# Vietnam

**A$4.8 million**
**Budgeted funding**

**18**
**Bilateral and regional research projects**

**8**
**Small projects and activities**

**Vietnam contained COVID-19 very effectively through 2020 and into 2021. As a result, it was one of only a few countries in the world with positive economic growth during that period. The agriculture sector remained a firm foundation for that growth, contributing 15% to the country's GDP.**

Despite the good performance of agriculture, the sector experienced a range of difficulties. These included disruptions of traditional value chains due to travel restrictions in the pandemic, the impact of African swine fever and the extreme events associated with natural disasters, such as the terrible flood in the central region, saline intrusion in the Mekong Delta and hail storms in the northern mountainous areas.

Vietnam has a stated ambition to become a country with world-class agriculture, prosperous rural areas, modern infrastructure, efficient use and sustainable protection of agricultural resources, and resilience to climate change. In agriculture specifically, Vietnam is aiming to be in the top 15 agricultural developed countries and rank tenth in agricultural processing technology by 2030. To achieve these goals, Vietnam has prioritised focus on export commodities that meet good agricultural practice and other quality standards, and by value-adding to products through new technologies.

Vietnam sees research-for-development (especially the application of 4.0 technology) as the key to achieving its ambitions to improve efficiency, productivity and increase the competitiveness of agricultural products. Research for rural development also continues to be vital, especially linking poorer rural areas to exports through free trade agreements. The main challenges to achieving these ambitions in the coming years remain the negative impacts of climate change, water shortage, soil degradation and development gaps of ethnic minorities and women in rural areas.

As a country vulnerable to climate change, Vietnam's agriculture sector has identified climate change mitigation and adaptation as a long-term mission. Measures to adapt or mitigate the negative impacts of climate change have been proposed, especially restructuring crop choices and times with the specific conditions, improving land and water management and applying technology for farming activities, and diversifying occupations for people in the rural areas.

Since 2020, One Health (the interface between human, animal, and environmental health) has drawn more attention than ever. Vietnam's One Health partners (including Australia) recently pledged to support a partnership framework for the 2021–2025 period, focusing on zoonotic diseases and antimicrobial resistance. Soil health and the relationship between soil fertility, crop nutrition, and pests and diseases (especially soil-borne diseases) are also priorities.

## Country priorities

ACIAR has sustained a program of research collaboration with Vietnam for the past 28 years. The strategy for research collaboration between Vietnam and ACIAR from 2017 to 2027 was developed on the basis of mutual acknowledgment that the relationship between ACIAR and Vietnam has evolved from donor–recipient to partnership, co-investment and, possibly, through this period, to trilateral collaboration. The strategy confirms the desire of both parties to join with the private sector wherever possible to create opportunities for poorer residents in rural and urban areas through inclusive agribusiness systems. It also focuses on transformational opportunities for women in research and agribusiness systems and on farms.

The key ambitions of the strategy are to:

- improve the capacity of Vietnamese researchers, research managers and development partners to support sustainable and equitable farming and livelihood systems in the Mekong River Delta, Central Highlands and Northwest regions and in the fisheries and aquaculture sector
- improve the skills, livelihoods and incomes of smallholder farmers, including ethnic minorities in the mountainous areas of the Central Highlands and Northwest regions, supported by knowledge networks that allow profitable engagement in domestic and international markets
- improve human health and nutrition through research on integrated farming systems, nutrition-sensitive agriculture and One Health
- improve the quality and safety of meat, fish, vegetables and fruit for domestic consumption
- develop a deeper knowledge of markets to help prevent and reduce economic shocks for participants in agricultural supply chains
- reduce inputs of chemicals and fertiliser for a cleaner environment, safer produce, improved soil health and more-profitable sustainable production systems
- improve resource use efficiency to produce more food with fewer resources
- implement practices and inform policymakers to manage climate-change impacts on agriculture.

In early 2020, Vietnam and ACIAR reaffirmed these priorities as being the key focus for our partnership. We also reaffirmed the commitment to:

- co-fund 75% of projects during the 10-year period
- develop research into climate change, especially drought-tolerant cropping systems in the Mekong River Delta and the Central Highlands, and saline-cropping systems for the Mekong River Delta.

## 2021–22 research program

- **26 ACIAR-supported projects in Vietnam**
- **12 projects are specific to this country**
- **14 projects are part of regional projects**

The research program addresses our high-level objectives, as outlined in the ACIAR 10-Year Strategy 2018–2027, as well as specific issues and opportunities identified by ACIAR and our partner organisations. The following sections briefly describe individual ACIAR-supported projects and anticipated outputs in Vietnam. The projects are grouped according to research program. Each project description is referenced in a list at the end of this section, which provides the project title and code.

Farmer Leo Van Lech in Son La province, Vietnam, has implemented a new agroforestry systems on his sloping land and is obtaining better production and fruit quality. As director of a local cooperative, he is encouraging other farmers to apply the new technique.
Photo: Huong Nguyen. ACIAR project FST/2016/152

### Agribusiness

Mango production makes a significant contribution to Vietnam's economy, with nearly half of the crop produced in the Mekong River Delta region. New opportunities in the fresh and processed mango value chain will be identified to improve net income and livelihoods of smallholder mango growers in southern Vietnam in a project led by Associate Professor Robin Roberts of Griffith University. The research has also focused on roles and opportunities for women in the industry. The project will conclude in 2021–22, identifying opportunities to improve through-chain operations and chain competitiveness, and reporting on options to overcome ongoing barriers to competitiveness and ways to improve capacity, industry stakeholder linkages and knowledge sharing.[1]

Smallholders who produce high-value vegetables in the Moc Chau district of Northwest Vietnam have a new supply channel to modern retail markets in Hanoi as a result of a previous ACIAR-supported project. A subsequent project, led by Dr Gordon Rogers of Applied Horticultural Research, has addressed research and development gaps in Vietnam to ensure the new vegetable chains are reliable, inclusive, sustainable and scalable. The research experience and knowledge developed through these projects in Vietnam was applied to rapidly identify, develop and evaluate a pilot high-quality vegetable chain in Myanmar. The project concludes in 2021–22, with the consolidation of effective frameworks and approaches to establish and develop resilient smallholder vegetable chains in northern Vietnam and Myanmar.[2]

Cassava witches' broom disease and Sri Lanka cassava mosaic virus are spreading rapidly in South-East Asia. A project led by Dr Jonathan Newby of the International Center for Tropical Agriculture is developing technically viable and economically and socially sustainable ways to improve the resilience of cassava production systems and value chains in Cambodia, Laos, Myanmar and Vietnam. During 2021–22, the project will continue testing and evaluation of virus-free planting material and resistant varieties, and on-farm testing of new agronomic practices and training of farmers and extension officers. The establishment of facilities using innovative methods for rapid multiplication of clean planting material continues, funded in joint ventures with private firms and non-government organisation in multiple countries.[3]

Unmanaged expansion of coffee and pepper production in the Central Highlands region has resulted in deforestation and production on unsuitable land. Increasingly, the region is subject to the impacts of climate change, with increasing temperatures and erratic rains. There has also been misuse and overuse of mineral fertilisers, irrigation water and synthetic pesticides. A new 4-year project aims to enhance smallholder livelihoods, including vulnerable populations, by improving the sustainability of coffee and black pepper farming systems and value chains. Research led by Dr Estelle Bienabe of the World Agroforestry Centre will start with an investigation of soil-borne pests and diseases, on-farm and in nurseries, and the use of bio-inoculants with soil remediation strategies.[4]

To combat serious diseases of cassava, ACIAR supports a project that is evaluating virus-free planting material and resistant varieties, and conducting on-farm testing of new agronomic practices and training of farmers and extension officers. Photo: Huong Nguyen. ACIAR project AGB/2018/172

About 1.5 million smallholder farmers in the Mekong River Delta region rely on rice for their livelihood. Rice is grown on small farms, with 2 or 3 crops produced each year. The industry faces issues such as reduced returns to farmers, soil degradation, environmental pollution and declining seed purity and grain quality. During 2017, the Government of Vietnam developed a policy to encourage reduced total rice production but a focus on high quality, with the aim of exporting to premium markets. A new 4-year project, led by Dr Jaquie Mitchell of the University of Queensland, aims to establish a highly productive, sustainable, traceable and quality-assured value chain for tropical medium-grain rice in the Mekong River Delta for the benefit of rice-farming households and to meet established market requirements of the partnering global marketer.[5]

Smallholder farmers in South-East Asia often cannot access credit to invest in new crops or technologies, deal with risks and shocks, and safely carry wealth from harvest to planting. To help smallholders reach their production potential, a project led by Dr Alan de Brauw of the International Food Policy Research Institute aims to increase knowledge about how to design and implement innovative and inclusive agricultural value chain financing models in South-East Asia. During 2021–22, the project will review, research and trial innovative financing models for agricultural value chains and evaluate specific chain finance interventions in Indonesia and Vietnam.[6]

The most important constraint to the development of a temperate fruit industry in northern Vietnam is the lack of coordination between farmers and stakeholders in the private sector (seedling producers, growers, traders and retailers), and between the private sector and local government. This small research activity led by Mr Oleg Nicetic of the University of Queensland has established an inclusive multi-stakeholder industry association, imported new varieties from Australia and completed the first harvest of imported varieties in field trials. Externally funded monitoring and guidance of association governance, commercial scale multiplication and release of varieties to participating farmers will continue beyond the project term.[7]

Vietnam has experienced excellent growth in agriculture, value-added agriculture and farm incomes over recent decades. However, the sector faces a number of challenges, including outdated technologies, inadequate food safety and fragmented supply chains. A small research activity led by Associate Professor Tiho Ancev of the University of Sydney will support the Ministry of Planning and Investment and the Vietnamese Government to set up an adequate framework for the Agricultural and Rural Development Strategy and formulate concrete strategic directions for the sector.[8]

Catfish (*Pangasius* sp) farming and wild caught catfish are important income generating activities for smallholder farmers in the Mekong River Basin and are an extremely important source of dietary protein for those countries' populations. The continued availability of catfish for human consumption is influenced by many factors including the impacts of climate change, the COVID-19 pandemic, consumer perceptions on food and health safety provenance, and environmental and political changes. Dr Van Kien Nguyen of the Health and Agricultural Policy Research Institute leads a new project in Cambodia, Laos and Vietnam to identify food loss and waste along the catfish value chain; conduct foresight exercises to determine the uncertainties of catfish production for food systems; and develop solutions to reduce food loss in catfish production. This project is part of the ACIAR–IDRC Food Loss Research Program (see page 8).[9]

### Climate Change

Australia is a world leader in greenhouse gas mitigation research in agriculture. This project provides the opportunity to assist partner countries to strengthen their national greenhouse gas accounting systems towards the same high standard used by Australia, and to use these systems to identify, quantify and implement on-farm management options that reduce emissions. Led by Professor Peter Grace of Queensland University of Technology, the project team will work with government institutions in Fiji and Vietnam, and will help grow capability in the data management, analyses and reporting needed to support current and future emissions reduction commitments under the Paris Agreement. The team will also collaborate with a sister project, led by the New Zealand Agricultural Greenhouse Gas Research Centre, which is pursuing the same approach in Kenya and Indonesia.[10]

### Fisheries

Dried sea cucumbers are highly valued in markets across China and South-East Asia. Overfishing and poor fisheries management throughout the Asia-Pacific region have resulted in serious declines of sea cucumber stocks and even led to fishery closures, reducing income-generating opportunities for coastal communities. A project led by Professor Paul Southgate of the University of the Sunshine Coast is developing culture methods that support pond-based sea cucumber farming in Vietnam and sea-based farming in the Philippines. During 2021–22, the project will be training hatchery staff in new methods, continuing field experiments and feeding trials, and refining pond culture methods.[11]

Unique among Pacific island countries is the production of half-pearls, or mabé, in Tonga from the winged pearl oyster. Although half-pearls are generally less valuable than round pearls, an individual oyster can produce multiple half-pearls (unlike round pearls). With appropriate training, pearl production can be accomplished by community members over a 10-month culture period, compared to approximately 2 years for round pearls. Professor Paul Southgate of the University of the Sunshine Coast completes a project in 2021 that is supporting further expansion of community-based pearl farming and handicraft production in Tonga and demonstrating the feasibility of similar development in Vietnam.[12]

Hybrid grouper farming is the most profitable marine fish aquaculture sector in Vietnam, involving over 400 hatchery operators and grow-out farmers. The Directorate of Fisheries aims to increase small and medium enterprises in marine aquaculture, but the hybrid grouper sector is constrained by reliance on a nutritionally poor and variable supply of 'trash' fish. Farmers report they are willing to use more sustainable, cost-effective formulated feeds, but the development of commercial feeds in Vietnam is constrained by a lack of data on suitable feed formulations. This project, led by Dr Leo Nankervis of James Cook University, will deliver nutritional data required to formulate cost-effective feeds that promote superior growth and survival compared with 'trash' fish, and so attract smallholder farmers to switch to formulated feeds. Cooperation with large feed mills in Vietnam's private sector will support the local supply of cost-effective diets for hybrid grouper and underpin broad-scale adoption of commercial pelleted feeds.[13]

Hybrid grouper farming is the most profitable marine fish aquaculture sector in Vietnam. ACIAR-supported research is finding nutritional data to formulate cost-effective feeds that promote superior growth and survival, which can be sustainably sourced. Photo: Khanh Long. ACIAR project FIS/2021/121

Marine bivalves, such as mussels, clams and oysters, are known to sequester carbon in their shells. There is interest in the potential for bivalves to mitigate the effects of climate change. In northern Vietnam, a small research activity led by Dr Sarah Ugalde of the University of Tasmania is examining the role of the Portuguese oyster (*Crassostrea angulata*) aquaculture industry in the carbon cycle and rates of carbon sequestration. This new information will be used to evaluate the potential value for oyster carbon farming to reduce climate-change impacts through shell recycling and value-adding, including through the use of carbon crediting mechanisms.[14]

### Forestry

The development of market-based agroforestry in Northwest Vietnam provides an opportunity for farmers to diversify, achieve higher incomes and reduce erosion of mountainous landscapes. A project led by Dr La Nguyen of the World Agroforestry Centre will finalise research on the development and adoption of locally appropriate, market-based agroforestry systems and the rehabilitation of degraded forests. Working closely with the Department of Agricultural and Rural Development offices in Son La, Yen Bai and Dien Bien provinces, the project will implement exemplar landscapes to support adoption of the new systems and improve livelihood options for the H'mong and Thai ethnic minorities living in these provinces.[15]

A new project in 2021–22, with activities in Indonesia and Vietnam, will underpin good plant biosecurity practices in forestry. With government and industry partners, the project led by Dr Caroline Mohammed of the University of Tasmania will extend screening approaches from prior research into the impact of the *Ceratocystis* fungus on acacias to eucalypts that have replaced acacias in the wet tropics. It will develop remote-sensing software applications for cheap and rapid forest health surveillance and, through geospatial modelling, deliver establishment (suitability and survival) risk maps under current and future climates at a regional level for the highest-priority pests and pathogens.[16]

Increased trade, global movement and a changing climate increase the threat of emerging pests and diseases. The capability to detect and respond to forest pest and disease incursions is crucial to minimising their impacts. In South-East Asia, this capacity varies widely among countries, but there is a general lack of preparedness to respond to invasive pests and diseases. A new project will establish an effective and sustainable forest biosecurity network in South-East Asia to improve risk management for invasive forest pests and diseases. Associate Professor Simon Lawson of the University of the Sunshine Coast will lead the project, which will use shared field protocols and data as an entry point and foundation for coordinated biosecurity response. The project will develop science tools to support and sustain the forest biosecurity network and develop coordinated forest biosecurity policies for South-East Asia.[17]

## Livestock Systems

Market demand for beef is increasing rapidly in Vietnam, outstripping current levels of domestic production. A project led by Dr Stephen Ives of the University of Tasmania is investigating and implementing whole-farm solutions for smallholder cattle producers in the highlands of Northwest Vietnam. This will help smallholder farmers shift from extensive to more-intensive production systems so they can meet market specifications, increase market linkages and improve profitability. In the final year, the project will focus on capacity building of stakeholders in the beef value chain, including key advisory and extension staff. A working group will be established to design an up-scaling strategy for a sustainable crop-livestock system.[18]

Asia is a major global producer of pork, with South-East Asia and southern China currently providing the majority of regional production. Food safety is a significant and growing concern in Vietnam, and a barrier to smallholder farmers wishing to sell product in high-value domestic and export markets. Through market-based approaches, the Safe Pork project, led by Dr Fred Unger of the International Livestock Research Institute, aims to reduce the burden of bacterial food-borne disease across informal pork markets in Vietnam. In the final year of the project, researchers will deliver a roadmap based on evaluations of approaches to food safely and recommendations that could lead to impact at scale.[19]

Goat production in Lao has more than doubled over the past 10 years, largely driven by high demand for goat meat from Vietnam. Traditional extensive goat-raising methods can result in overgrazing of feed resources, negative consequences for the environment and higher incidence of diseases and parasites in livestock. A project led by Dr Stephen Walkden-Brown of the University of New England is aiming to enhance income-generating opportunities for goats in Lao farming systems, while identifying sustainable production practices. Additionally, the project is seeking greater understanding of consumer preferences for goats in Vietnam to further develop market specifications, especially for premium meat.[20]

Poultry enterprises offer opportunities to improve the nutrition of households and economically empower women, who are the key custodians of smallholder poultry in South-East Asia. However, low-producing chicken genotypes typically dominate smallholder or family production systems. Dr Tadelle Dessie of the International Livestock Research Institute leads a project that is testing and making available high-producing, farmer-preferred genotypes of chickens to increase smallholder productivity as a pathway out of poverty in Cambodia, Myanmar and Vietnam. The project is also strengthening the capacity of young scientists in the project countries to conduct high-quality research on village poultry systems, for the benefit of smallholder farmers.[21]

The Safe Pork project aims to reduce the burden of bacterial foodborne disease across informal pork markets in Vietnam. Photo: ILRI Vietnam.
ACIAR project LS/2016/143

The animal origins of COVID-19 have again placed concerns about zoonotic diseases in the global policy limelight. Wet markets in Asia were singled out as a source of global pandemic risk and there were calls to close, ban, regulate and reform them. While some wet markets centre heavily on wild animals, many do not sell wildlife or bushmeat. More commonly, a wet market is a fresh-food market where live animals (poultry, ruminants, seafood and wildlife) are kept, slaughtered and sold to consumers alongside fruits, vegetables and/or grains. Dr Kevin Bardosh and Associate Professor Cecily Maller of RMIT University leads a rapid assessment to understand how the COVID-19 pandemic has impacted wet markets in Vietnam, Kenya and the Philippines, specifically in relation to biosecurity reforms, food security, and women's economic empowerment. This project contributes to stage 3 of the ACIAR assessment of COVID-19 impacts on food systems in our region.[22]

The COVID-19 pandemic exposed multiple failures in economy and society, and it is clear that the costs of the global shock have not been equally distributed. Also contributing to the ACIAR COVID-19 impacts assessment is a small research activity led by Dr Paulo Santos of Monash University aims to understand what drives vulnerability to poverty among agricultural households in Myanmar and Vietnam, and what research needs to originate from such analysis. The research analyses existing expenditure and consumption data to quantify the relative importance of different shocks on poverty.[23]

### Social Systems

Agrichemicals are an important tool for increasing agricultural yields and a necessary contributor to food and nutrition security. However, off-label use can have significant impacts on human and environmental health. A small research activity, led by Dr Liana Williams and Dr Lucy Carter of CSIRO, is using a human-centred approach to understand the interplay between agrichemical use and the institutional and regulatory frameworks that are intended to safeguard against off-label use, as well as networks for access to chemicals, information and training. Agrichemical use will be analysed through case studies in selected crops in Laos and Vietnam. Understanding gained from the study will serve as a foundation for future ACIAR research.[24]

A small research activity will analyse gender transformative tools designed to support ethnic minorities in the Technologically Enhanced Agricultural Livelihoods (2018–2022) project operated by CARE International in the northern uplands of Vietnam. The project, led by Dr Rochelle Spencer of Murdoch University, will determine how the tools contribute to changing gender relations and empowering women, and to what extent. The project will also build the capacity of in-country partners and 10 social science researchers in the early stages of their careers, through training in mixed-method research, including participatory methods, and project-level Women's Empowerment in Agriculture Index.[25]

Sea-level rise and changes to seasonal rainfall patterns reduce freshwater availability and higher saline intrusion of farms in the Mekong River Delta during the dry season. ACIAR is supporting research to identify options for profitable crop diversification in the region. ACIAR project SLAM/2018/144

### Soil and Land Management

Sea-level rise and changes to seasonal rainfall patterns due to climate change result in decreased freshwater availability and higher saline intrusion of the Mekong River Delta during the dry season. To maintain productivity and profitability, farmers require better soil-management techniques and profitable alternative crops to grow in the dry season. A project led by Dr Jason Condon of Charles Sturt University is providing evidence-based options for profitable crop diversification in the rice production areas of the Mekong River Delta. The project aims to increase production and profitability through diversification of saline-affected rice-based cropping systems and create a capacity legacy to enable these systems to adapt to ongoing climate change.[26]

**Country Manager, Vietnam**
Ms Nguyen Thi Thanh An

**Research Program Managers**
Agribusiness: Mr Howard Hall
Climate Change: Dr Veronica Doerr
Fisheries: Prof Ann Fleming
Forestry: Dr Nora Devoe
Livestock Systems: Dr Anna Okello
Social Systems: Dr Clemens Grünbühel
Soil and Land Management: Dr James Quilty

See page 197 for contact details.

## Current and proposed projects

1. Improving smallholder farmer incomes through strategic market development in mango supply chains in southern Vietnam (AGB/2012/061)
2. Improving livelihoods in Myanmar and Vietnam through vegetable value chains (AGB/2014/035)
3. Establishing sustainable solutions to cassava diseases in mainland South-East Asia [Cambodia, Laos, Myanmar, Vietnam] (AGB/2018/172)
4. Increasing the sustainability, productivity and economic value of coffee and black pepper farming systems and value chains in the Central Highlands region of Vietnam (AGB/2018/175)
5. Planning and establishing a sustainable smallholder rice chain in the Mekong Delta [Vietnam] (AGB/2019/153)
6. Inclusive agriculture value chain financing [Indonesia, Vietnam] (AGB/2016/163)
7. Strengthening leadership, coordination and economic development of the temperate fruit industry in northern Vietnam (AGB/2018/171)
8. Research to support agricultural policy and strategic planning: research to assist the Vietnam Government with the formulation of the 2021–2030 Agricultural Development Strategy for Vietnam (AGB/2019/185)
9. Food loss in the catfish value chain of the Mekong River Basin (Food Loss Research Program) [Cambodia, Lao PDR, Vietnam] (CS/2020/209)
10. Improving greenhouse gas inventory systems to support the mitigation ambitions of Fiji and Vietnam [Fiji, Vietnam] (WAC/2019/150)
11. Increasing technical skills supporting community-based sea cucumber production in Vietnam and the Philippines (FIS/2016/122)
12. Half-pearl industry development in Tonga and Vietnam (FIS/2016/126)
13. Supporting grouper farming smallholders in Vietnam to improve their small-medium enterprise businesses by engaging with aquafeed companies to produce commercial feeds (FIS/2021/121)
14. Blue economy: valuing the carbon sequestration potential in oyster aquaculture [Vietnam] (FIS/2020/175)
15. Developing and promoting market-based agroforestry and forest rehabilitation options for northwest Vietnam (FST/2016/152)
16. Reducing forest biosecurity threats in South-East Asia [Indonesia, Vietnam] (FST/2018/179)
17. Building effective forest health and biosecurity networks in South-East Asia [Cambodia, Indonesia, Laos, Malaysia, Thailand, Vietnam] (FST/2020/123)
18. Intensification of beef cattle production in upland cropping systems in Northwest Vietnam (LPS/2015/037)
19. Safe Pork: market-based approaches to improving the safety of pork in Vietnam (LS/2016/143)
20. Goat production systems and marketing in Laos and Vietnam (LS/2017/034)
21. Asian chicken genetic gains: a platform for exploring, testing, delivering, and improving chickens for enhanced livelihood outcomes in South-East Asia [Cambodia, Myanmar, Vietnam] (LS/2019/142)
22. Rapid assessment of the impact of COVID-19 on wet market reforms: case studies from Vietnam, Kenya and the Philippines (COVID-19 impacts program) (LS/2020/204)
23. Vulnerability in the Anthropocene: a prospective analysis of the need for social protection (COVID-19 impacts program) [Myanmar, Vietnam] (LS/2020/206)
24. Understanding agrichemical use in South-East Asia agriculture [Laos, Vietnam] (SSS/2020/143)
25. Analysing gender transformative approaches to agricultural development with ethnic minority communities in Vietnam (SSS/2018/139)
26. Farmer options for crops under saline conditions in the Mekong River Delta, Vietnam (SLAM/2018/144)