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# **Evaluation of SLU's research and capacity development collaborations with Vietnam 1977–2018**

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**Publication year:** 2020, Uppsala

**Production:** SLU Global

**Layout:** SLU Repro

**Illustration:** <https://aseanup.com/free-maps-vietnam/> p18, Léonie Prevel, SLU Global p22.

**Cover photo:** Solveig Freudenthal (Ba Vi experimental station for forest tree improvement.)

**Photographer:** Duong Nguyen Khang p33, Le Duc Ngoan p46. All other photos: Solveig Freudenthal.

**Print:** SLU Repro

**ISBN (electronic version):** 978-91-576-9762-2

**ISBN (print version):** 978-91-576-9763-9

The views expressed in this report are those of the author and are not necessarily shared by the Swedish University of Agricultural Sciences (SLU).

# Preface

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It is clear that the transformative change envisioned in UN's Agenda 2030 will require broad and strong international partnerships to develop science and society through mutual learning, development of capacities and evidence-based knowledge. As one of the leading agricultural universities in the world, SLU continually strengthens its work through international collaborations. Our international engagement stretches over many decades, and all our faculties, in partnerships with actors across the globe.

This evaluation of SLU's collaborations with Vietnam was commissioned by SLU Global to increase SLU's learning from past experiences and to feed into our present and future international collaborations. SLU has been working together with Vietnamese actors for more than four decades on a wide range of collaborative programmes and projects and through different modalities and topics. These activities have helped us forge strong partnerships in research and education and have resulted in the establishment of an impressive group of alumni, who actively contribute to the development of research and higher education in Vietnam. Vietnam thus offers unique opportunities to better understand what characterises a successful collaboration and to learn how we can build on that knowledge to further strengthen international partnerships for the future.

We are deeply grateful to everyone in Vietnam and Sweden who has contributed to the richness of this study by generously sharing their views, experience, knowledge and advice, and to Solveig Freudenthal, who conducted the study.

*Sara Gräslund*  
Head of SLU Global

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## ABBREVIATIONS AND ACRONYMS

<b>AGU</b>	An Giang University
<b>BSc</b>	Bachelor of Science
<b>CTU</b>	Can Tho University
<b>FAO</b>	Food and Agriculture Organization of the United Nations
<b>GDP</b>	Gross Domestic Product
<b>GDPR</b>	General Data Protection Regulation
<b>HUAF</b>	Hue University of Agriculture and Forestry
<b>IFS</b>	International Foundation for Science
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>MARD</b>	Ministry of Agriculture and Rural Development
<b>MEKARN</b>	The Research Cooperation for Livestock-Based Sustainable Farming Systems in the Lower Mekong Basin
<b>MOET</b>	Ministry of Education and Training
<b>MOST</b>	Ministry of Science and Technology
<b>MSc</b>	Master of Science
<b>NIAS</b>	National Institute of Animal Sciences, (former National Institute of Animal Husbandry)
<b>NAFOSTED</b>	National Foundation for Science and Technology Development
<b>NISTPASS</b>	National Institute for Science and Technology, Policy and Strategy Studies
<b>NLU</b>	Nong Lam University, Ho Chi Minh City
<b>OECD</b>	Organisation for Economic Co-Operation and Development
<b>SAREC</b>	Swedish Agency for Research Cooperation
<b>Sida</b>	Swedish International Development Cooperation Agency
<b>SLU</b>	Swedish University of Agricultural Sciences
<b>VAFS</b>	Vietnamese Academy of Forestry Science
<b>VASS</b>	Vietnamese Academy of Social Science
<b>VAST</b>	Vietnamese Academy of Science and Technology
<b>VU</b>	Vinh University
<b>WTO</b>	World Trade Organization

# Executive summary

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The Swedish University of Agricultural Sciences' (SLU) contacts with Vietnam were initiated more than 35 years ago. Several departments and faculties at SLU have over the years been involved in the collaborations. This has mainly consisted of research capacity development programmes funded by Sida/SAREC aimed at strengthening individual and institutional research capacity in Vietnamese priority areas. The programmes have been part of the development agenda to reduce poverty and contribute to the socio-economic development of Vietnam. Smaller research projects undertaken by individual researchers at SLU in collaboration with individual researchers in Vietnam have also taken place with other funding. Some of these projects have also involved Swedish MSc and PhD students who have been able to conduct fieldwork in Vietnam. Many programmes have been large long-term projects involving several universities and research institutes in Vietnam and resulting in a large number of Vietnamese MSc and PhD graduates.

The purpose of the evaluation was to identify results and relevant approaches of SLU's research and capacity development collaborations with Vietnam. Focus has been on initiatives within sectors relevant to agriculture, rural development and forestry. Both qualitative and quantitative methods have been used in the study.

Forty-three Vietnamese researchers with a PhD from SLU were traced, out of probably 50–60 PhDs awarded within the studied programmes. Moreover, 36 MSc graduates were traced, out of probably more than one hundred MSc graduates. An online survey was sent to all 79 traced Vietnamese MSc and/or PhD graduates. Fifty-four individuals (68%) responded to the survey, with an equal number of women and men. Twenty-three of the respondents had a PhD from SLU.

Out of the 54 respondents, 38 individuals, with an equal number of women and men, were interviewed during a field visit to Vietnam in November–December 2019. During that field visit, many

universities and research institutes as well as field sites and demonstration farms were visited, from the north to the south of Vietnam. SLU staff and supervisors were also interviewed.

The study examines the career path of Vietnamese researchers who have completed their MSc and/or PhD in collaboration with SLU. The PhD training was mainly done according to the sandwich model, which meant that the research students, who were already supposed to be university staff at the start of the training, should define their research project in the Vietnamese context and only spend periods of time at SLU for coursework, analysis and writing up. All of the respondents live and work in Vietnam today, and the majority are employed at the same university or research institute where they were based as staff before their MSc and/or PhD training. The training was seen as staff development and the researchers were expected to move back to their home university after completing their degrees and to help develop their own institutions. They often had contracts with their home institution which stated that they had to come back for at least 3–5 years following graduation. It is nonetheless remarkable that the majority of the scientists, many of whom graduated 10–20 years ago, are still at the same university they were as students. All of them, both women and men, were given higher positions as they returned to their universities with a MSc or PhD degree. The findings indicate that the sandwich model of PhD training has been successful in terms of retaining staff at the home university, ensuring a high relevance of the training to the Vietnamese context and enabling the combination of studies with family life.

Moreover, the sandwich model of PhD training was also seen by the researchers as a way to form contacts with the international research community and to develop networks and other types of connections with researchers in countries outside Vietnam including Sweden. Employment outside academia has attracted only a few of the graduates who are working at government agencies

and ministries. They have also attained senior positions and are doing important work, often in the fields of policy and analysis. Men have in general reached higher positions than women, but there are also many women with high academic positions. The scientists are located at universities/institutes all over Vietnam, which reflects the history of the research collaborations. They have all continued with teaching and research. It is noteworthy that the majority of the respondents (46 individuals) reported that they thought that their current work to a large degree corresponds to their academic qualification.

The study has also examined capacity development at institutional/national level and can show that institutional capacity has been developed. As increasing numbers of researchers have reached senior positions at their departments and faculties, they have been able to develop research groups and conducive research environments for younger research students using the kind of teaching and research methods they learnt at SLU. More concretely, two new Master's programmes, one in rural development and one in sustainable livestock systems, with emphasis on animal production and management, have been developed in collaboration with SLU. When looking beyond collaborations with SLU both a new faculty on Extension and Rural Development and a new Centre for Climate Change Study in Central Vietnam have been established. The collaborations have led to large and strong research networks, both at national and international level and today Vietnamese research institutions have collaborations with many universities around the world.

Research publications and level of research uptake have been impressive. As this study stretches over 35 years it has not been possible to give a complete picture of the number of publications that have been generated through the collaborations. What we know is that some programmes like the MEKARN, especially in later years, had a high publication rate in international refereed journals. The majority of the respondents in the survey had published both in international and in national refereed journals, as well as in policy briefs, books, teaching materials, university reports and conference papers.

An important part of the study was to examine the knowledge (research findings) generated from the research collaborations and look at how and to what extent this knowledge has been used in society. Apart from a broader discussion on transfer of knowledge and research uptake, five cases (Cases 5–9) have been selected to illustrate how results have been used. The cases show that research has been carried out in fields and areas of importance to the socio-economic development of Vietnam and the reduction of poverty. For example, research within the *Sustainable Livestock-Based Farming Systems* programme has focused on the use of local by-products as new animal feed. There is evidence that these practices, introduced to small-scale farmers all over Vietnam, have reduced poverty in rural areas, enhanced food safety and improved the sustainability and income of livestock farming in Vietnam. At least 100,000 households are nowadays using various local by-products as animal feed. One of the interesting components within the *Farming Systems* programme is the development of biogas digesters. The biogas digesters use manure from pigs (or goats, cows or other animals) to produce cooking gas for family home consumption. The transferring of biogas technology to smallholder farms in Vietnam by the researchers has had an impressive impact. More than 100,000 units of polyethylene tube biodigesters were installed in small scale farms in Vietnam from 1992 to 2010. According to a World Bank report, the biodigesters have so far helped Vietnam reduce 1.3 million tonnes of carbon emissions annually. Another example is the programme in forestry research where scientists have developed fast-growing, economically valuable tree species, by setting up tree nurseries for breeding hybrids of acacia and eucalyptus and developing tissue culture technology. Wood of acacia hybrid generated from the project is now widely used for pulp and timber to produce furniture for domestic use and export. There are indications that the many research programmes are in some respects at the forefront regarding transforming agriculture and food systems into resilient systems with low emissions, including shifting diets and new protein sources.

In conclusion, the collaborations have been successful in terms of results generated and being used in rural areas of Vietnam. The study points to the importance of long-term, flexible research programmes open to new ideas. Research capacity has been developed and a large number of Vietnamese researchers have graduated with a MSc and/or PhD from SLU. The personalities of the Vietnamese and Swedish researchers involved, their communication skills, ability to inspire and mutual interest in research, have all played a part

in making these research collaborations successful. Key Vietnamese scientists have become change agents and developed new research groups and conducive research environments. There is a potential for future research collaborations, not with capacity development programmes, but with joint research projects between equal partners. Opportunities to build partnerships between researchers from Vietnam and SLU to work on important issues to reach the goals of Agenda 2030 are there.



# 1. Introduction

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The Swedish University of Agricultural Sciences (SLU), with its mission to develop knowledge and capacity for sustainable management and use of the biological natural resources through research, education and environmental monitoring, has an important role to play in the global implementation of Agenda 2030. SLU's international engagement goes back to its foundation in 1977 and is aligned with Sweden's Policy for Global Development. The long-term capacity development collaboration with Vietnam is one example of this.

The *specific objective* of this evaluation study is to identify results and relevant approaches of SLU's research and capacity development collaborations with Vietnam. Focus is on initiatives within the sectors relevant to agriculture, rural development, and forestry. The time scope for the study is 1977–2018.

At the end of the 1970s, SLU was already involved in a variety of collaborations with Vietnamese actors. Since then they have ranged from long-term engagements within the framework of larger Sida/SAREC supported collaborations, to smaller research projects undertaken by individual researchers in Sweden in collaboration with individual researchers in Vietnam. Data and information from the different collaborations were not readily available in one place and had to be tracked and gathered from a range of sources, including people, libraries and databases. The evaluation has analysed this data and information, including results and lessons learnt during the

collaborations. The primary intended users of the evaluation are the SLU management, SLU Global, and the wider SLU and Vietnamese research and higher education communities.

Chapter 2 describes the methods used in the study and Chapter 3 provides the general context with some basic facts on Vietnam today and an overview of higher education and research in Vietnam. Chapter 4 gives a brief account of SLU's research and capacity development collaborations with Vietnam over the years. The findings of the evaluation study are presented in Chapters 5–8. The potential for future collaborations is proposed in Chapter 9 while Chapter 10 provides a conclusion of the most important findings of the study and lessons learnt.

## Acknowledgement

Many people have contributed to this study. The author wishes to express her heartfelt gratitude to the many Vietnamese MSc and PhD graduates and members of Vietnamese research institutions, who generously contributed their time to complete the questionnaire, discussed research and even assisted in finding additional MSc and PhD graduates. Without their valuable contributions, as well as generous hospitality, this study would not have been possible. The author also wishes to thank SLU staff, SLU Library staff and SLU Global staff members who have contributed intellectually, discussing both the design of the study and giving feedback all along in the process of completing the report.

## 2. Methods used in the evaluation study

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Both quantitative and qualitative methods are used in this study in a complementary way to examine different types of evidence about the context, evolution and outcome of SLU's collaborations with Vietnam. The study was initiated by reading relevant and accessible Sida documentation about the history of more than 35 years of bilateral research cooperation between Vietnam and Sweden. Most of the bilateral Sida-financed research capacity development programmes have focused on PhD training, but when SLU developed capacity development programmes with Vietnam in the early 1980s there was a need to start the training at Master's level. It was thus decided to include both MSc graduates and PhD holders in this evaluation study. Research collaborations between SLU and Vietnam have changed over the years, faculties and departments have sometimes changed names or merged, and also many of the key individuals at SLU have now retired and the institutional memory has been lost. Tracing previous collaborations and people involved was therefore challenging, as there is no complete information on the number of Vietnamese MSc and PhD graduates who have been trained over the years within these large programmes. Nor is there any collected information on the smaller and individual research projects, involving SLU staff and individual Vietnamese MSc or PhD students. All this made tracing of individuals difficult and the work had to be pursued through obtaining information from different sources, much through personal connections and networks, which most likely means that not all MSc and PhD graduates have been traced.

The total data set consisted of 79 identified and traced Vietnamese MSc and PhD graduates who had received their degrees in collaboration

with SLU. Forty-three of these 79 individuals had a PhD degree from SLU. The remaining 36 individuals had a MSc from SLU and several had continued to a PhD at other universities. A web-based questionnaire<sup>1</sup> was developed to gather basic information about the MSc/PhD holders: age, gender, degree, career path after MSc/PhD and current position, but also on results generated through these collaborations and how and to what extent they have been used in society<sup>2</sup>.

The survey was piloted on a few researchers in Vietnam and Sweden. An introductory letter was sent out with the survey, explaining the purpose of the survey, also informing about the General Data Protection Regulation (GDPR) and that appropriate measures would be taken to protect the researchers' privacy and ensure that sensitive issues were addressed properly. The researchers (respondents) had to give their consent for SLU to collect and process personal data. The respondents were also informed that they had the right to withdraw this consent at any point.

Fieldwork was carried out both in Sweden and in Vietnam. In Sweden, interviews were held with former supervisors and project leaders at SLU. Interviews with Vietnamese researchers took place in Vietnam over a three-week period in November–December 2019 and were held with a range of academic staff at universities and research institutes in Hanoi, Hue, Ho Chi Minh City, Can Tho and An Giang. Thirty-eight individuals who had responded to the survey (19 women and 19 men) and had taken either a MSc or PhD or both in collaboration with SLU were interviewed. The interviewees were selected in order to be representative in terms of gender, age, university

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1. *The survey was developed in collaboration with a Stockholm-based company with wide experience of web-based surveys, Netigate.*
  2. *This evaluation study is different from a tracer study carried out in 2008–2009 that focused mainly on Vietnamese PhD holders and their career path (Freudenthal, 2009).*

or research institute affiliation. The interviews gave the interviewees a chance to expand on the questions asked in the survey and explore various topics in more depth. Field visits were made to Ba Vi experimental station for forest tree improvement, approximately 60 km northwest of Hanoi; to farms outside of Hue; to farms at Cu Chi district outside of Ho Chi Minh City (HCMC) and to chicken farms on the way to Can Tho. The field sites were visited to find out more about on-farm trials and the use of research findings. The transfer and uptake of new knowledge were discussed with both farmers and researchers. The interviews with representatives from both the Vietnamese universities and SLU cannot claim to represent the views of these large universities, since they were only carried out with a few individuals.

However, the added information and perceptions on how the collaborations have worked over the years were found to be valuable in the analysis of the data.

There is no complete information on the individuals that have been involved in the collaborations. It is therefore not possible to give a complete picture of the number of publications that have been generated through these collaborations. Focus has been on illustrating how the knowledge generated has been communicated and used in various forms. Information about publications was mainly gathered via the survey. However, this data has been complemented with some publication data available on collaborations between researchers affiliated to SLU and researchers in Vietnam.

# 3. Vietnam – general context

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## Some basic facts<sup>3</sup>

The Socialist Republic of Vietnam is densely populated with an area about three quarters the size of Sweden. In 1986, the population was around 60 million and in 2019, the population had reached 98 million. About 65 per cent of the population lives in rural areas and around 70 per cent of the population is under 35 years of age.

The transition from a very poor agrarian state pre 1980s to one of rapid economic development has been a result largely of the country's integration into regional markets. The Doi Moi (renovation) policy initiated by the Vietnamese Government in 1986 led to the beginning of economic reforms

and since then Vietnam has made considerable progress in moving from a planned economy to a market economy. This has led to increasing foreign investment, rapid economic growth and one of the best records of any low-income country in reducing poverty. In a short period of time Vietnam has become one of the world's largest exporters of rice, coffee, rubber, seafood, electronics, garments and footwear and in 2017 the country had a per capita GDP of 6,900 USD and an impressive economic growth of 6.8 per cent per year. Vietnam joined the WTO (World Trade Organization) in 2007 and concluded free trade agreements in 2015–2016 with EU, Korea and AFTA (ASEAN Free Trade Area).



*Since 1980s, Vietnam has developed from a poor agrarian state to a country with rapid economic growth and a high level of social development.*

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3. The primary source for all data in this paragraph is *The World Bank (2019)*

The country has been successful in achieving a high level of social development with an adult literacy rate of 95 per cent and a life expectancy of 74 years. The reduction in poverty levels has been dramatic. In 1994, the number of families below the poverty line was about 58 per cent. This had declined to about 16 per cent in 2006 and the extreme poverty rate in 2018 is estimated to have declined to under 3 per cent. The provision of basic services in terms of education and health has improved significantly. Gender gaps have narrowed and there are now more female students attending school than male students at the upper secondary and tertiary education levels. From 1990 to 2015, the maternal mortality rate fell from 233 to 58.3 deaths per 100,000 live births and infant mortality dropped from 44 deaths per 1000 live births to 15, with no difference between male and female infants. Rural access to clean water has risen from 17 per cent of households in 1993 to 70 per cent in 2016, and in 2016, 99 per cent of the population used electricity as their main source of lighting, whereas in 1993 only 14 per cent did (The World Bank 2019).

#### **Historical overview of higher education and research in Vietnam<sup>4</sup>**

The history of the Vietnamese system for research and higher education is very old and complex. State-sponsored formal education in China and Vietnam can be traced back to the year AD 622 and the so-called Temple of Literature was built in AD 1070. Confucian academies were first established in the 11<sup>th</sup> century and played an important role in Vietnamese society for almost 900 years. They provided an educated class from which mandarins responsible for the country's governance could be selected. They also imbued much of the country's population with respect for intellectual tradition and certain methods of learning.

The basis for scientific research was laid during the French era (1858–1954). Many noted French scientists were working in Vietnam and cooperative efforts between French and Vietnamese scientists produced much of what today is the basis for research in Vietnam. The French colonial administration founded the University of Indochina in

Hanoi in 1906, with faculties in medicine, pharmacology, law and the humanities. Throughout the education system, all training was in French. The year 1954 marked the end of French colonialism in northern Vietnam and the country was temporarily divided into North and South. It took more than 20 years before the country was united again in 1975.

The division of the country led to two separate systems of higher education and research. In the North, the Democratic Republic of Vietnam under Ho Chi Minh developed a higher education system based on a Soviet model, which meant that universities were to be in charge of teaching higher education and research was to be carried out at research institutes. Many research institutes were mono disciplinary and affiliated to line ministries to conduct research commissioned by the ministries. In line with the Soviet model, the education in the North was to be open for everyone, not just for the elite and it should have a technical focus in order to contribute to the economic growth of the country.

In the South, the Republic of Vietnam developed a system of higher education that maintained close ties with the French system of education and research and later with the American system. After the reunification of the country in 1975, the government was faced with the task of reunifying the two systems of higher education and research. Vietnam mainly collaborated with the Soviet Union and Eastern European countries and many Vietnamese scientists were sent to those countries for higher education and research. The Soviet model was adopted nationally. Private-sector institutions in the South were abolished and discipline-specific research institutes, detached completely from the higher education sector were established across the country.

The Doi Moi (renovation) policy introduced by the Vietnamese Government in 1986 marks a huge change in Vietnamese history as the country began to move from a planned economy to a market economy. The *open-door policy* initiated in the late 1980s further opened the country for for-

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4. This section is based on: Anh & Hayden (2017), Zink (2008) and Göhl & Ngyen (1990)



*State-sponsored formal education in China and Vietnam can be traced back to the year AD 622 and the so-called Temple of Literature was built in AD 1070.*

eign investments. For Vietnamese scientists in the South, the *open-door policy* meant that they were allowed to study abroad in Western countries.

It has taken time to reunify the two systems of higher education and research but also to develop the education system in line with Doi Moi and the *open-door policy*. Reform of the higher education sector began in the early 1990s with a process to move away from the Soviet model and give the universities the right to engage in research and research training. However, it would take more than ten years before a clear majority of Vietnam's universities could claim to be research-performing institutions. The next significant development was the adoption in 2005 of the Higher Education Reform Agenda (HERA), a framework for reform of the sector through to 2020. HERA proposed several changes among which was a commitment to remove line-ministries' control of public higher education institutions, the creation of research-

oriented universities and a significant increase in the proportion of academic staff members holding a PhD qualification. HERA also stressed the need for a stronger commitment to research and internationalisation in public universities.

Although teaching and education still dominate the activities of universities, research has become more common. Moreover, the strong element of detailed central planning regarding research has been abandoned. Research institutes have received increasing autonomy and are allowed to engage in commercial and contract-based relationships. In 2018, according to the Ministry of Education and Training, there were 171 public universities, 60 private universities, and 41 research institutes both governmental and non-governmental, and 1,700,000 students were enrolled at undergraduate level, about 107,000 at Master's level and 15,000 at PhD level (Tu, 2018).

## 4. SLU – Vietnam research and capacity development collaborations

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The history of SLU's several collaborations with Vietnam over time has not been easy to trace. The early history is especially hard to find. This brief account is based on interviews with SLU staff or former SLU staff, interviews with Vietnamese researchers and various publications.

What we do know is that Sweden was one of the first countries to establish contacts with the Democratic Republic of Vietnam – as North Vietnam was called – as far back as 1969, when the country was at war. The *Bai Bang Pulp and Paper Mill Project* originated in the solidarity movement, which arose in reaction to the Vietnam War (or the “American War” as the Vietnamese say). The planning of the project started in the early 1970s, and while Swedish forestry experts were trying to survey Vietnamese forests, American B-52 bombers were flying overhead, discharging their devastating cargo. Construction for the paper mill took place in the second half of the 1970s, at the time when Vietnam was trying to recover from the war, while simultaneously heading into another violent conflict with Cambodia and China. The *Bai Bang Project* consisted of an industrial component and a forestry component. During the early 1980s around 650 expatriates, mostly Swedes, worked and lived in the Bai Bang area. Some of the forestry experts were educated at SLU<sup>5</sup> and were hired by some of the consultancy companies involved in the forestry component of the project (Jerve et al., 1999).

This forestry component triggered a deeper and broader Swedish involvement in the Vietnamese forest sector parallel to and beyond the *Bai Bang Project* through several smaller social forestry-oriented projects. In the latter half of the 1980s, some of these projects were in cooperation with FAO, such as the *Forest, Trees and People* programme. This was a global programme and Vietnam was one of the participating countries between 1986 and 1989<sup>6</sup> (Lindahl et al., 2003).

The first contact between Vietnam and the Swedish Agency for Research Cooperation with developing countries (SAREC) was established in early 1976 when the possibilities of initiating a research assistance programme were explored. Vietnam's university system was then in a poor condition due to the war and had at that time limited exposure to scientific progress in countries outside the Soviet bloc and China. International exchange was considered very important to Vietnamese scientists. However, due to lack of experience with these types of research collaborations it was difficult for both Vietnam's State Commission for Science and Technology (SCST) and for SAREC to formulate objectives and procedures. The point of departure for SAREC was its general objective of strengthening research capacity in low-income countries. After a couple of years of different attempts to find meaningful ways to support research, the SAREC board decided that support to Vietnam should be based on research cooperation between Vietnamese and Swedish research institutes/universities (Göhl & Nguyen, 1990).

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5. *The Swedish Agricultural, Forestry and Veterinary Colleges merged in 1977 and formed the Swedish University of Agricultural Sciences*

6. *In the mid 1980s, the Tropical Forestry Action Plan was another global initiative to reduce deforestation initiated by the World Bank, UNDP, FAO and World Resources Institute. Vietnam became part of this programme from 1989 with Swedish support (Lindahl et al., 2003).*

SAREC's general approach to research cooperation in low-income countries has been to support one single national state university in order to strengthen research capacity at that university which would then gain essential analytical competence and produce high quality research. When planning for support to Vietnam, SAREC decided that support should be given to research institutes/universities not only in the North but also in the South. Preferably universities should be supported in an attempt to get away from the Soviet model of only conducting research at institutes belonging to various line-ministries. However, it was not until the middle of the 1980s and the *open-door policy* that universities in the South were allowed to have contact with universities outside the Soviet bloc.

One of the first research projects that SLU was involved in was a research project on *Reforestation of the Vietnamese Highlands*, initiated in 1986 with support from SAREC<sup>7</sup>. The Research Centre for Forest Tree Improvement at the Forestry Research Institute, under the Ministry of Agriculture and Rural Development (MARD) was the Vietnamese partner in this project and SLU in collaboration with the Forest Research Institute of Sweden (Skogforsk) were the Swedish partners. This project was motivated by the alarming decrease in forest coverage due among other things to the war, but also using every piece of land to combat food insecurity, which led to serious erosion. The objectives of the project were to contribute to efficient reforestation with fast-growing, economically valuable tree species, by setting up tree nurseries for breeding hybrids and developing tissue culture technology. In later years the programme was called the *Forest Tree Improvement Project* and the emphasis was also put on capacity development and training of MSc and PhD students. The project ended in 2011.

One bilateral research project based in the south of Vietnam was the project *Research on Utilization of Acid Soils*, which was initiated in 1986 at

Can Tho University in the Mekong Delta<sup>8</sup>. The Department of Soil Science at Can Tho University and the Department of Soil Sciences (now Soil and Environment) at SLU were collaborating partners. This project was motivated by large mangrove areas in the Mekong Delta being devastated



Figure 1. Map of Vietnam and location of SLU's key university/institute partners.

7. There has been Swedish support to many forestry research projects over the years, in this report we use the title mentioned in an evaluation made by: Annerstedt & Liyanage (2008).

8. A research preparation was initiated (Management of Acid Sulphate Soils in Vietnam; Can Tho University) already in 1984.

due to the war. These areas were rich in sulphidic sediments that turned very acidic when they were drained for cultivation. This resulted in the spreading of acid water to the fertile land nearby. Research concentrated on finding appropriate crops and suitable management practices and farming systems for this land. Master's and PhD students were trained in collaboration with SLU from 1993. The project ended in 1999, but was followed by Sida (u-forsk) funded projects involving Swedish PhD students as well as students from Can Tho coming to SLU for MSc and PhD on Vietnamese government fellowships and other funding sources. At least one professor from SLU, involved at that time, is still engaged in research in Vietnam and in supervising Vietnamese MSc and PhD students with funding from other sources (VR, Formas, etc.).

SLU has over the years also been involved in and conducted shorter courses on specific topics such as *The SIDA International Postgraduate Course on Veterinary Pathology (SIPAT)* and *The SIDA International Postgraduate Course on Animal Reproduction (SIPAR)*. These courses seem to have been carried out from the early 1980s to the late 1990s. According to one Vietnamese researcher interviewed during the field visit to Vietnam, the director of SIPAT went to Vietnam looking for participants for his course and those who were accepted went to SLU to attend the course. Completing the course with good marks could later on lead to PhD training at SLU, but since there was no Sida funding for continued studies in Veterinary pathology, grants had to be found elsewhere, sometimes from the International Foundation for Science (IFS).

The programme *Sustainable Livestock-Based Farming Systems Research* was initiated in 1989 and was designed to develop research capacity through improvement of facilities, research collaboration and research training at four research institutes/universities in Vietnam<sup>9</sup> situated in the north, middle and the south in collaboration with SLU (Department of Animal Nutrition and Manage-

ment). A professor from SLU (now retired) said in an interview that he was asked by SAREC in 1988 to travel to Vietnam and find out if there was an interest in a livestock-based research programme. When arriving in Vietnam he found that the needs were enormous, there were no books in the research libraries and the laboratories were in a poor condition, but the researchers and staff at the universities were eager and interested in initiating a collaboration with SLU. Originally, the focus was on support to laboratories, libraries and equipment. Soon the need to support MSc training became apparent, since there was no equivalent Master's programme in Vietnam at that time. So, from 1992 to the late 1990s, an international Master's programme in Tropical Animal Production at SLU began to accept students from Vietnam but also from East Africa and Latin America and from 1994 onwards students were accepted from Cambodia, Laos and Thailand. The programme was first financed by SAREC (1992–1994) and later on by Sida<sup>10</sup> from 1995. On the basis of a sustainable production systems approach, different technologies suitable for resource poor farmers in different regions had been developed and were taught in this programme.

The objective of the *Sustainable Livestock-Based Farming Systems Research* programme was to build capacity to develop models on how to increase productivity and efficiency of livestock production using locally available feed from integrated, sustainable farming systems within the resources of small farms. The programme kept a holistic perspective on farming and production and aimed to transfer new knowledge to the farmers. The students spent part of their time in Sweden taking graduate courses and part of their time in Vietnam carrying out farm-based research. English was a problem during the first years of the collaboration and the students had to work hard to learn English at the same time as they had to learn about sustainable tropical livestock systems. In 1996, some of the MSc graduates were able to continue to the PhD level. The training model for the PhD studies was the so-called “sandwich model”, which meant

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9. National Institute of Animal Husbandry (NIAH) in Hanoi, Hue University of Agriculture and Forestry (HUAF), The University of Agriculture and Forestry in Ho Chi Minh City (UAF-HCMC) and Can Tho University (CTU).

10. SAREC was incorporated into Sida in 1995.

that the research students who were supposed to be university staff already, should maintain their position at their home institution, define their research project in that context and spend only periods of time at SLU for coursework, analysis and write up. By the time the *Farming Systems* programme ended in 2003, 14 Vietnamese research students had been awarded a PhD from SLU.

In 2000, the researchers within the *Sustainable Livestock-Based Farming Systems Research* programme saw an opportunity to expand the research to include the whole region of the Lower Mekong Basin (Cambodia, Laos, Thailand and Vietnam). It was assumed that such an expansion would benefit all participating countries as each research centre/university could contribute as well as gain from such a network. The idea was supported by the fact that Sida's country strategies for the region at that time all emphasised a change in focus towards research and assistance to the rural poor. The network, funded by Sida, was called *The Research Cooperation for Livestock-Based Sustainable Farming Systems in the Lower Mekong Basin* (MEKARN) and began to operate in 2001.

The objectives of the MEKARN programme were to strengthen cooperation in research, training and dissemination of information in the Lower Mekong Basin; exchange ideas, experience and information between researchers in the region and promote livestock as the epicentre of sustainable farming systems. The capacity objectives were to train junior researchers through short courses, MSc and PhD training and providing small grants for primarily on-farm research in accordance with the IFS model<sup>11</sup>. The training courses should centre on knowledge and technologies necessary to further develop sustainable agriculture in the region e.g. diagnostic methods, biological basis for livestock and plant productions, computer skills, biometrics, research methodology, feed evaluation, production systems, environment interactions, aquaculture, agro-forestry and farming systems methodology. A new international Master's programme in Animal Production was developed and welcomed a first batch of MSc students in 2010. Different parts of

this programme were taught in Cambodia, Laos, Thailand and Vietnam. Since the MEKARN project started, 32 students have received PhD degrees and 63 students have received MSc degrees, all awarded at SLU. The programme ended in 2018. However, the MEKARN network is still very active. The researchers who have taken a Master's degree or received some small grants from MEKARN are still in touch with each other, organise meetings and conferences and talk about themselves as belonging to the MEKARN family.

A Sida-financed bilateral project *Study on Plant Disease Control*, was initiated in 2000 and was a collaboration between the Institute of Agricultural Genetics under the Vietnamese Academy of Agricultural Sciences (VAAS) within the Ministry of Agriculture and Rural Development (MARD) in Hanoi and the Department of Plant Pathology at SLU. The objective of the project was to strengthen the capacity for national plant pathology research in Vietnam. The project was relevant to crop improvement programmes, which have followed and catered for testing of bacterial, fungal and viral resistance. From 2004, the project changed name to *Non-chemical Control of Coffee production* since this was a prioritised area for research in Vietnam. The purpose of this specific project was to establish capacity and skills in plant pathology and increase the knowledge on specific fungi and the diseases they cause. This knowledge was considered very valuable for resistance breeding and for forming disease management strategies. The project included the training of one Vietnamese MSc and one Vietnamese PhD. The project ended in 2011.

A project on the *Use of Biotechnology in Oil Crops research* was initiated in 2004 at Nong Lam University (NLU), which is the agricultural university in Ho Chi Minh City, with support from the Department of Plant Breeding and Biotechnology at SLU in Alnarp. During the first phase, the project focused on strengthening the research environment at NLU by supporting two students during their PhD studies in plant oil research at SLU and allowing short research visits for the NLU Master's students at SLU. The second phase

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11. The objective of IFS is to enhance the capacity of early career scientists through small research grants.

was focused on plant biotechnology research and the improvement and diversifying of oil crops. The aim was also to further develop the knowledge on biosafety risk assessment by developing a biosafety training course (curricula, modules etc.). The project ended in 2011.

During the final years of Sida support (2004–2011), the bilateral research programmes between Vietnam and Sweden were clustered into three sub-programmes: Health, Biotechnology and Rural Development. The largest SLU collaborative project with Vietnam was the RDViet programme within the sub-programme Rural Development, but there were also SLU-Vietnam projects within the Biotechnology sub-programme. *The Forest Tree Improvement* project which had already been initiated in 1986 became part of the Biotechnology sub-programme in 2004, as did the *Plant Disease Control* programme and the programme on the *Use of Biotechnology in Oil Crops* research.

The *Sustainable Rural Development Programme* or RDViet programme was initiated in 2004 and had a broad interdisciplinary approach. This programme was based at Hue University for Agriculture and Forestry (HUAF) with SLU's Department of Urban and Rural Development as the Swedish collaborating partner. At the start of the project there was no higher education in the subject of rural development in Vietnam. This research and capacity developing programme thus combined approaches in social and natural

sciences, system analysis, natural resources management and rural livelihood analysis. The main objective was to further develop existing research and teaching capacity at seven partner universities<sup>12</sup> in Vietnam, to enable them to carry out multidisciplinary research to promote development and reduce poverty in rural areas. The capacity development objective was to strengthen existing competence through creating a platform and network for cooperation between different universities and institutions bringing together experience from different disciplines and to train staff in rural development at Master's and PhD level.

The seven Vietnamese partner universities sent their staff to a Hue-based Masters' programme in *Rural Development* that had been jointly developed by SLU and HUAF and was taught by staff from SLU and Vietnam. Three rounds of the Master's course were held producing 28 Vietnamese Master's graduates who went back to their universities and research institutions afterwards and developed these institutions to include training in Rural Development. The Vietnamese coordinator of the *Rural Development* programme was a former PhD student from the *Farming Systems* programme, now a PhD holder, professor and vice-rector at the University. The programme ended in 2011, but also here there is still a large group of Vietnamese researchers who talk of themselves as the RDViet family or the SLU family and have developed research networks, which are still active.

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12. Hue University of Agriculture Science (HUAF); Vietnam National University of Agriculture (VNUA); Nong Lam University (NLU), Vinh University (VU); Can Tho University (CTU); An Giang University (AGU); National Institute of Animal Sciences (NIAS) and Institute of Policies and Strategies of Agriculture and Rural Development, Ministry of Agriculture (MARD).

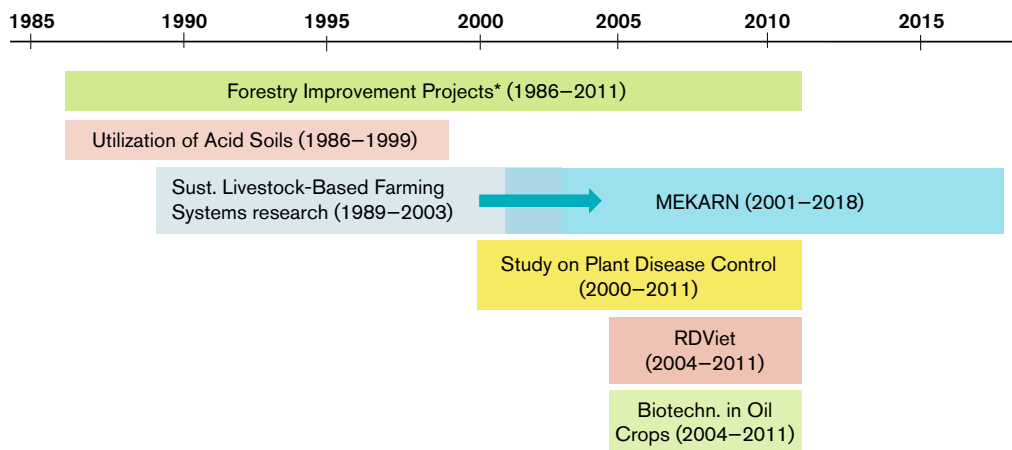


Figure 2. Some of the larger SLU-Vietnam collaborative programmes/projects over time.  
 \*This programme has changed name several times, but it has continually worked with forestry.

### Summing up

The majority of the 35 years of collaborations between SLU and Vietnam have consisted of bilateral research capacity development programmes, financed by Sida/SAREC. The main aim of these programmes has been to strengthen individual and institutional research capacity in Vietnamese priority areas and they have been part of the development agenda to reduce poverty and contribute to the socio-economic development of Vietnam. Many of these programmes have been long-term and have involved several universities and research institutes in Vietnam as well as several departments at SLU and have resulted in a large number of Vietnamese Master's and PhD graduates. The bilateral research projects ended in 2011 and the regional MEKARN programme in 2018. All MSc and PhD degrees from 1992 until 2018 were awarded by SLU.

It is also important to mention another type of research collaboration between SLU and Vietnam, which has not been part of the bilateral programmes funded by Sida/SAREC. These collaborations are individual projects involving a few supervisors from SLU and a few Master's and PhD students from universities in Vietnam. The Vietnamese students are in these cases at SLU on Vietnamese government scholarships or with other funding. The SLU side is funded by the Swedish Research Council, Research Links,

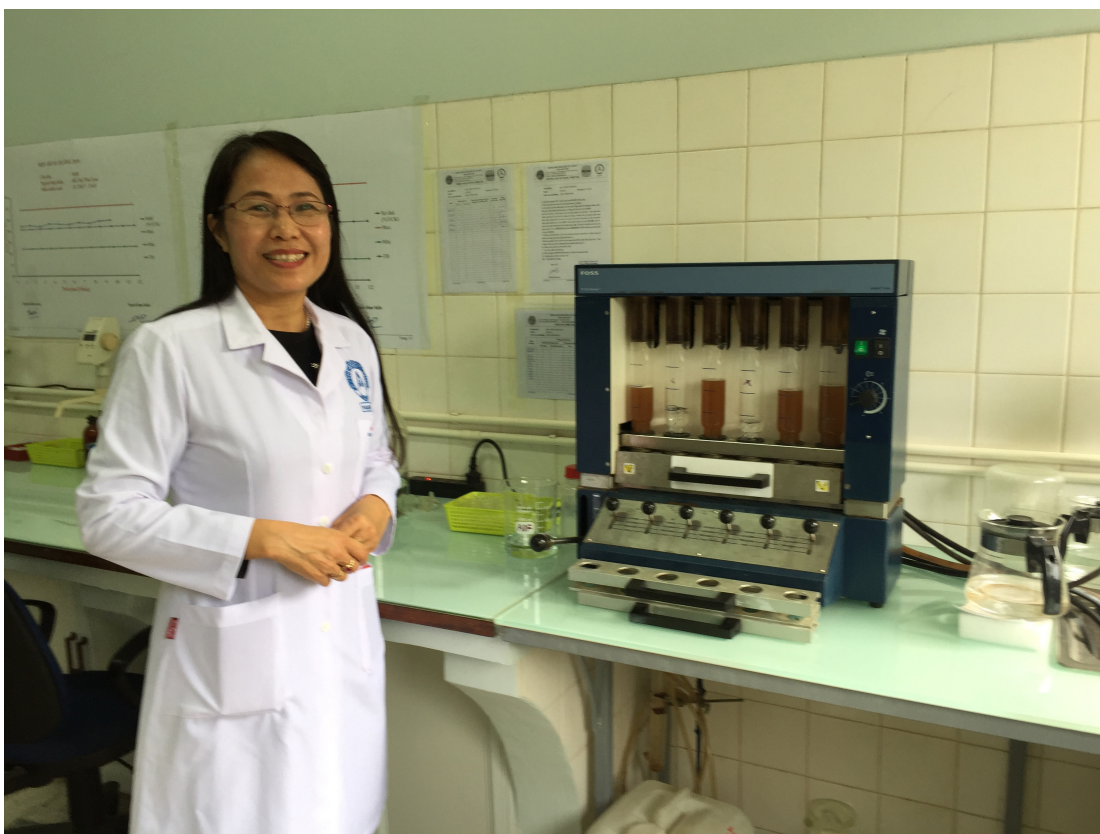
Formas, EU or other funding agencies. These collaborations still exist today and can continue to exist as long as there is funding and mutual interest in the collaboration.

A history of the SLU-Vietnam collaborations is not complete without saying a few words about the numerous Swedish undergraduate and graduate students who have done fieldwork in Vietnam and have benefitted from collaborations with Vietnamese researchers and their universities. Right after the war in 1975 many young Swedish people wanted to visit Vietnam, many of these had been part of the Swedish solidarity movement. Some of them found employment within the various forestry projects surrounding the Bai Bang paper mill, and this led to a life-long interest and commitment to work for development and research in Vietnam. During the 1980s and 1990s, the International Rural Development Centre (IRDC) at SLU played an important role in creating an interest in young Swedish students to get in touch with low-income countries around the world, including Vietnam.

Swedish SLU Master's students have for many years been able to get grants through the Sida-financed *Minor Field Studies* programme (MFS) and have spent some months in Vietnam for their Master's thesis. Several Swedish PhD students

from SLU have, with the help of their supervisors, been able to do research and fieldwork in Vietnam. One effect of the involvement of SLU's Department of Animal Nutrition and Management in the Vietnam livestock-related projects over the years has been that several of the Swedish academic and technical staff (lab. technicians), with no previous experience, became so interested in tropical agriculture after visiting Vietnam to

organise MSc courses and give lectures, that they later became the main or co-supervisors of MSc and PhD students in the region. The competences built because of these collaborations have made it possible for SLU staff to teach about livestock-based farming systems in many low-income countries with great credibility and, according to some SLU researchers, it has greatly enriched their work as researchers and teachers.



*The majority of collaborations have been bilateral research capacity development programmes financed by Sida/SAREC, aiming to strengthen individual and institutional research in Vietnam. Here, Ms Duong Thi Thu Anh (Head of Feed and Animal Product Analysis, NIAS) who collaborated with SLU within the MEKARN programme, is making feed analysis in the lab.*

# 5. Capacity development at individual level

This chapter presents and discusses the capacity that the collaborations have contributed to at the individual level based on the survey and interviews. It examines the career path of Vietnamese researchers who have completed their MSc and/or PhD degrees.

### Characteristics of the MSc and/or PhD graduates and geographic distribution

The survey was sent to 79 identified and traced MSc and/or PhD graduates (39 women and 40 men). The scientists' university affiliation and geographic distribution reflect the history of the research collaborations (Figure 3). As mentioned earlier, the unification of North and South

Vietnam in 1976 made Sweden eager to not just support one university in Vietnam, but several universities/research institutes both in the north, the middle and the south of the country. The four Vietnamese universities/institutes being part of the collaborations with SLU from the early days are Can Tho University (CTU), Nong Lam University in Ho Chi Minh City (NLU), Hue University of Agriculture and Forestry (HUAF), and the National Institute of Animal Sciences (NIAS) in Hanoi. The collaboration with the Forestry researchers also goes back a long way and is now under the Vietnamese Academy of Forest Science (VAFS). An Giang university (AGU) became a partner university with the RDViet programme.

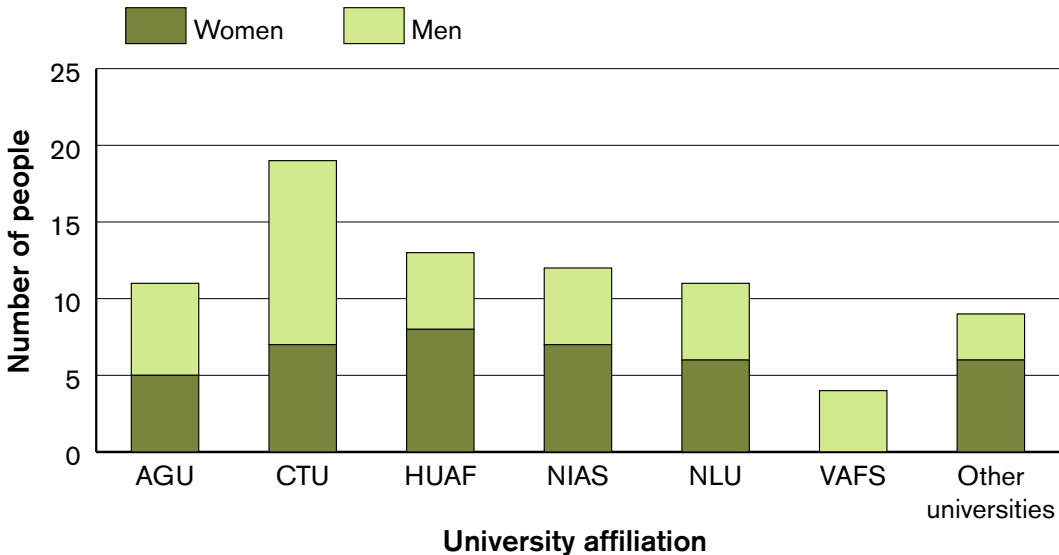


Figure 3. University affiliation of 79 vietnamese students (39 women and 40 men) who carried out an MSc and/or PhD at SLU. The universities are: An Giang university (AGU), Can Tho University (CTU), Hue University of Agriculture and Forestry (HUAF), National Institute of Animal Sciences (NIAS), Nong Lam University (NLU) and Vietnamese Academy of Forest Science (VAFS).

### Number of respondents

Fifty-four individuals (68 per cent) responded to the survey, with an equal number of women and men. All of the 54 responding individuals live and work in Vietnam today, and the majority are employed at the same universities or research institutes as they were at the onset of their academic career. The number of responses to each question varies to a small extent, since some individuals did not answer all questions. In addition to the survey, 38 individuals who had responded to the survey were interviewed during the field visit to Vietnam (19 women and 19 men). Their university affiliation corresponds with that of the respondents to the survey.

### Age distribution

The largest group of both women and men responding to the survey are in the age span of 41–45 years old, but there are also many between the age of 36–40 (Figure 4). This means that they are right in the middle of their career and not close to retirement age. Retirement age for women is 55 and 60 for men.<sup>13</sup>

### MSc training

The modalities of the Master’s courses have changed over the years. Originally, in 1992 the international Master’s courses were held at SLU in Sweden. With the RDViet programme established in 2004, the Master’s courses moved to Vietnam and were held by SLU teachers, in cooperation with Vietnamese teachers. With MEKARN (initiated in 2001), the Master’s programmes were held in several Asian countries: Cambodia, Laos, Thailand and Vietnam, but the MSc certificates were issued at SLU.

One woman who had been part of the MEKARN programme said:

*“I got involved in the Master’s programme through MEKARN. In 2001 Bo Göhl and Brian Ogle came to Hue to select candidates for the Master’s programme and they selected two people. Me and another person. So, from 2001–2003 I worked on my Master’s. Being within the MEKARN programme we studied in many countries: Thailand, Cambodia, Laos and Vietnam. Through these courses in the various countries we got knowledge of many countries and problems. The evaluation of the Master’s thesis took place at Nong Lam University and Swedish professors from SLU were*

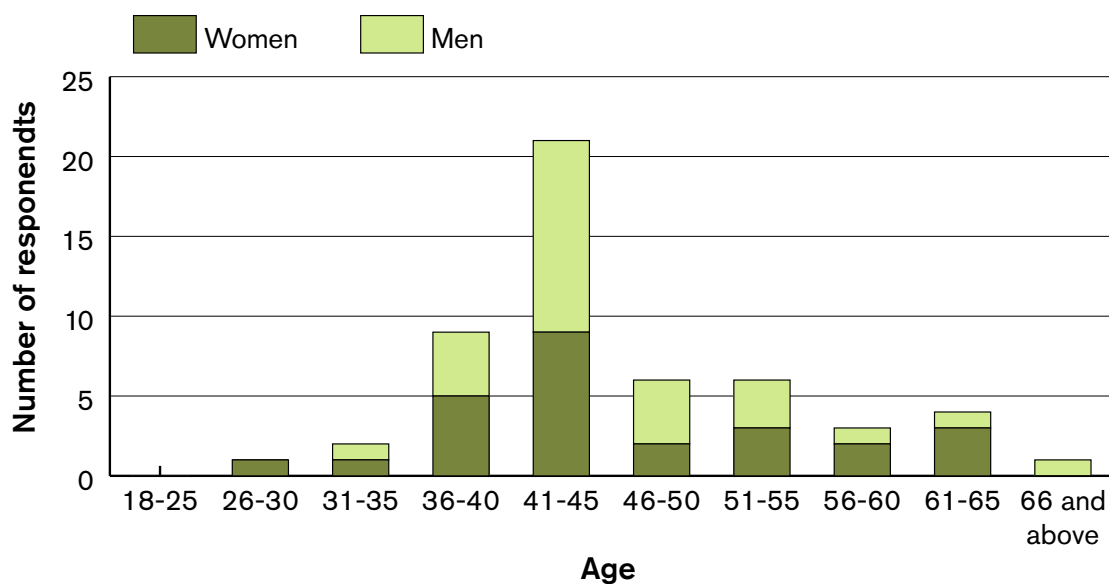


Figure 4. Age distribution of the respondents (26 women and 27 men).

13. From 2021 the retirement age for women will be 60 and for men 62.

supposed to carry out the evaluation, but because of some virus at that time the Swedish professor could not come and the evaluation was done with Vietnamese professors. But then we got our Master's certificate from SLU."

### **PhD training - Sandwich model**

Of the 54 respondents to the survey, 44 had continued to a PhD. Of these individuals, 23 were enrolled at SLU and reported that their training was organised according to the sandwich model. The training started with a period lasting from a few months up to a year, where the Vietnamese students followed basic courses at SLU. They then developed a research proposal. After that, the students returned to Vietnam and resumed work/studies at the institute/university they came from. They gathered data for thesis work, and prepared drafts. When the supervisory group recognised that the work was close to completion, the students returned to SLU, where they finalised the research and defended their thesis. Sida has never given instructions regarding the format of the sandwich model training in terms of duration of stay for PhD students in Sweden or exactly how the collaboration between the Swedish university and the Vietnamese university should be organised. Thus, there have been variations in terms of times and length of students' stay in Sweden (from a couple of weeks to several months), structure of the studies and roles of Swedish and Vietnamese supervisors.

The respondents to the survey expressed that the periods at SLU during their MSc and/or PhD training had been very good. *"During my PhD study I learnt many things from my supervisors, teachers, staff and students at SLU, not only in my field but also about Swedish life and culture"*, said one person. Another said: *"What I learnt from SLU is very useful for my work today, and for my life, it opened my mind. I am very proud of graduating with a PhD from SLU. Sweden is my second country"*.

The sandwich model training was discussed both in the interviews and in the survey. Advantages included the students being able to retain the position they had at their Vietnamese university or research institute before they began their PhD training.

One man said: *"The sandwich model is very good since you focus on problems in your own country and you are still employed at your institute or university and then you learn new techniques and methodologies at SLU, Sweden. I learned to be analytic, scientific and how to write academic papers at SLU – and now I teach young Vietnamese PhD students how to write academic papers."*

More women than men reported that one of the biggest advantages with the sandwich model was that they could take care of children and maintain family relationships, but even men appreciated not being away from their families for too long. One woman said: *"We were a little bit older than younger students when we studied for our PhDs so we had families and children already, so for us it was very suitable not to be away from home for too long"*.

One question in the survey was: *"How did you experience the periods of training in relation to the following aspects, periods of research training, supervision, resources for research (equipment and time), research networks at SLU and home university?"* The answers reflected that most respondents were very satisfied with the training both at SLU and at their home university. There was not much difference in the answers except regarding resources for research, which was scored higher at SLU.

The findings indicate that the sandwich model of PhD training has been successful in terms of retaining staff at the home university. The training was seen as staff development and the researchers were expected to move back to their home university after completing their degrees and to develop their own institutions. They often had contracts with their home institution that stated that they had to come back for at least 3–5 years. It was also seen by several individuals as a way to obtain contacts with the international research community and to develop networks and other types of connections with researchers in other countries including Sweden. It was said that to get a PhD degree from a prestigious and renowned Swedish university gave the researchers a high status in Vietnam. The researchers saw themselves, and were often seen by other researchers, as role models to follow.

### Research topics – applied research

The objectives of the Vietnam-Sweden research cooperation have, over the years, been to strengthen research capacity in research areas prioritised by Vietnam. The programmes and projects within the fields of agriculture, forestry and rural development have all had a very strong focus on applied research even when the objective has been capacity development and PhD training. During interviews, the question of choice of research topics and who decided on research topics came up. Several of the interviewees responded that supervisors at SLU wanted the PhD students to choose their own research topic. This was a completely new situation for them. One respondent expressed it: *“The first time we went to SLU to develop our research proposal the supervisors wanted us to develop it ourselves and do it by ourselves. This was very different from the Vietnamese system where the professors tell you what to do. The professors at SLU want the students to be independent and develop their research topics on their own”*.

Another respondent said: *“The teachers at SLU encourage the students to reflect and discuss and come up with their own ideas for what to study and how to solve problems, not just listen to what the professor is saying.”*

However, the influence of SLU can also be seen in the choice of research topics. PhD training could only take place in fields where there were Swedish expertise and available supervisors. Swedish

priorities for development cooperation can also be seen in the choice of research topics and how research is supposed to be conducted. The supervisors wanted the students to formulate their own research problem, but within the fields where they – the supervisors – had expertise and in areas that could lead to reduced poverty in Vietnam. The use of research results in society will be dealt with at length later in the report.

### Year of PhD graduation by gender

Thirty-nine individuals responded to the question: *“Year of graduation, PhD degree”* (Figure 5). The majority of those who graduated after 2011 have not graduated in Sweden but in Vietnam or in other countries.

### Country of PhD graduation

Of the 21 respondents having a PhD degree outside SLU, 6 graduated in Vietnam and 15 graduated in other countries. The country of PhD graduation is of interest, since it says something about the importance of higher education and research in Vietnam and about Vietnamese researchers’ determination to find universities abroad, which would accept them as PhD students. Several PhD candidates had received scholarships from universities in the Netherlands (Wageningen), Belgium (Liege and Gent), Germany (Bonn, Munich, Hohenheim), Italy, Indonesia, Thailand and Australia and graduated in those countries. Nowadays, many Vietnamese research institutes and universi-

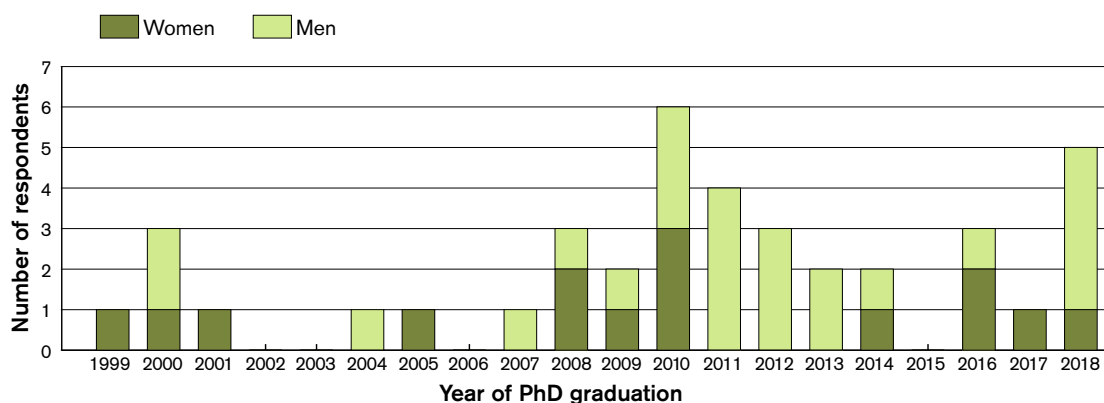


Figure 5. Year of PhD graduation of respondents (15 women and 24 men).



*The majority of the respondents presently work at the same university or research institute where they were based as staff before their Master's and/or PhD training at SLU. Dr Kien and his colleagues at IFTIB are producing clones of acacia and eucalyptus.*

ties have extensive collaborations with universities in other countries.

It is also worth noting that the PhD programmes in some of these countries are not sandwich model programmes, and that the research students have to spend four years (or more) at those universities. However, all 15 respondents who reported that they had their PhD training in these other countries, have also returned to Vietnam and are back at their home universities. This indicates that it is not only the sandwich model training that makes PhD graduates move back to their home universities, nor only the contractual obligation, but also the thought that you as a scientist can contribute to the development of your country both economically and socially.

### **Current career**

Forty-eight of the 53 individuals who responded to a question about their current career reported

that they work at a university or research institute today. Three individuals work at ministries (the Ministry of Agriculture and Rural Development - MARD and the Ministry of Education and Training - MOET), and two work for an NGO or international organisation. The majority of women and men are employed by the same university or research institute where they were based as staff before their Master's and/or PhD training. The training was seen as staff development and all of them were given higher positions when they returned to their universities with a Master's or PhD degree from Sweden. One survey question was about the respondents' work experience since MSc or PhD graduation. Some interesting answers were given, shedding more light on individual career paths:

*“After graduating with a PhD in 2008, I came back to my university and have worked there ever since. I was first a lecturer and after four years I was upgraded to Vice*

*Dean of the faculty. In 2017 I became Associate Professor and now I am Head of Department” (Man).*

*“Before getting MSc and PhD degrees I worked as a research assistant. During my PhD studies I became the principal researcher and leader of a three-year research project funded by the government. After getting my PhD degree in 2012 I was promoted to a higher position and became Vice Dean of my department and then I became Dean of my department. Besides I got many research projects from the government and international organisations (IFS, ACIAR, CIRAD etc.)” (Woman).*

### **Current position**

In general, more men had advanced to a higher academic level than women had, but several women are also now associate professors and deans or heads of department. Still, lecturer is the most common position for the women participating in the survey. To get a more complete picture of the respondents' current position it would have been better if the survey had included not only the title: *lecturer* but also *senior lecturer*. There are four positions in the Vietnamese university system referring to lecturers: assistant lecturer, lecturer, senior lecturer, advanced senior lecturer. All of them with criteria for advancement and salaries. Among the group of women (12 women) who reported being lecturers, I discovered during interviews that several were senior lecturers, which is a high position in the Vietnamese academic system.

There are set criteria for being a lecturer, an associate professor and a professor. These criteria have changed over the years. To become an associate professor nowadays requires 270 hours of teaching per year, supervision of two Master's students and to publish three papers in international peer reviewed scientific journals. The criteria for a professorship are 270 hours of teaching per year, the supervision of two PhD students and at least five papers in international scientific journals published after getting the associate professorship and also being the main author of at least two academic books. Looking into the matter of current positions for respondents working at ministries, the survey shows that one person has risen to be a Deputy Head of Department at MOET and another is Deputy Director in MARD's research department.

One question in the survey related to what extent the respondents thought that their current position and work corresponded to their academic qualifications. It is noteworthy that a majority of the respondents (46 individuals) reported that they thought that their current work corresponded to a large degree to their academic qualifications. This is indeed a positive finding and in line with the overall objectives of the research cooperation.

### **Nature of current work**

The Higher Education Law of 2012 requires that academic staff members at public universities teach, conduct research and participate in professional development. Teaching refers to academic programmes at the diploma, Bachelor's, Master's and PhD level. Interestingly, Article 15 of this law reflects the Confucian cultural values in stating that the state has to provide the “*necessary material and spiritual conditions for the teachers to fulfil their roles and responsibilities, preserving and developing the tradition of respecting teachers and honouring the teaching profession*” (Anh & Hayden, 2017).

The majority of the respondents of the survey teach, conduct research, and supervise students at BSc, MSc and PhD level. More men than women supervise at PhD level. More men than women are involved in university management and administration. Three women and six men are engaged in policy and analysis work. Five women and 13 men are also doing consultant jobs in addition to research (Table 1).

A challenge that many staff face is that the teaching severely limits the time for research. To teach 270 hours per year plus the time it takes to prepare lectures and correct exams means that there is not much time for research. Teaching is also seen by researchers as one important thing to do as university staff. The individuals who work for MARD and MOET are involved in policy and analysis work at policy research institutions within these ministries.

One question in the survey related to the time the respondents could devote to research. Acknowledging the burden of teaching, it was somewhat surprising that 21 respondents reported that they can devote 75 per cent or more of their time to

Table 1. Nature of current work. The respondents had the possibility of selecting more than one option. (Number of respondents to this question, 26 women and 27 men)

Nature of current work	Women	Men
Research	21 (81%)	22 (81%)
Teaching/lecturing	20 (77%)	22 (81%)
Supervision at BSc and MSc level	19 (73%)	23 (85%)
Supervision at PhD level	10 (38%)	16 (59%)
Management and administration	7 (27%)	17 (63%)
Professional work (forester, agronomist, veterinarian)	3 (12%)	5 (19%)
Laboratory work	0 (0%)	4 (15%)
Policy/analysis	3 (12%)	6 (22%)
Development work/project implementation	6 (23%)	9 (33%)
Consultancy	5 (19%)	13 (48%)
Other	0 (0%)	0 (0%)

research, and 5 women and 14 men reported that they could devote 50 per cent of their time to research. However, research often seems to mean supervision of their Master's and PhD students' research projects and being a co-author of their students' research papers.

The possibility to get research funding is an important factor here. There are governmental funds from MOET, the Ministry of Science and Technology (MOST) and the National Fund for Science and Technology Development (NAFOSTED). In general, the funding is low and for example MOET only accepts 4–5 projects per year per university. Research proposals to NAFOSTED will be rigorously assessed by peer review and a selection committee but command only 5 per cent of the national research budget. The fund was established in 2008. There are also small funds available at provincial level at departments of Science and Technology. These funds are often given to specific research topics. Access to research funding is thus a challenge. However, there are possibilities to obtain funding through international organisations, and as long as the MEKARN programme was active there were small funds to apply for there. It should also be mentioned that the researchers have a basic salary for teaching and supervising from the government and need funding for research projects.

### Gender influences on career paths

The recruitment of students to the various capacity development programmes has aimed at achieving a gender balance. Especially in the programmes initiated from around 2000, there is a clear policy on gender balance. For example, in the RDViet programme, 16 out of 30 of the Master's graduates were women. The MEKARN programme had a principle of selecting a woman if a man and a woman were equally qualified for the programme. The question of whether the respondents had experienced that gender aspects had influenced their career path, gave several answers. One woman replied that: *“In my opinion, in Vietnam, gender aspects influence the career path. The Vietnamese women have many responsibilities besides the work”*. Another woman said: *“Yes, but not so much, because I got the support from my husband and family.”* One of the men said that he thought that gender does influence the career path: *“Yes, somehow as my wife gives me more time to work”*.

As mentioned earlier, many women expressed that the sandwich model training was especially good for them since they did not have to be away from their children and family for too long and this was clearly something they felt was part of their duties as wives and mothers. Many women saw themselves as having double responsibilities for their families and for their professional life. Several women had risen to high academic positions as senior lecturers, associate professors, deans and heads of

departments but still only men have the highest positions as rectors and full professors. However, the interviews revealed that there is a great deal of gender awareness among both women and men and men seem to take a greater responsibility for their families nowadays than was the case in the past.

### **Mobility – work abroad**

International mobility is often seen as a premise for scientific advancement and is at the core of the internationalisation discourse. One of the questions in the survey was whether the respondents had ever worked abroad. Forty of the 53 individuals responding to this question answered that they had not worked abroad.

When considering these findings on mobility, the framework of the capacity development approach decided by Sida/SAREC has to be taken into account. It was considered important that the Master's and PhD students were based at their home institutions in order to build a critical mass of qualified researchers in their own country. The PhD graduates were thus expected and contracted to move back to their home universities after completing their exams in Sweden. They were not expected to look for employment or research positions in other countries. Some of the respondents who answered that they had worked abroad referred to the time they spent overseas to study for their PhD, but a few, both women and men, had actually done some post-doc research for around 6 months at universities abroad after graduation.

### **Summing up - capacity development at individual level**

The findings regarding the Vietnamese researchers' career paths are indeed positive and in line with

the overall objectives of the capacity development programmes. All of the responding researchers live and work in Vietnam today and the majority are employed at the same university or research institute where they were based as staff before their Master's and PhD training. The findings indicate that the sandwich model of PhD training has been successful in terms of retaining staff at the home university. But it must also be said that the Vietnamese students who in later years have taken their PhD degree in countries other than Sweden, often as full-time students, have also returned to their home universities after graduation. This can partly be explained by them often having contracts with their home institutions to work there for at least 3–5 years after graduation. But it is still remarkable that the majority of the scientists, many of whom graduated 10–20 years ago, are still today at the same university as they were as students. This most likely reflects the researchers' views on the importance of higher education and research in Vietnam. The training was seen as staff development and all of them, both women and men, were given higher positions when they returned to their universities with a Master's or PhD degree. Employment outside academia has attracted only a few individuals who are working at government agencies and ministries. They have also reached senior positions and are doing important work, often in the fields of policy and analysis. Men have in general reached higher positions than women have, but there are also many women with high academic positions. The scientists are located at universities/institutes all over Vietnam, which reflects the history of the research collaborations. They have all continued with teaching and research. A majority of them (46 individuals) reported that they thought that their current work corresponded to a large degree to their academic qualification.

## 6. Capacity development at institutional level/ national level

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This chapter focuses on capacity development at institutional/national level and some cases of capacity development results and how and to what extent capacity has been used beyond the initial collaborations with SLU.

The focus of the SLU-Vietnam programmes has been on developing individual research capacities in several universities in Vietnam, but since the number of graduated Vietnamese scientists at some faculties has been quite large it has contributed to the development of a critical mass of Vietnamese scientists in specific research fields and areas. The effect can in some cases be seen at an institutional level, in the development of new teaching and research cultures in the faculty or department. As increasing numbers of researchers have reached senior positions at their faculties, they have developed conducive research environments for younger research students using the kind of teaching and research methods they learnt at SLU.

Research and teaching is done by people. And therefore, the personalities, communication skills, the ability to inspire and the mutual interest in research all play a part in how successful the research collaboration is and what kind of research environments are developed. Moreover, personal networks and kinship play a big role in Vietnam and it is through the network of devoted individuals working within the university system that change can be achieved. Within these collaborations, key scientists have become change agents and have developed and led strong and effective research groups and created conducive research environments.

### **Case 1: The establishment of two new Master's programmes, a new faculty and a new research centre**

The need for a new generation of professionals with a broad and interdisciplinary education and capacity to handle questions of research training, extension and communication was the reason behind the RDViet programme. At the start of the project in 2004, there was no higher education in the subject of rural development in Vietnam. Staff working with rural development issues only had sectoral background in e.g. animal husbandry, soil science, forestry etc. In order to analyse how to improve rural livelihoods there was a need for a holistic understanding of the different sources of livelihood that people have, production conditions, policy context, environmental context and impact of different choices, social and cultural dimensions of different alternatives etc. There was a recognition within Vietnamese universities as well as government institutions that there was a need for higher education and research in rural development to meet the challenges of the rapidly changing society.

The programme was based at Hue University of Agriculture and Forestry (HUAF) and the Department of Urban and Rural Development at SLU was the Swedish partner. This programme focused to a large degree on developing a Vietnamese Master's programme in Rural Development with specialisation in livelihoods and natural resource management – a MSc programme which did not exist in Vietnam earlier. The Master's course and its curriculum were jointly developed by SLU and RDViet experts. The courses were in English and the lecturers came from SLU and from Vietnam. There were seven Vietnamese partner universities within the RDViet programme and each of them sent their staff to Hue to attend courses within this Master's programme. The

teaching materials for these Master's courses were also produced within the RDViet programme (Hue University of Agriculture and Forestry, HUAF & Swedish University of Agricultural Sciences, SLU, 2006 & 2011).

Both Can Tho University and HUAF applied to the Ministry of Education and Training (MOET) to start local Master's programmes based on the SLU-HUAF MSc in Rural Development and got them approved in 2007. Since then, these universities have been able to offer these MSc programmes. This can be seen as an important outcome of the project. In terms of research management, the project staff as well as the researchers at the collaborating universities gained valuable knowledge, skills, and methodology in how to develop research ideas. They also gained skills in imple-

menting, monitoring, managing and conducting research projects in Rural Development (Hue University of Agriculture and Forestry, HUAF & Swedish University of Agricultural Sciences, SLU 2006, 2011).

A second MSc programme was developed in Animal Production by the MEKARN programme. This MSc programme was developed by SLU and the various universities in Laos, Cambodia, Thailand and Vietnam belonging to the MEKARN network. The MSc programme was launched at Can Tho University in 2010 and has been offered there ever since. During the first year of the programme, several of the teachers came from SLU but over the following years SLU reduced its participation and now the programme is run locally in Can Tho.<sup>14</sup>



*A Master's programme in Animal Production was developed within the MEKARN programme by SLU together with universities in Laos, Cambodia, Thailand and Vietnam.*

14. Personal communication, Ewa Wredle, March 2020

SLU and the RDViet programme have also contributed to the development of a new faculty at HUAF – the Faculty of Extension and Rural Development (FERD), which was established in 2005. Interviews showed that FERD today is a faculty with 35 staff (some of them trained within the RDViet programme) and has annually around 500 students at BSc, MSc and PhD level. However, the majority of the students are still at BSc level.

The former coordinator of the RDViet programme at HUAF and the Vice Dean of FERD have now established a Centre for Climate Change Study in Central Vietnam (CCCSC). This will also be an important contribution for research on climate change and they are inviting researchers from all over the world to join them in their efforts to mitigate climate change.

### **Case 2: Network development**

Network development is an important aspect of institutional development. Several programmes within the SLU-Vietnam collaboration have developed well-functioning networks with universities and research institutes all over the country. One of the first programmes to do this was the *Livestock-Based Farming Systems Research*, which connected the University in Can Tho to the Nong Lam University in HCMC and Hue University of Agriculture and Forestry and to the National Institute of Animal Sciences in Hanoi. Since the Vietnamese system of research and higher education still to an extent suffers from the split between research institutes and universities, these programmes and their established networks helped to bridge that gap in their specific sector or discipline.

The networks, which were formed within the *Farming Systems Research Programme*, RDViet and MEKARN, still exist today, even though there is no funding for them – at least not from Sweden. These networks have led to durable research and teaching relationships between the Vietnamese researchers. For example, the network of research on rural development has enriched the literature, materials, contacts and experiences for research and training for the members of the network. This network stretches wider than the institutions which were involved in the RDViet programme,

and has also led to contacts with other agencies in relation to rural development in Vietnam and abroad.

The experience of network management in Vietnam has enabled the researchers within the SLU-Vietnam collaboration to play a leading role in other regional and international networks. In interviews, some individuals mentioned specific research networks they are members of like the *Vietnamese Soil Science Association*, or the *Sustainable Renewable Energy Research Network* and there are many more.

The question of research networks was brought up in the survey. Forty-four respondents were part of international research networks, 38 were members of regional research networks and 45 were part of national networks with researchers in Vietnam. The issue of the driving force behind the engagement in research networks was brought up and many answered that networks were important for linking scientists together, not only for publications but even more for solving social issues, for example in the field of agriculture. “*The research network motivates me to engage in dialogues with colleagues on different problems and find solutions that can be applied under different conditions – different ecological and environmental conditions among regions*”.

One researcher said: “*The PhD changed my life. I feel much more confident about my work now. I have a good network with other Swedish-Vietnamese researchers and we are like a big family*”.

During the last years (2004–2011) of the bilateral Sweden–Vietnam research collaboration, 13 separate projects were clustered into three sub-programmes: Health, Biotechnology and Rural Development including Environment. During my visit to Vietnam, it was interesting to note that networks created during this period still existed on an informal basis. I was told that the scientists who had been involved in these programmes still got together and would also contact each other for support on various issues. This meant that the scientists within the Rural Development sub-programme did not only stay in contact with the researchers within this programme but also with researchers within the Health and Biotechnology

programmes and projects.

Moreover, Vietnamese researchers today seem to have extensive collaborations with many universities around the world. The collaborations are partly individual, where students have scholarships to universities abroad to study for their PhD degrees, but partly institutional since many Vietnamese universities also have large institutional collaborations with universities abroad. The increased international collaborations can also be seen in the survey. An overwhelming majority (47 out of 51 individuals) reported that they had worked on joint research applications/projects with researchers from other countries after graduation and 37 of the respondents reported that they were involved in joint educational programmes. Furthermore, 36 had co-published articles with researchers from other countries. Over the last 10-year period there has been increased international collaboration, which can be seen from outputs in terms of publications, with leading country collaborations with Japan, USA, France, South Korea, Germany and China (Tvedten et al., 2020)<sup>15</sup>.

### **Summing up – capacity development at institutional level**

The study has examined and demonstrates capacity development at institutional/national level. As increasing numbers of researchers have achieved senior positions at their departments and faculties, they have been able to develop research groups and conducive research environments for younger research students using the kind of teaching and research methods they learnt at SLU. More concretely, two new MSc programmes, one in Rural Development and one in Animal Nutrition, have been developed in collaboration with SLU and when looking beyond collaborations with SLU both a new faculty on Extension and Rural Development and a new Centre for Climate Change Study in Central Vietnam have been established. The collaborations have led to large and strong research networks, both at national and international level and today Vietnamese research institutions have collaborations with many universities around the world. There is evidence that Vietnam is being drawn into more international collaborations, which can be seen from the increased number of publications generated from these international collaborations.

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15. See annex 2

# 7. Publication of research findings

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One way to assess research performance is to look at publications. Scientific publications are a measure of the researcher's productivity and often a basis for determining promotion of work. Scientific publications are also important for sharing research results and contributing to the pool of scientific knowledge. As already mentioned, this study stretches over more than 35 years and there is no complete information on individuals that have been involved. It is therefore not possible to give a picture of the total number of publications that have been generated through these collaborations. It should be mentioned that to publish articles in peer reviewed international journals was initially not the main aim of these programmes. The focus was on how to reduce poverty and develop Vietnam economically and socially. However, in recent years it has become more important to publish due to changes in criteria for being promoted academically. The purpose of this chapter is thus to give examples of different types of publications being generated within the collaborations. Part of the information is retrieved from the survey, but it is complemented with data on co-publications between researchers at SLU and Vietnam and download statistics on PhD theses.

## Research articles/papers published in national and international scientific journals

### *Research articles – findings in previous evaluation studies*

Previous evaluation studies have documented that over the years, many of the bilateral programmes have generated substantial numbers of publications of various kinds. One example is Annerstedt and Liyanage (2008) where the *Sustainable*

*Livestock-Based Farming systems* programme is said to have generated some 80 scientific papers published in international refereed journals. Another example is from the MEKARN programme 2008–2012, which shows that during this period more than 150 articles were published in international refereed journals, to be compared to the target that was set at 80 articles (Ponce & Sanchez, 2014). Fifty-two per cent of these 150 articles were generated by scientists based in Vietnam (ibid.)

### *Research articles – generated by the respondents in the survey*

One question in the survey related to the types of publications generated by the respondents. The respondents were asked to what extent they, since graduation, had published their research in peer reviewed international journals and peer reviewed national journals. Forty-seven of the respondents (89 per cent) reported that they have published in international peer reviewed journals, and 43 respondents (84 per cent) had published in national journals<sup>16</sup>. According to the survey, men have published more scientific papers than women both in national and international peer-reviewed journals. The respondents also gave information on how many articles they had authored since graduation by choosing between different spans specified in the survey from “1–3” up to “more than 13”. Therefore, the exact number of articles published by the respondents is not known. But it shows that there have been at least 300 articles in international journals from the respondents since their graduation. The actual number of articles is probably much higher. Counted the same way for national peer-reviewed journals we also get a total of more than 300 articles published.

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16. This can be compared with the results from a tracer study carried out in 2008 where the respondents reported that 72% had published in international peer reviewed journals (Freudenthal, 2009).

### Research articles – examples of co-publications between researchers affiliated to SLU and to Vietnam

A broad search in several databases<sup>17</sup> was carried out to collect examples of co-publications between researchers at SLU and Vietnam. This search generated a list of 228 publications, published from 1995 to April 2019. It should be noted that this list provides examples of co-publications, and is not to be seen as an exhaustive list. Many of the co-publications are examples of research articles generated from studies included in PhD theses authored by Vietnamese PhD students and one or several SLU supervisors. There are also other articles reflecting an extended collaboration between researchers at SLU and at Vietnamese universities/research institutes.

### Other publications

One survey question was about to what degree the respondents had published policy briefs, books or book chapters, teaching materials, university

reports, conference papers and other reports. The respondents reported that they had published to a varying extent in these types of publications (Figure 6).

### Contribution to policy documents

Fifty-seven per cent of the respondents to the survey, i.e. 26 individuals, reported that they had published their research in policy briefs (Figure 6). Another approach to study policy outreach was to look at altmetrics of scientific papers co-published by SLU and Vietnam based researchers. Altmetrics were used to identify publications being cited in various policy documents (see further, Case 4 – Citations in policy documents). The RDViet programme had as one objective to strengthen the relevance of research into policy and practice in rural development. This programme not only generated policy briefs, but additionally several MSc theses and one PhD thesis focusing on policy issues (see further, Case 8 – Rural development and policy related research, Chapter 8).

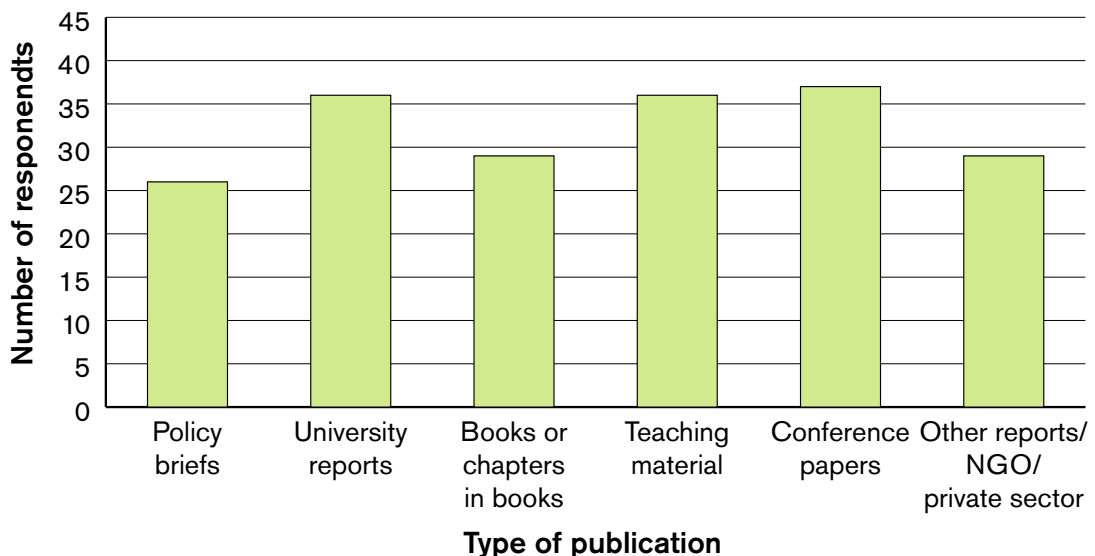


Figure 6. Number of respondents who reported that they had published policy briefs, university reports, books or book chapters, teaching material, conference papers and other reports. The respondents could select more than one type of publication.

17. Web of Science Core Collection, Scopus, Biosis, Medline and CAB Abstracts, 24 April 2019.

### One measure of visibility - download statistics of doctoral theses

This section looks at the download statistics September 2012 to December 2019, for SLU's doctoral theses published 2008 to 2012<sup>18</sup>. This gives some indication of to what extent the knowledge has received attention and been spread internationally. Nineteen of 501 doctoral theses published at SLU during 2008–2012 were traced to the SLU-Vietnam collaborations<sup>19</sup>. During September 2012–December 2019, those SLU doctoral theses were downloaded as shown in Table 2.

Table 2. Number of SLU doctoral theses published 2008–2012, downloaded between September 2012–December 2019

Download interval (number of downloads)	Number of theses (Vietnamese authors)	Number of theses (other authors)
Less than 1000	4	282
1000–2000	7	136
2000–3000	4	34
3000–4000	0	13
4000–6000	3	8
6000–8000	0	4
More than 8000	1	5
<b>Total</b>	<b>19</b>	<b>482</b>

Six of the SLU doctoral theses published between 2008 and 2012 have in total been downloaded more than 8,000 times within the given timespan. One thesis that stood out was *Water hyacinth biomass production, ensilability and feeding value to growing cattle* by the Vietnamese researcher Ho Than Tham (2012). This thesis has been downloaded over 8,000 times, a fact possibly related to the large problems with water hyacinth invasions in many regions. However, whether or not this is the reason for the high number of downloads of this particular thesis has not been confirmed. It is also notable that among the 21 SLU doctoral theses downloaded more than 4,000 times, as many as four (19%) are published by a Vietnamese author.

Country-wise, download patterns for the theses with a Vietnamese author show that most downloads were made from Germany. Other countries which account for many of these downloads include India, China, France and Vietnam. This is interesting considering that Germany, France and China have extensive collaborations with Vietnam.

### Case 3: Examples of publications from the survey

The respondents of the survey were asked to give one or two examples of articles or reports they had authored and considered being of special importance. The titles of the articles suggest that the publications named seemed to relate to research findings that were important in the sense of reducing poverty and promoting economic and social development, as well as dealing with climate change issues and how to adapt to climate change. Below three examples of articles published by the respondents are presented.

#### *Assessing dietary exposure to cadmium in a metal recycling community in Vietnam: Age and gender aspects*

This study estimates the dietary exposure to cadmium, one of the most dangerous elements in food, for the people living in a metal recycling community in Vietnam. The rice grown around the village was heavily contaminated by cadmium. Women and children had generally higher cadmium burdens than men and this, combined with a low body weight, contributed to an aggregated health risk for the inhabitants in the metal recycling community (Minh et al., 2012).

#### *The potential of informal institutions for marine fisheries management—A case study of a coastal commune in Vietnam*

In Vietnam, fishermen have adhered to the informal institutions, local customs and norms for hundreds of years. This study has investigated the informal institutions to explore whether they have the potential to support sustainable fisheries development. The authors conclude that the informal institutions can be a complement to and

18. Data retrieved from Epsilon Open Archive - data is available from September 2012.

19. On average 100 SLU doctoral theses were published per year during 2008–2012.

consolidate the formal institutions to manage marine fisheries effectively in order to achieve sustainable development (Nguyen et al., 2018).

#### *Effect of temperature and humidity on heat stress responses in Vietnamese Yellow cattle*

One chapter in the report *Sustainable Improvement of Animal Production and Health* from FAO/IAEA (Odongo & Joint FAO IAEA Division of Nuclear Techniques in Food and Agriculture, 2010) deals with the effects of temperature and humidity on heat stress responses in Vietnamese Yellow cattle. The authors (Thanh and Shichang) conclude that Yellow cattle are well adapted to hot and humid tropical conditions, but sudden changes in weather can cause heat stress in them. The cattle need a building with shade, a well-prepared diet, and access to water in the hot season.

#### **Case 4: Citations in policy documents**

An altmetric analysis revealed that at least eleven of the 228 identified co-publications between SLU and Vietnam, published 1995 to April 2019, had been cited in various policy documents. For example, three articles written jointly by SLU and Vietnam-based researchers have been cited in a joint FAO & IPCC expert meeting report on land use, climate change and food security (Elbehri et al., 2017). Several articles have been cited in FAO reports, including one report on antimicrobial usage in pigs in Asia (Otte et al., 2014) and one on soil (FAO & ITPS, 2015). Research articles have also been cited in policy documents by the World Health Organization, European Food Safety Authority (EFSA), the Publications Office of the European Union and the UK Parliament. Read more in Annex 2.

Five brief summaries are given below, highlighting examples of co-publications between SLU and Vietnam researchers that have been cited in a policy document.

#### *FAO/IPCC Expert meeting on land use, climate change and food security*

On 23–25 January 2017, the IPCC and FAO held an expert meeting on land use, climate change and food security. In the meeting report, three co-publications by SLU and Vietnam research-

ers are quoted (Elbehri et al., 2017). The first by Hoang et al. (2014) compares diversity-based climate adaptation approaches in current land use in a village in Vietnam and in the Kapingazi River watershed in Kenya, in order to understand local responses to climate variability and examine the potential for policy support. The authors saw that at all study sites, diversity in land use at farm level and along agriculture–forestry landscape gradients was a key strategy, and they made suggestions on how to encourage this in policy decisions (ibid.). In the second article, Nguyen et al. (2013) showed that agroforestry and livestock systems were resilient as regards severe weather events. In the third article, Beckman and Nguyen (2016) explore village-level perspectives on climate change adaptation. They argue that policies towards upland communities in Vietnam tend to reinforce land use strategies that increase vulnerability to climate-related risk and undermine adaptive capacity of upland communities. Instead, they recommend more integration of agriculture and forestry land use (ibid.).



*Researchers from Vietnam and SLU have studied cattle fodder made from mixed cassava and legume foliage. The results were highlighted in the FAO report *Pulses and their by-products as animal feed*. In this photo, Dr Hai shows a cassava byproduct.*

*The effects of cassava and legume fodder on cattle*

SLU and Vietnamese researchers have studied cattle fodder made from mixed cassava and legume foliage. The results were highlighted in the FAO report *Pulses and their by-products as animal feed* (Sherasia et al., 2017). Thang et al. (2008) had fed a mixture of cassava hay and rice bean hay to growing crossbred heifers. They concluded that it resulted in higher daily weight gain, reduced feed cost and a higher economic return for the farmer (ibid.).

*Health of weaned piglets fed diet supplement*

Giang et al. (2012) wrote an article about diet supplements fed to weaned piglets. The piglets were fed a supplement with a complex of lactic acid bacteria, alone or in combination with *Bacillus subtilis* and *Saccharomyces boulardii*. The piglets' growth performance, digestibility, gut environment and health status were monitored. The authors concluded that the piglets' growth was increased and their risk of diarrhea decreased (ibid.). These findings were highlighted in an FAO report on *Antimicrobial Usage and Alternatives for Prophylaxis and Performance Enhancement in Pig Populations in East and Southeast Asia* (Otte et al., 2014).

## 8. Use of research findings in Vietnamese society

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This chapter presents some of the research findings that have been generated from the research collaborations over the years, and analyses how and to what extent this knowledge has been used in Vietnamese society. It begins with a more general discussion about the difficulty in knowing which results lead to uptake and change in society. It then describes how the researchers have engaged in different types of community outreach activities to inform different groups in society about new research findings. Finally, five cases are presented (Cases 5–9). These cases were discussed during the field visit to Vietnam, but do not claim to be representative of all research that has taken place.

Even if the research and capacity development projects have mainly focused on applied research, which means that the research results were meant to be applied in society, it is still difficult to understand how institutional and societal change comes about (Forss, 2002; Tvedten et al., 2020). The move from new knowledge to uptake in policy or improved products and services, let alone for that to contribute to sustainable development in a society, does not follow a clear-cut result chain in OECD terms – a result chain which begins with input, moves through activities and outputs and ends with outcome and impact. Change does not depend on individual research capacity, research infrastructure or research management, but on several other factors relating to political, economic, and university systems, local culture etc. It usually takes a long time to produce research results, but even longer to be able to apply new research results in society. This process often involves new actors, issues of patent rights, agreement on distribution of profits, pricing of benefits etc. For example, the rise of world market price and demand for a certain crop may cause many farmers to begin to grow this crop, while a lowering of demand and price may make the

farmers stop growing the crop despite scientists having developed this crop to give high yields even during droughts or pest infestations. The cultural context is also important. Farmers may stick to what their fathers and mothers did and not listen to any scientist telling them what to do. There is also a time lag between the publication of research findings and some form of practical outcome or impact.

In this context, it is important to point out that research results are not confined only to findings that can be applied immediately in sectors of society. Apart from producing new knowledge and innovations, research provides tools for dealing with knowledge in a systematic way. It builds analytic capacity, which is one of the enabling conditions for, among other issues, the reduction of poverty. Moreover, teachers with research capacity improve the quality of education at BSc and MSc level.

Having said all this, it is remarkable to note how many of the results from the various research programmes have been used in parts of Vietnamese society. A large majority of the respondents and interviewees reported that they were deeply engaged in research with direct relevance to poverty reduction and the development of Vietnam. They considered themselves to contribute in several ways not only by producing important research results, but also directly in community outreach activities, extension work, public service and in many other ways. One question asked in the survey was: “*To what extent do you think that your research results have contributed to poverty reduction, policy development, new information to extension staff, change in agricultural/forestry methods and praxis, new products, innovations, advancement of the international and national research frontline.*” Both women and men reported that they had contributed in varying degrees to all of these options.

The respondents were also asked to provide some examples of how their research results had been used in society. Several interesting answers were given, which also point to the usefulness of the research. One woman wrote: “*Most of my research involves diseases causing economic problems in Vietnam*”. Moreover, she mentions two subjects that she is proud of: “*1. Discover the life cycle of one parasite in water buffaloes. Through this discovery, I have advised the farmers to raise separate hosts of this parasite to reduce the infection in water buffaloes. 2. Study about Coccidiosis causing diarrhea in piglets. Based on the results from this research, I have transferred my knowledge to farmers in many regions of Vietnam and helped them to prevent and treat the disease.*”

The majority of the interviewees had not been able to commercialise their research results or develop agricultural products<sup>20</sup>. One problem mentioned was that they had neither the knowledge of intellectual property rights (IPR) or patents, nor the time or money to get patent rights. The researchers need to publish in order to be promoted academically, which means that they cannot patent a product, which has already been described in a scientific journal. One of the interviewees said: “*We would like to commercialise our knowledge but we cannot do that. We have no time to contact commercial factories and we do not know how to do business*”. Some of the interviewees mentioned that they were sometimes hired by commercial companies to test and analyse new products, but did not produce any new products for commercial use themselves.

Community outreach activities and extension work is part of what is called universities’ *third mission*<sup>21</sup> – which refers to the activities of a university to reach out to society at large, via its provision of research, technology transfer services and other links. These issues were discussed at length during the interviews. Depending upon the nature of the research, type of collaborations with the local community and regulations at various universities, different modalities and methods were used to transfer knowledge to farmers and other individu-

als in society. Unfortunately, the universities also face many barriers in carrying out this mission. One is lack of financial resources and another one is time, since teaching takes up a large amount of the university staff’s time. But despite all these barriers, it is important to point out that all interviewees were involved in community outreach and extension work in different ways.

Several researchers explained that they had carried out their research on farms or research stations. In both cases the scientists need to get permission from authorities at province level and if they are given funding from the Vietnamese government, they have to include in their research proposals how to transfer their results back to the local community. Before they begin, they also have to carry out a survey of the area and a needs assessment. Very often they involve the farmers right from the start of their fieldwork, so many farmers are straight away interested in the final results. Some researchers argued that they preferred to transfer the knowledge to the farmers themselves. They felt that they knew the farmers better than some extension worker based at the ministry. They had sometimes worked with the farmers for several years and it was natural to them to help farmers to increase the productivity and income from the farm (See also: Annerstedt & Liyanage, 2008, p. 46).

Other researchers argued that the extension system through the ministry (MARD) is the most important system to spread new knowledge. The extension system exists on all levels from the national, to the province, district and down to commune level. However, it should be pointed out that agricultural extension services were not introduced in Vietnam until 1993 and it was originally perceived mainly as a way to perform technical updates. Can Tho university has an extension centre which is responsible for informing farmers about new research findings, but as mentioned above many researchers transfer new knowledge themselves directly to the farmers. Also the Nong Lam University has a *Research and Technology Trans-*

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20. Some trials were done on a small scale with feed for animals, which would reduce the methane gas emission.

21. The third mission activities are performed in addition to the first mission which is teaching and the second which is research.

fer Center, which transfers the knowledge from among others, the MEKARN projects to farmers and companies in the region. The question of scaling up was discussed and different methods were mentioned: from one farmer to the next, through workshops and training with many farmers. Challenges with issues of scaling up, socio-economic barriers to adoption of new technologies, market, financing and gender have also been brought up by Ponce and Sanchez (2014).

The universities seem to have good interactions with local authorities, entrepreneurs, farmers and other end-users. The formats used for communication and dissemination include different kinds of workshops, seminars, conferences, short training courses and information exchange for farmers in collaboration with others. The universities have also produced leaflets, brochures and media programmes via television. Nowadays they also use social media such as Facebook and special Facebook groups for particular topics. Moreover, farmers were invited to become members of various clubs like the “pig club” where new research findings regarding pigs are disseminated and discussed. Can Tho University has set up commercial

units such as the *Company of Plant Protection* and the *Laboratory of Tissue Culture* and the main users of the services are farmers with small-scale and family-based production (Ca, 2009).

### **Case 5: Vietnam – Sweden forest tree improvement research cooperation**

A now-retired Director of the Institute of Forest Tree Improvement and Biotechnology (IFTIB) recalled that even in the late 1970s, the Swedes were known in Vietnam as being good tree breeders and he personally knew some of the Swedes working in Bai Bang with tree breeding. Therefore, when the country opened up after 1986, IFTIB got in contact with SAREC and asked for assistance in tree breeding and issues related to that. With the help of SLU (Department of Plant Biology and Forest Genetics) and Skogforsk they developed a research project together. The objectives of the project were to contribute to efficient reforestation with fast-growing, economically valuable tree species, by setting up tree nurseries for breeding hybrids and developing tissue culture technology. The focus for several years was tree breeding and the development of clones of acacia and eucalyptus. In later years emphasis was also



*“We have developed many new acacia clones for commercial plantation which are widely used in Vietnam today. Those clones have helped improve productivity and thus improve income for farmers”, says Dr Kien (IFTIB) during a field visit in the Ba Vi district.*

put on capacity development and training of MSc and PhD students. Master's training started at SLU in 2000. There were three Vietnamese Master's students within forestry at that time and after graduation two of them plus another one continued towards a PhD at SLU. Their studies followed the sandwich model training and they divided their time between the forestry institute in Vietnam and SLU. They are now all back in Vietnam and have important positions within forestry research. One is the Director of IFTIB, one is Head of Department at the Institute of Biotechnology under the Vietnamese Academy of Forestry Sciences and one is Vice-President at the Vietnamese Academy of Forestry Science.

During my visit to Vietnam I had the opportunity to visit some of the Institute's demonstration sites in the Ba Vi district, about 60 km north-west of Hanoi. I was accompanied by Dr Kien, the current Director of IFTIB and former SLU PhD student. There were many activities going on at the demonstration sites. We saw 10-year-old trees that were full-grown and ready to be harvested, even five-year-old-trees that were ready to be cut. My guides told me that they invite farmers and local government officials to these sites to show them how fast the trees grow and how profitable it is for farmers to plant these trees. They also transfer knowledge about propagation techniques to local nurseries. At their own demonstration nurseries, they prepare new clones all the time. Different clones are developed for different parts of the country with different climate, soils etc.

The project has, according to evaluations (Forss, 2002; Annerstedt & Liyanage, 2008; Thinh et al., 2009), achieved significant success in strengthening research capacity and the development of many planting varieties with high productivity and desired wood quality. Wood of acacia hybrid generated from this project is now widely used for pulp and timber to produce furniture for domestic use and export. After the phasing out of Swedish support the Institute has continued with collaborations in forestry research with many countries, Australia being the largest partner, followed by other Southeast Asian countries.

## **Case 6: The use of local by-products as novel animal feed**

One of the objectives of the *Sustainable Livestock-Based Farming Systems Research* programme initiated in 1989 was to develop livestock production and integrated farming systems for small-scale farmers in Vietnam using locally available resources. This involved the use of shrimp by-products, catfish by-products, sugarcane, cassava, groundnut leaves, sweet potato leaves, legume trees, rice straw, cane top, molasses, aquatic plants and agro-industrial by-products as sources of feed for livestock. A large number of Vietnamese MSc and PhD students have over the years carried out on-station experiments and on-farm research to investigate, for example the chemical composition, the nutritional value or the digestibility of various by-products as new animal feed. When the MEKARN programme started in 2001, this type of research was continued, now also in the neighbouring countries of Cambodia, Laos and Thailand. In the following sections I will highlight some of the research carried out.

### *Shrimp by-products for pigs in Central Vietnam*

The deficit of protein sources has been a serious constraint to livestock development. Shrimp production for export has increased rapidly in Vietnam, resulting in large quantities of by-products from the shrimp processing industry. The by-products consist of head and shell and are estimated to make up about 50 per cent of the total raw fish material. In many places the heads and shells were thrown back into the rivers and waters, causing environmental pollution. However, shrimp by-products contain 30–45 per cent crude protein as dry matter (Ngoan et al., 2000). By carrying out research to evaluate different methods for preserving shrimp by-products and to determine their chemical composition, one researcher was able to recommend that farmers use shrimp by-products ensiled with sugar cane molasses or with cassava root meal as a new protein feed source for pigs (Ngoan, 2000). This improvement has been welcome and helped a large number of farmers to reduce feed costs and obtain a higher economic return. Nowadays the production of shrimp by-products as animal feed

is commercialised and the estimated production for 2018 was 400,000 tonnes.<sup>22</sup>

#### *Cassava root and leaf silage for crossbred pigs under village conditions*

When this research started in 1995, there were 15 million pigs in Vietnam, of which 95 per cent were raised by small scale farmers. Cereal grains, which were needed for human consumption, could not be used for feeding pigs. Cassava, the third most important crop, after rice and maize, is not only a major source of rural household income but also used for feeding animals (Loc et al., 1996). The root is highly digestible carbohydrate and leaves are rich in protein. However, the presence of cyanogenic glucosides in the cassava plant, which are converted to hydrogen cyanide, can be a major problem for feeding animals. The researchers in the programme helped farmers with establishing processes to reduce the cyanide content. On-farm trials were then conducted in villages to evaluate the effect of processing methods on pH and hydrocyanic acid content to ensiled cassava roots and/or leaves and the effect on the performance of growing pigs. More than 1,000 households in the research area adopted this technique and it has increased the growth rate of the pigs, reduced the feed costs and given the farmers a higher economic return.

Each of the participating institutions in Vietnam has carried out comprehensive extension programmes to disseminate information about how to use various local by-products as animal feed. According to Annerstedt and Liyanage (2008), these by-products, introduced to small scale farmers all over Vietnam, have reduced poverty in rural areas, enhanced food safety and improved the sustainability and income of livestock farming in Vietnam. At least 100,000 households are nowadays using various local by-products as animal feed<sup>23</sup>.

During my visits to villages outside of Hue and Ho Chi Minh City I met many farmers who had put a room in their house at the researchers' disposal while they were doing their farm trials. Several researchers seemed to have used the same farm or at least the same farm area to conduct their experiments and research. These on-farm trials had been going on for several years. At one farm both the wife and husband told me that they had followed the farm trials and experiments with great interest and when they realised that their pigs became healthier and gained more weight with the kind of feed suggested by the researchers, they had no problem changing their way of feeding their pigs.



*Agriculture by-products such as cassava pulp and rice straw are now used by many farmers to feed cattle. The manure produced is then sold to other farmers who use the material in worm farming.*

22. Personal communication, Prof. Ngoan, Le Duc, December 2019

23. Personal communication Prof. Ngoan, Le Duc, January 2020

At another farm I met a farmer who had also begun to use agriculture by-products such as cassava pulp and rice straw to feed his cattle, but not only that, since he had too much manure from his cattle he sold his manure to another farmer who had learned from the researchers that he could use manure as media for growing earthworms. These earthworms were then sold as an extra protein source for fish production at fish farms in the region.

The above examples highlight the integrated farming systems approach – how to use locally available low-cost agriculture by-products to feed animals, and then use the manure from these animals to both fertilise the soil to get better crops, and produce worms as an extra protein source for fish farms. Manure is furthermore used to produce methane for cooking (which will be further explained in the next case).

### **Case 7: Low-cost biogas digesters as part of the Sustainable Livestock-Based Farming Systems Research**

One of the interesting components within the programme on *Sustainable Livestock-Based Farming Systems Research* is the development of biogas digesters. The technology of the biodigesters was already well known in Vietnam, but farmers had been slow to adopt the technique for a number of reasons. Installation costs were quite high, and the application had been low because of difficulties in using the gas. The young researchers within the *Farming Systems Programme* developed new tanks in plastic that were easy and cheap to produce, and they also developed the pipes and stoves further. The biogas digesters use manure from pigs (or goats, cows or other animals) to produce cooking gas for family home consumption. This also means that the wood-burning stoves, causing a lot of air pollution, are not needed. One of the first plastic tube biodigesters was installed in one family household in Ba Vi district in the north



*Biodigesters use manure to produce cooking gas for family home consumption. New tanks in plastic were developed that were easy and cheap to produce. In addition, the pipes and stoves were further developed.*

of Vietnam and it proved to the family that it worked well and had a long life - more than three years. From there the technology was applied in the Ho Chi Minh City area, Southern provinces, Can Tho, Hue and Hanoi. The researchers used demonstration sites to transfer the technology to the farmers and were running training courses. They also involved the farmers in evaluating the technique and from there the use of biodigesters spread through word-of-mouth from farmer to farmer (Le Viet Ly, 1996).

The transferring of biogas technology to small-holder farms in Vietnam by the researchers has had a powerful impact. More than 100,000 units of polyethylene tube biodigesters were installed in small scale farms in Vietnam from 1992 to 2010.

Today, biogas digesters are one of the most popular technologies in rural areas, helping to mitigate environmental problems caused by animal waste and converting waste into energy for home consumption. Vietnam has set a goal to reduce its greenhouse gas emissions by 20 to 30 per cent by 2030. The government is, via a financial assistance programme, encouraging farmers all over the country to swap their wood-burning stoves for biogas, coming particularly from pig waste (Dinh, 2017). This makes sense for Vietnam, since pork accounts for almost 73 per cent of meat production, which means that there are around 26 million pigs whose manure is degrading into methane, an even more potent greenhouse gas than carbon dioxide. According to a World Bank report (Dinh, 2017), the biodigesters have so far helped Vietnam reduce 1.3 million tonnes of carbon emissions annually.

### **Case 8: Rural development and policy related research**

The research and capacity development programme in rural development (RDViet) combined approaches in social and natural sciences, systems analysis, natural resources management and rural livelihoods analysis. Rural problems are often complex and there was a need for a holistic understanding of the different sources of livelihood that people have, production conditions, policy context, environmental context and the impact of different choices people make. One of

the objectives of the programme was therefore to strengthen the relevance of research into policy and practice in rural development. Several of the MSc theses dealt with this subject, for example one study in the Mekong delta concerned the policy of the farm size limitation of 6 ha enacted since the middle of 2007. Another one dealt with the potential impact of WTO accession for tea farmers in Vietnam (Hue University of Agriculture and Forestry, HUAF & Swedish University of Agricultural Sciences, SLU, 2011). Below are two more examples of policy-related research:

#### *Gains and losses: devolution of forestry land and natural forest*

This is the title of one PhD thesis which was defended at SLU in 2009. The research examines the processes of the making of a forest devolution policy in Vietnam and its interpretation in practice. It explores the influence of forest devolution on endowments and entitlements and thus on the livelihoods of different socio-economic groups. The findings suggest inconsistencies between policy and interpretations in practice, leading to imbalance in achieving the objectives of increasing the rate of economic growth, reducing poverty and forest rehabilitation. The new institutional arrangements for forest management have brought inequalities in endowments and entitlements between social groups (Hoang Thi, 2009).

I had the opportunity to meet with the researcher and author of this thesis, Dr Hoang Thi Sen, now a partly retired senior lecturer. Dr Sen explained that she has continued to study policies and their implementations. The policies are usually good, but the implementation of them is sometimes challenging. She has received some small grants to study how policies work out in practice, in this case regarding microcredit policies. She appreciated the broad socio-economic training she got on the SLU-HUAF Master's course in order to understand what goes on in society and she enjoys working with farmers and getting to know their situation in the country. At present, she is still trying to find opportunities to do research on policy and to bring her knowledge to work with the farmers.

### *Women's differentiated vulnerability and adaptations to climate-related agricultural water scarcity in rural central Vietnam*

The main author of this paper is a former RDViet Master's student, who after completing her Master's thesis in 2008 went to AIT (Asian Institute of Technology) in Thailand to pursue her PhD degree. She is now Dean and Head of Department at Hue University of Science.

This study highlights the heterogeneity of women as a group (Huynh & Resurreccion, 2014). Social differences shape women's differentiated experiences of vulnerability in access to water, forest land and credit. It also stresses that existing development policies can cause inequality in resource access in practice, running the risk of further marginalising certain groups of women, especially female heads of household. The study argues that development and climate programmes have to be redesigned to accommodate more context-specific policies instead of one-size-fits-all packages that will effectively address women's, and men's, different needs and unequal relations and circumstances (ibid.). The article was referenced in the report *The State of Food and Agriculture 2016 (SOFA): Climate change, agriculture and food security* (FAO, 2016).

The RDViet programme also established a forum for discussion and sharing between policy makers, researchers and other development workers on the Vietnam Government Policy Programme, *Agriculture, Farmers and Rural Development for Improved Policy Formation and Implementation* in 2008. Advantages and disadvantages of the new policy were discussed and challenges regarding rural development research and development were raised.

### **Case 9: The use of antibiotics and regulations on feed management**

The use of antibiotics in livestock production is considered a major driver of the development of antibiotic resistance on a global scale. In Vietnam, small and medium-scale livestock producers dominate the domestic market and regulations have done little to reduce antibiotic use. Many farmers apply antibiotics at the first indication of disease among livestock instead of applying other

measures (quarantine, better hygiene etc.). A large proportion of antibiotics use goes unsupervised by veterinarians, particularly as antibiotics are available over-the-counter without prescription. Legal antibiotics are often present in livestock feed sold in Vietnam, sometimes alongside other drugs banned by the WTO (Pham-Duc et al., 2019).

To combat antibiotic resistance and antibiotic residues in meat products, the Vietnamese government has issued a Law on Animal Husbandry to become effective in 2020, which will reinforce efforts to control the use of drugs in animal feed and livestock. However, enforcement of regulations remains difficult given the number of smallholder producers in the market. It is estimated that at least 80 per cent of pork in Vietnam is supplied by smallholder producers.

Two researchers who are dealing with this problem work at the Department of Livestock Production at MARD. They are former PhD graduates from SLU and were, at the time of their PhD training, academic staff at NIAS. One of them is now Head of the Animal Feed division and the other is Deputy Head of the Animal Feed division. I had the opportunity to meet these two women researchers late one evening in Hanoi when they were still at work at their desks. They were busy working with the regulations regarding the new law. They explained that it will for example no longer be permitted for farmers to buy antibiotics for their animals over-the-counter, without a prescription from a veterinarian. The veterinarians also have to be stricter about prescribing antibiotics. It will be against the law to give animals antibiotics as prevention. Antibiotics can only be given if the animals are seriously ill, and only with a prescription from a veterinarian. All of this has to be regulated. The veterinarians have to know when they can prescribe antibiotics and the drug suppliers have to know when they can sell antibiotics. There are also different kinds of regulations for different animals and different conditions. Antibiotics as prevention has already been banned since 2017 and now antibiotics in animal feed will be prohibited. There is still a lot of work to be done to inform various groups (farmers, veterinarians, drug suppliers) about the new law and its regulation.

### **Summing up - use of research findings in Vietnamese society**

This chapter examines the knowledge (research findings) that has been generated from the research collaborations and looks at how and to what extent this knowledge has been used in society. Apart from a broader discussion on transfer of knowledge and research uptake, five cases (Cases 5–9) have been selected to illustrate how some of the results have been used in Vietnamese

society. These cases demonstrate that research has been carried out in fields and areas of importance to the socio-economic development of Vietnam and the reduction of poverty. There were also indications that the research is in some respects at the forefront regarding transforming agriculture and food systems into resilient systems with low emissions, including shifting diets and new protein sources.

## 9. Potential for future collaborations

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The potential for future collaborations between SLU and Vietnam was brought up both in the survey and during the interviews. All respondents expressed that their experience with SLU over the years had been very positive. Their MSc and/or PhD training had been excellent and they had learnt new ways of teaching and conducting research. They had appreciated their Swedish supervisors and also the personal friendships and networks with the Swedish researchers. Moreover, there had been strong elements of mutual research interests between the Swedish researchers and themselves. They were aware that the Sida/SAREC funding for research capacity development had ended, but they were interested in continued contact and keen on finding opportunities for future research collaborations.

During interviews, Swedish researchers also expressed their appreciation for the Vietnamese researchers they had collaborated with and the many MSc and PhD students they had supervised. The Vietnamese MSc and PhD students were seen as hard working, with a good knowledge in basic science, highly motivated and stimulating to work with. The SLU researchers had established both professional and friendship networks with the Vietnamese researchers and even though most of the bilateral programmes had ended in 2011, these networks still existed and some of the scientists remained in contact with their Vietnamese counterparts. Furthermore, they expressed a wish to continue the research collaboration with Vietnam but had not been able to access any research funding following the phasing out of Sida/SAREC funding.



*All respondents expressed that the collaboration with SLU had been very positive and many of them are interested in finding opportunities for future research collaborations.*

As mentioned earlier, not all research collaborations between SLU and Vietnam have been part of the bilateral research capacity development programmes. There have been and still are some ongoing individual projects involving a few researchers from SLU and Vietnam. The major difference is that the funding for these projects comes from other sources and has been applied for in competition with other projects. This type of funding could be a way forward for renewed contact between SLU and Vietnamese researchers. A future modality for research collaboration could be joint research projects as equal partners with external funding, rather than capacity development programmes. As one Vietnamese interviewee said: “*Funding is there when you have a good project proposal*”.

Ideas for potential future collaborations were mentioned by Swedish researchers, who suggested that post-doc possibilities should be explored as well as research exchange opportunities, joint PhD courses or virtual research schools for MSc and PhD students. Training in inter/multidisciplinary research as well as training in translating science to policy and practice was considered to be important. Writing international peer-reviewed publications in collaborative projects and networks was considered a very good training for both sides. A joint SLU-Vietnam course in multidisciplinary research could be a good starting point for continued collaboration.

Concrete ideas for potential future collaborations were also given by the Vietnamese scientists. One interviewee suggested that Vietnamese and Swedish scientists, with mutual interest in specific research topics of importance for both countries, should come together and develop research proposals, and look for funding. Climate change mitigation, new protein sources and other sustainable feed systems were mentioned as examples of important research topics. Another issue brought up which could be of mutual interest was how to classify and treat domestic waste. Another interviewee would like to involve Laos and Cambodia in possible future collaborations with SLU and Vietnam.

One person mentioned that several of the SLU supervisors and professors who had been part of the collaborations are now retired, so there is a need to build a new network with the current staff at SLU. On the other hand, most of the Vietnamese researchers who received their MSc and/or PhD degree from SLU are right now in the middle of their career. They would therefore like to be in touch with SLU again and build these new research networks, work on joint educational programmes, refresher courses, student/teacher exchanges and develop research proposals together.

One rector of a university said that he felt that his university offers the students a very good education, but he was not sure that it made the students attractive on the labour market and that there is a gap between what the universities offer and what companies and the labour market need. The needs of the labour market are not integrated in university curricula and here he could see the potential for a future collaboration with SLU – not just a collaboration on animal science or rural development but a broader more comprehensive collaboration regarding emerging issues.

The SLU Alumni in Vietnam have been growing and have become a large group. At the alumni meeting held in Hanoi and Ho Chi Minh City in November 2019, most Vietnamese researchers who graduated from SLU and had registered to be part of the formal SLU Alumni network showed up. All these researchers have now attained senior positions at leading universities in Vietnam and they showed a strong interest in future collaborations with SLU.

The views of many of the interviewees can be summarised by the following quote:

*“In the past it was a one-way communication and we were receivers of support for capacity building, but now we could collaborate as equal partners with SLU, if they still are interested. I would like to invite SLU for a workshop to develop ideas for joint collaborations in areas where we write research proposals together and could do research together. Cooperation opportunities are there. Welcome”.*

# 10. Conclusions and lessons learnt

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The aim of these programmes has been to strengthen individual research capacity in Vietnamese priority areas within the fields of agriculture, forestry and rural development and to have been part of the development agenda to reduce poverty and contribute to the socio-economic development of Vietnam. The focus has been on developing capacity at MSc and PhD levels. Many programmes have been long-term collaborations and have resulted in a large number of Vietnamese Master's and PhD graduates. During the early years both the MSc and the PhD training took place at SLU, but in later years the Master's training moved to Vietnam (with the RDViet and MEKARN programmes). However, most of the PhD training has been done according to the sandwich model. It has not been possible to find out the total number of Vietnamese researchers having graduated with a Master's and/or PhD degree from SLU, but 43 PhD holders were identified and traced, out of probably 50–60 PhDs awarded within the studied programmes. Thirty-six MSc graduates were traced, out of probably more than one hundred MSc graduates. All MSc and PhD degrees from 1992 until 2018 were awarded by SLU.

The focus of the collaborations between SLU and Vietnam has been on bilateral research capacity development. These programmes have been different from Sida/SARECs general approach to capacity development in low-income countries, which is to support one single national state university in order to strengthen research capacity at that university. The support to Vietnam reflects the history of Vietnam. The unification of North and South Vietnam after the war in 1975 made Sweden eager to support not just one university but several universities and research institutes from the north to the south of Vietnam. One effect of the support to several Vietnamese institutes and universities is the development of strong research networks between these institutions.

The long-term collaborations have contributed to the development of the current critical mass of scientists in specific research fields at some universities and faculties. The effect can in some cases be seen at an institutional level, in the development of new teaching and research cultures in the faculty or department. As increasing numbers of researchers have attained senior positions at their faculties, they have developed conducive research environments for younger research students using the kind of teaching and research methods they learnt at SLU. The long-term collaborations between SLU supervisors and the Vietnamese researchers have also contributed to building personal relationships.

The collaborations have also been flexible and open to new ideas. The long-term approach has enabled existing projects to evolve and adapt to changes in Vietnam – as can be exemplified by the *Sustainable Livestock-Based Farming Systems Research* programme, which developed into the regional MEKARN programme, but also to a certain extent to the RDViet programme on rural development. There is reason to believe that this long-term flexible approach is mainly a result of the efforts of the researchers from SLU and Vietnam, rather than the funding agency. Most bilateral projects run for 3–4 years, but the involved researchers have applied for continued funding several times and it was the researchers involved in the *Sustainable Livestock-Based Farming Systems Research* programme that saw an opportunity to develop a wider regional programme to include Cambodia, Laos and Thailand and therefore wrote a proposal to Sida for funding. These two livestock-based programmes were together in operation for almost 20 years (1989–2018).

Scientific publications and research contributions to society, some of which have been described in this report, have been quite impressive. It is not possible to provide information on the

exact number of scientific publications and level of research uptake in society. The Vietnamese researchers have over the years built new international research partnerships and are part of international as well as regional and national research networks. They have managed to obtain funding from both Vietnamese and international sources. The Vietnamese government puts great emphasis on innovations and technology to develop the country further.

In conclusion, the collaborations have been successful in terms of results generated and used in rural areas in Vietnam. The approach by SLU to train MSc and PhD students according to the sandwich model has also been successful. The study points to the importance of long-term, flexible research programmes open to new ideas which can enable projects to evolve and adapt to changes. Moreover, research and teaching are done by people, and the personalities, communication skills, the ability to inspire and the mutual interest in research all play a part in how successful a research collaboration is and what kind of research environments are developed. The long-term personalised networks of the Swedish and Vietnamese scientists and their mutual interest in research have resulted in strong research relations which could continue (given that funding is available) not as capacity development programmes but as joint research projects between equal partners.

Lessons learnt are that long-term, large-scale capacity development collaborations have greater impact than smaller and short-term collaborations and can lead to sustainable development and change. A long-term perspective can moreover contribute to the development of strong relationships between researchers, which is a prerequisite for developing good research projects of mutual interest. Within the SLU-Vietnam collaborations,

key Vietnamese scientists have become change agents and have developed and led strong and effective research groups and created conducive research environments.

An important lesson is that exposure to international research and networks is crucial in order to develop conducive research environments. The study shows that the exposure the Vietnamese MSc and PhD students had to a Swedish research environment through the sandwich programme and the exposure the Swedish researchers and research students had to Vietnamese research environments have contributed to this development. Moreover, the development of research networks between the Vietnamese research institutions all over Vietnam has contributed to the creation of conducive research environments in several departments and institutions.

Another important lesson is that research capacity development programmes should, early on, plan for a continuation of collaborative research after a certain level of research capacity has been developed. It is in such a setting that important research collaborations can take place, which will benefit societies and contribute to sustainable global development.

There is a potential for future collaborations. A workshop to explore ideas might be a first step. The Vietnamese researchers in the fields of agriculture, forestry and rural development are involved in research of great relevance for sustainable development. There are major challenges to reach the Agenda 2030 goals, which means transforming agriculture and food systems into resilient systems with low emissions. There should be opportunities to build global partnerships between researchers from SLU, Vietnam and other countries to develop innovative and important research projects together.

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# Annexes

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## **Annex 1 ToR for an evaluation of SLU's research and capacity building collaborations in Vietnam**

### Background and objective

An analysis of the results of SLU's research and capacity building collaborations for global development was commissioned by the Vice-Chancellor of SLU<sup>24</sup>. The ultimate goal of the evaluation is to improve the quality of SLU's collaborations with partners in low and middle income regions by learning from the past. The specific objective of the evaluation is to identify results and relevant approaches of SLU's research and capacity building collaborations with Vietnam. Focus is on initiatives within the sectors relevant to agriculture, rural development, and forestry. The time scope for the study is 1977–2018.

SLU has been engaged in a diversity of collaborations with Vietnamese actors over the years, ranging from long-term engagements within the frames of larger Sida supported collaborations, to smaller research projects undertaken by individual researchers in Sweden in collaboration with individual researchers in Vietnam. Data and information from the different collaborations are not readily available in one place but need to be tracked and gathered from a diversity of sources, including people, libraries and databases. The evaluation will furthermore analyse this data and information, including results, challenges faced and lessons learned during the collaborations.

### Intended use and users

The evaluation is intended to increase the knowledge of the results of these joint collaborations and will contribute to SLU's learning to improve planning and implementation of future collaborative efforts. The primary intended users of the evaluation are the SLU management, SLU Global, and the wider SLU and Vietnamese research and higher education communities.

### Methods, evaluation questions and design

The evaluation study will include fact-finding in Sweden, fact-finding in Vietnam, analysis and report writing. The study should build upon both qualitative and quantitative data.

In accordance with the objective of this assignment, the evaluation shall:

- Document and analyse knowledge (research findings) that has been generated from research collaborations; and how and to what extent this knowledge has been used.
  - This shall include qualitative and quantitative data such as publications, methods or products resulting from the collaborations. It shall be analysed how and to what extent the knowledge has been used. Usage in terms of academic citations and citations in policy documents shall be documented. The study shall include bibliometric analyses and, for the more recent years, also altmetrics.
  - Additionally the evaluator shall, based on the information collected, select and present particular cases in form of 5–10 narratives of research findings generated through the collaborations; and how and to what extent they have been used in society e.g. by farmers, companies or public actors.

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24. *Rektors Beslut "Ansats för att mäta genomslag av SLUs forskning och kapacitetsuppbyggnad för global utveckling", 2018-09-19 (SLU ID: SLU.ua 2018.1.1.1-3309)*

- Document and analyse capacity that the collaborations have contributed at the individual and institutional/national level; and how and to what extent the capacity has been used.
  - This shall include, e.g., numbers of MSc and PhD graduates, as well as information about the work they have performed after graduation within academia and other sectors. The study shall include information about internationalisation (for example publications, collaborations, networking and mobility). It shall furthermore include capacity development results at the institutional level and potentially national level (e.g. establishment of MSc programs).
  - The evaluator shall, based on the information collected, select and present particular cases in form of 5–10 narratives of capacity building results and how and to what extent that capacity has been used beyond the initial collaborations with SLU.

The evaluator shall conduct interviews with any person considered appropriate, including with key people at SLU that have been involved in collaborations with Vietnamese actors in the past and present, with Vietnamese MSc and PhD graduates, senior researchers and other staff that have been part of the collaborations or that are expected to have benefited from knowledge or capacity from the collaborations.

The evaluator undertaking the assignment will get access to some information about key persons, bibliometric data, and key documentation. The evaluator shall independently build upon this information and track people and documentation to gather the data and information necessary for the evaluation.

The consultant shall in its proposal for the consultancy work present a brief evaluation plan. At the onset of the assignment, the evaluator shall provide an inception report with a further-developed evaluation design, methodology and methods for data collection and analysis, including specific questions to be addressed.

The evaluation must be conducted in a professional and ethical manner. Evaluators should take appropriate measures to protect the integrity of people concerned by the study and ensure that sensitive or confidential issues are appropriately addressed.

The evaluation will focus on results at the outcome level (according to the OECD DAC definitions).

### **Work plan and organisation**

The evaluator will report to SLU Global. The evaluator will be identified June–August. The evaluation, including the fact-finding phase, should be carried out September 2019 to February 2020. The time and work plan should be further detailed by the evaluator in the inception report.

The assignment will involve up to two visits to Vietnam, covering the field visits at relevant universities/institutions. The consultant will be required to arrange the logistics for preparing the field visits. The timing of the field visits needs to be decided by the evaluator in dialogue with the main stakeholders.

The evaluator should in an inception report suggest evaluation design, methodology and methods for data collection and analysis including specific questions to be addressed. The evaluator shall present a draft evaluation report at SLU Global at a time agreed during inception. The evaluator should submit the final report by February 28, 2020.

## Reporting

The consultant shall produce an **inception report**, a **draft evaluation report** and a **final evaluation report**. The reports should be submitted electronically to SLU Global. The reports shall be written in English, and the final report shall be approximately 20–40 pages, excluding annexes. The final evaluation report must be presented in a way that enables publication without further editing. Subject to decision by SLU, the report may be published. In addition to the reports, data (rådata), and other materials related to the study, such as power point presentations shall be made available to SLU.

## Qualifications

The task is to be carried out by a consultant, or a small team of consultants, possessing:

- Good understanding of academic systems at institutional and national level
- Extensive experience from development collaborations
- Expert knowledge of capacity-building building in low and middle income countries, preferably with experience from Vietnam
- Experience from evaluating development research co-operations
- Good analytical ability
- Good stylistic abilities
- A PhD degree
- Fluency in English and Swedish

## Annex 2 Examples of policy documents that cite an article with authors from SLU and Vietnam

Policy documents that cite an article with authors both from SLU and Vietnam	Research article cited
<p>World Health Organization &amp; Joint FAO/WHO Expert Committee on Food Additives (83rd, 2017: Geneva, Switzerland). (2017). <i>Evaluation of certain contaminants in food: eighty-third report of the Joint FAO/WHO Expert Committee on Food Additives</i>. WHO Technical Report Series; 1002. World Health Organization.  <a href="https://apps.who.int/iris/handle/10665/254893">https://apps.who.int/iris/handle/10665/254893</a></p>	<p>Phuong N.H., Thieu N.Q., Ogle B. &amp; Pettersson H. (2015). Aflatoxins, fumonisins and zearalenone contamination of maize in the Southeastern and Central Highlands provinces of Vietnam. <i>Agriculture</i>, vol. 5, pp.1195–1203.            doi:10.3390/agriculture5041195</p>
<p>Elbehri, A., Challinor, A., Verchot, L., Angelsen, A., Hess, T., Ouled Belgacem, A., Clark, H., Badraoui, M., Cowie, A., De Silva, S., Erickson, J., Joar Hegland, S., Iglesias, A., Inouye, D., Jarvis, A., Mansur, E., Mirzabaev, A., Montanarella, L., Murdiyarsa, D., Notenbaert, A., Obersteiner, M., Paustian, K., Pennock, D., Reisinger, A., Soto, D., Soussana, J-F, Thomas, R., Vargas, R., Van Wijk, M. &amp; Walker, R. (2017). <i>FAO-IPCC Expert Meeting on Climate Change, Land Use and Food Security: Final Meeting Report. January 23-25 2017</i>. FAO HQ Rome: FAO and IPCC.</p>	<p>Nguyen, Q., Hoang, M.H., Öborn, I. &amp; van Noordwijk, M. (2013). Multipurpose agroforestry as a climate change resiliency option for farmers: An example of local adaptation in Vietnam. <i>Climatic Change</i>, vol. 117, pp. 241-257.            doi:10.1007/s10584-012-0550-1</p>
<p>Vergne, T., Fournié, G., Hardstaff, J., Tornimbene, B., Pfeiffer, D.U. &amp; Otte, J. (2014). <i>Report on Antimicrobial Usage and Alternatives for Prophylaxis and Performance Enhancement in Pig Populations in East and Southeast Asia</i>. Bangkok: FAO.  <a href="http://www.fao.org/3/a-bt720e.pdf">http://www.fao.org/3/a-bt720e.pdf</a></p>	<p>Giang, H. H., Viet, T. Q., Ogle B. &amp; Lindberg, J. E. (2012). Growth performance, digestibility, gut environment and health status in weaned piglets fed a diet supplemented with a complex of lactic acid bacteria alone or in combination with <i>Bacillus subtilis</i> and <i>Saccharomyces boulardii</i>. <i>Livestock Science</i>, vol. 143, pp. 132-141.            doi:10.1016/j.livsci.2011.09.003</p>
<p>EFSA Panel on Additives and Products or Substances used in Animal Feed (FEEDAP). (2011). <i>Scientific Opinion on the safety and efficacy of bentonite (dioctahedral montmorillonite) as feed additive for all species</i>. EFSA Journal 2011;9(2):2007.            doi:10.2903/j.efsa.2011.2007.</p>	<p>Thieu, N.Q., Ogle, B. &amp; Pettersson, H. (2008). Efficacy of bentonite clay in ameliorating aflatoxicosis in piglets fed aflatoxin contaminated diets. <i>Tropical animal health and production</i>, vol. 40, pp. 649-656. doi:10.1007/s11250-008-9144-3</p>

<p>FAO and ITPS. (2015). <i>Status of the World's Soil Resources (SWSR) – Main Report</i>. Food and Agriculture Organization of the United Nations and Intergovernmental Technical Panel on Soils. Rome: FAO.  <a href="http://www.fao.org/3/a-i5199e.pdf">http://www.fao.org/3/a-i5199e.pdf</a></p>	<p>Khai, N.M., Ha, P.Q. &amp; Öborn, I. (2007). Nutrient flows in small-scale peri-urban vegetable farming systems in Southeast Asia—A case study in Hanoi. <i>Agriculture, Ecosystems &amp; Environment</i>, vol. 122, pp. 192–202.  doi:10.1016/j.agee.2007.01.003</p>
<p>Verheijen, F.G.A., Jeffery, S., Bastos, A.C., van der Velde, M., and Diafas, I. (2010). <i>Biochar application to soils - a critical scientific review of effects on soil properties, processes and functions</i>. EUR 24099 EN, Office for the Official Publications of the European Communities, Luxembourg.  DOI: 10.2788/472</p>	<p>Van, D.T.T., Mui, N.T. &amp; Ledin, I. (2006). Effect of processing foliage of <i>Acacia mangium</i> and inclusion of bamboo charcoal in the diet on performance of growing goats. <i>Animal Feed Science and Technology</i>, vol. 130, pp. 242–256.  doi:10.1016/j.anifeedsci.2006.01.008</p>
<p>Mostrag-Szlichtyng, A. &amp; Worth, A.P. (2010). <i>In silico modelling of microbial and human metabolism: a case study with the fungicide carbendazim</i>. EUR 24523 EN, Office for the Official Publications of the European Communities, Luxembourg.  op.europa.eu/en/publication-detail/-/publication/31a861c7-19db-49ed-9ff6-606cfd701eda/language-en/format-PDF</p>	<p>Berglof, T., Van Dung, T., Kylin, H. &amp; Nilsson, I. (2002). Carbendazim sorption-desorption in Vietnamese soils. <i>Chemosphere</i>, vol. 48, pp. 267–273. doi:10.1016/s0045-6535(02)00096-6</p>
<p>Elbehri, A., Challinor, A., Verchot, L., Angelsen, A., Hess, T., Ouled Belgacem, A., Clark, H., Badraoui, M., Cowie, A., De Silva, S., Erickson, J., Joar Hegland, S., Iglesias, A., Inouye, D., Jarvis, A., Mansur, E., Mirzabaev, A., Montanarella, L., Murdiyarsa, D., Notenbaert, A., Obersteiner, M., Paustian, K., Pennock, D., Reisinger, A., Soto, D., Soussana, J-F, Thomas, R., Vargas, R., Van Wijk, M. &amp; Walker, R. (2017). <i>FAO-IPCC Expert Meeting on Climate Change, Land Use and Food Security: Final Meeting Report</i>. January 23–25 2017. FAO HQ Rome: FAO and IPCC.  <a href="http://www.fao.org/3/a-i7068e.pdf">http://www.fao.org/3/a-i7068e.pdf</a></p>	<p>Beckman, M. &amp; Thi Nguyen, M.V. (2016). Upland development, climate-related risk and institutional conditions for adaptation in Vietnam. <i>Climate and Development</i>, vol. 8, pp. 413–422.  doi:10.1080/17565529.2015.1067178</p>
<p>1. Anderson, A. (2018). <i>Leaving the EU: Antimicrobial Resistance</i>. UK Parliament Briefing notes. <a href="https://researchbriefings.parliament.uk/ResearchBriefing/Summary/LLN-2018-0087">researchbriefings.parliament.uk/ResearchBriefing/Summary/LLN-2018-0087</a>  2. World Health Organization. (2017). Global antimicrobial resistance surveillance system (GLASS) report: early implementation 2016–2017. World Health Organization. <a href="https://apps.who.int/iris/handle/10665/259744">apps.who.int/iris/handle/10665/259744</a>. License: CC BY-NC-SA 3.0 IGO  3. FAO (2016). <i>FAO Aquaculture Newsletter</i> 55.</p>	<p>Robinson, T.P., Bu, D.P., Carrique-Mas, J., Fevre, E.M., Gilbert, M., Grace, D., Hay, S.I., Jiwakanon, J., Kakkar, M., Kariuki, S., Laxminarayan, R., Lubroth, J., Magnusson, U., Ngoc, P.T., Van Boeckel T.P. &amp; Woolhouse M.E.J. (2016). Antibiotic resistance is the quintessential One Health issue. <i>Trans R Soc Trop Med Hyg</i>, vol. 110, pp. 377–380. doi:10.1093/trstmh/trw048</p>

Sherasia, P.L, Garg, M.R. and Bhanderi, B.M. (2017). *Pulses and their by-products as animal feed*. Edited by Calles, T. & Makkar, H.P.S. Rome: FAO. <http://www.fao.org/3/a-i7779e.pdf>

Thang, C.M., Sanh M.V. & Wiktorsson, H. (2008). Effects of supplementation of mixed cassava (*Manihot esculenta*) and legume (*Phaseolus calcaratus*) fodder on the rumen degradability and performance of growing cattle. *Asian-Australian Journal of Animal Sciences*, vol. 21. pp. 66-74. doi:10.5713/ajas.2008.60487

### Annex 3 Questionnaire

Welcome to the SLU online survey!

This survey is designed to cover all of you who have been collaborating with SLU in various capacities over the years. Some of you have taken a MSc as part of the SLU collaboration and then continued at other universities in Vietnam or abroad to take your PhD, some have not continued with an academic training after MSc but continued with other kinds of work. Some of you have taken both a MSc and PhD as part of the SLU-Vietnam collaboration. The survey is addressing all of you. There are many open questions which you can fill in as you see fit. To fill in the survey takes about 30–40 minutes. SLU would like to have your replies within 2 weeks from when you receive the survey. Your answers are important to SLU.

So, please, start the survey!

1. Background information
  - a. Gender (Female/Male)
  - b. Age
2. Year of graduation MSc degree or equivalent
3. Country of graduation MSc degree or equivalent (SLU, Sweden/Vietnam/Other, please specify)
4. Did you continue to a PhD degree? (Yes/No)
5. At which university were you enrolled during your PhD training?
6. Was your PhD training organized according to the “Sandwich model” – meaning that part of your training were based at SLU? (Yes/No)
7. How did you experience the periods of training in relation to the following aspects (Very good/Good/Difficult/Very difficult):
  - a. Periods of research training at SLU
  - b. Periods of research training at home university in Vietnam
  - c. Supervision at SLU
  - d. Supervision at home university
  - e. Resources for research (equipment and time) at SLU
  - f. Resources for research at home university
  - g. Collegial support and research networks at SLU
  - h. Collegial support and research networks at home university
8. Year of graduation PhD degree
9. Country of graduation PhD degree (SLU, Sweden/Vietnam/Other, please specify)
10. Career path since MSc or PhD graduation
  - a. Did you get employment at a university/research institute after your graduation? (Yes/No)
  - b. If Yes, what was your first position?
11. If you did not continue at a university/research institute what did you do? What was your first employment?
12. Current career information  
Where do you work today (or if retired where did you work before retirement)?
  - a. University/research institute
  - b. Government agency/ministry
  - c. Other Public agency
  - d. International/regional organization

- e. Non-Governmental Organization (NGO)
  - f. Private sector company Self-employed/consultant
  - g. Unemployed/between jobs
  - h. Other, please specify
13. What is your current position (or was your last position if retired or unemployed)?
- a. Executive (Minister, Director General, CEO etc.)
  - b. Professor
  - c. Associate professor
  - d. Dean/ Head of Department
  - e. Lecturer
  - f. Professional staff (forester, agronomist etc)
  - g. High Official at government organisation/international organization or NGO
  - h. Senior management
  - i. Middle management
  - j. Consultant
  - k. Other, Please specify
14. Nature of current work (or recent) More than one option is possible
- a. Research
  - b. Teaching/lecturing
  - c. Supervision at BSc and MSc level
  - d. Supervision at PhD level
  - e. Management and administration
  - f. Professional work (forester, agronomist, veterinarian)
  - g. Laboratory work
  - h. Policy/analysis
  - i. Development work/project implementation
  - j. Consultancy
  - k. Other, Please, specify
15. Besides your current or recent position, describe your work experience since MSc or PhD graduation (for example, first I did this and after a year I got another job...)
16. If you have a position at a university/institute, to what extent do you conduct research?
- a. More than 75% of full time
  - b. 75% of full time
  - c. 50% of full time
  - d. 25% of full time
  - e. Less than 25% of full time
  - f. Not at all
17. Are you satisfied with the amount of time you can devote to research?
- a. Very satisfied
  - b. Satisfied
  - c. Not very satisfied
  - d. Not satisfied at all
18. To what extent do you think that your current work corresponds to your academic qualifications?
- a. To a very large extent
  - b. To a large extent
  - c. To a small extent
  - d. Not at all
19. In your opinion, have you experienced that gender aspects have influenced your career path? (free-text answers)

20. To what extent have you since graduation published your research in the following types of publications? (To a large extent/To some extent/To a small extent/Not at all)
  - a. Peer reviewed international journals
  - b. Peer reviewed national journals
  - c. Policy briefs University reports
  - d. Books or chapters in books
  - e. Teaching materials
  - f. Papers for conferences etc.
  - g. Other reports/NGO/private sector
21. Please, give 1–2 examples of articles/reports that you have authored and consider being of special importance
22. How many publications of the following types have your authored since graduation? (1–3; 4–6; 7–9; 10–12; 13 or more)
  - a. Peer reviewed international journals
  - b. Peer reviewed national journals
  - c. University reports
  - d. Books or chapters in books
  - e. Teaching materials
  - f. Papers for conferences etc.
23. To what extent have you worked with researchers/teachers from other countries after graduation? (To a very large extent/ To a large extent/ To some extent/ Not at all)
  - a. Joint research applications/projects
  - b. Joint publications
  - c. Joint educational programs
24. To what extent have you worked with researchers/teachers from SLU after graduation?
  - a. To a very large extent
  - b. To a large extent
  - c. To a some extent
  - d. Not at all
25. Have you ever worked abroad since graduation? (Yes/No)
  - a. If yes, please provide name(s) and country(ies) and duration of stay for each country
26. What kind of work did you do during your stay abroad? Please, explain
27. To what extent are you now or have been involved in the following types of research networks? (To a large extent/ To some extent/ To a small extent/ Not at all)
  - a. International research networks with researchers from several countries
  - b. Regional research networks with researchers from several countries
  - c. National research networks with Vietnamese researchers
28. If you are involved in one or more research networks, what has been the driving force behind your engagement in these networks? Please, explain
29. Please, give your thought on what the collaboration with SLU has meant to you personally and to your workplace
30. To what extent do you think that your research results have contributed to the following (To a large extent/ To some extent/ To a small extent/ Not at all):
  - a. Policy development in the fields of agriculture, rural development and forestry
  - b. Development of new information to extension staff at ministries
  - c. Change of agricultural or forestry methods and praxis
  - d. New agricultural/forestry products emanating from research findings
  - e. Innovations within the field of agriculture, rural development and forestry
  - f. Advancement of the international research frontline
  - g. Advancement of the national research frontline

- h. Poverty reduction in Vietnam
31. In reference to the question above, can you provide some examples of how your research results have been used in society?
  32. Suggestions for the future To what extent are you interested in a continued contact/collaboration with SLU regarding the following: (To a large extent/ To some extent/ To a small extent/ Not at all)
    - a. Joint research applications/projects
    - b. Joint research networks
    - c. Joint educational programs
    - d. Refresher courses in various subjects
    - e. SLU alumni
  33. Are you interested in other types of collaborations than the ones mentioned above? Please, develop your ideas
  34. Is there something not covered in the survey you would like to add regarding the past and possible future collaborations with SLU?





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