard
- 3 cloves red shallots
- 5 g scallions
- 20 g Vietnamese mint
- 20 g ground peanuts
- pepper, salt

Method

- Wash oysters with a brush to remove residue on the shell. Slice red shallots, scallions and Vietnamese mint. Roast and crush ground nuts.
- Preheat the pan at medium temperature, then add the lard onto the pan until it is hot enough. Add red shallots into the pan and stir until fragrant then add scallions. Pour this mix into a bowl and set aside.
- Prepare the grill (can use charcoal or gas grill). Place oysters on the grill.
- Note: There is a lot of water inside the oysters but water will be released when grilled and can be drained.
- When the oyster meat has shrunk, spread the shallot mix over the oyster meat.
- Note: Make sure there is enough shallot mix to spread over the oyster.
- Sprinkle Vietnamese mint and roasted groundnuts before removing the oyster from the grill. Serve on a plate and enjoy.

Mango and forage grass in the agroforestry option of Longan-Mango-Maize-Forage Grass, Son La Province, Vietnam. Photo: ACIAR.

The Australian Centre for International Agricultural Research (ACIAR) is part of Australia's international development cooperation program. Its mission is to achieve more productive and sustainable agricultural systems for the benefit of developing countries and Australia. ACIAR commissions collaborative research between Australian and developing-country researchers in areas where Australia has special research competence. ACIAR also administers Australia's contribution to the international agricultural research centres.

ACIAR Vietnam is one of the ten country/regional offices and we have been active in Vietnam since 1993.

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