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# The Value of Capacity Building in Bilateral Research Projects: Institutional and Individual Perspectives in Vietnam

Technical Report 089



# **The Value of Capacity Building in Bilateral Research Projects: Institutional and Individual Perspectives in Vietnam**

## **Technical Report**

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## 1 Background and Objectives

Research funders such as ACIAR typically invest in a spectrum of activities, including human capacity building, in pursuit of economic, social and environmental benefits. Capacity development includes strengthening institutions and organisations, informal individual on-the-job training, mentoring, learning by doing, and formal individual qualifications from Australian and partner country institutions.

ACIAR has a strong record in estimating the impact of research leading to new technologies. It is, however, less experienced in valuing research activities that add to human scientific capacity either through formal training programs or through each research project's informal and learning-by-doing component.

To fill that gap, ACIAR commissioned Gordon and Chadwick (2007) to review the literature, devise an evaluation framework, and apply their approach in two case studies. They apportioned estimates of total welfare gains from a new technology between a) building the capacity of project teams and b) the project's research outcomes. They qualitatively recognised that new knowledge and research outcomes could later lead to new technology.

ACIAR commissioned Gray et al. (2015) to develop a research program extending Gordon and Chadwick's work to provide further confidence in the value of ACIAR's investment in capacity building, and to develop practical processes by which project development, reporting and impact assessment could routinely incorporate investment in, and benefits from, capacity building. Gray et al. recommended that the project's next stage should focus on forestry and fisheries projects ACIAR funded in two Vietnamese research institutions: the Research Institute for Aquaculture No. 1 (RIA1) and the Forest Science Institute of Vietnam (FSIV, now called the Vietnam Academy of Forest Sciences, VAFS).

Two companion projects look at the impacts of capacity building from two perspectives. The first study, presented in this report, assessed the institutional and individual capacity ACIAR programs built in RIA1 and VAFS. The second study reassessed the impact of three projects these institutes hosted: IAS 27 on Acacia Hybrids in Vietnam, IAS 47 on Improved Australian Tree Species in Vietnam, and the Final Report on Building Bivalve Hatchery Production Capacity in Vietnam and Australia. The results from the second study are published in IAS 93.

This report assesses capacity building from institutional and individual perspectives, and aims:

- To better understand the medium- and long-term benefits of formal and informal capacity building in institutions. Based on the scoping study's results, this assessment phase will focus on VAFS and RIA1.
- To better understand the career paths of ACIAR-funded scholars, presenting case studies of John Allwright Fellows (JAFs) and John Dillon Fellows (JDFs) from key institutes.
- To improve project design and report pro-forma to better include capacity building.

These institutions were specifically selected to develop a methodology to track the benefits of capacity building in the ACIAR program. In these two institutions, almost all capacity building has been successful. It is likely that there would be a wide range of outcomes in other institutions in Vietnam and elsewhere.

### 1.1 Definition of Individual and Institutional Capacity Building

Capacity building is at the core of ACIAR work, and is implicitly or explicitly part of all ACIAR activities. ACIAR pursues capacity building not for its own sake, but because it can enhance the welfare of farmers and others in partner countries. This project assesses the impact of capacity development at two levels based on the Food and Agriculture Organization of the United Nations (FAO) definition (2010):

- *At individual level:* Capacities developed by individuals lead to changes in skills, behaviours and attitudes among ACIAR project partners and collaborators. Formal and informal training, knowledge sharing, and networking are ways of strengthening individual capacities. In this context, informal training includes mentoring and learning by doing.
- *At institutional level:* To strengthen an organisation's capacity, measures should be taken to improve the organisation's overall functioning and performance. This directly affects how individuals within the organisation develop their competencies and use their capabilities. In ACIAR's case, the impacts at organisational level should be considered a spillover of the individual capacity developed. Trained individuals returning to their institution might play a stronger role in setting priorities or provide leadership in other research areas. For the institution's capacity to exceed the sum of individual scientists' capacities, there must be gains from co-operation and teamwork. Increasing institutional capacity could improve livelihoods for Vietnamese farmers and others when it results in new technologies, practices or policies that lower costs and increase profitability. These gains arise, for example, if institutions allocate research resources more efficiently through improved priority setting.

### 1.2 Previous Studies of Research for Development Capacity Building

Several studies have attempted to evaluate the effectiveness of externally-funded training programs in Vietnam that focused on postgraduate or 'young scientist' awards. ACIAR surveyed the John Allwright Fellowship (JAF) scheme (Harvey and Skerritt 2004; Muller and Morton 2008) and the 'returnee' grants awarded to JAFs when they return to their home institutions. The Swedish government studied PhD graduates across a wider range of topics (Swedish International Development Cooperation Agency; SIDA 2009), and the Australian government Department of Foreign Affairs and Trade (DFAT) surveyed more than 1,000 Australia Awards recipients (Australian Scholarships for Development in Vietnam; ASDiV 2011). The International Foundation for Science (IFS) surveyed recipients of its grant scheme in Vietnam, most of whom were already Master's or PhD graduates (Zink 2009). These studies commonly used questionnaires delivered to awardees on their institutional database, to which a proportion responded. SIDA and IFS followed these with face-to face interviews. DFAT's new approach to tracking Australian awardees is to combine

questionnaire surveys (every three years for each awardee) with a smaller number of face-to-face interviews. Summaries of these published studies are in Appendix 3. A mechanism for doing this through the Australia Awards Global Tracer Facility has been designed but not yet funded or implemented. To our knowledge, the informal capacity building that is an important component of successful collaborative research has never been formally assessed.



## 2 Conclusions and Rationale from the Scoping Study

The scoping study (Gray et al. 2015) reached several conclusions described here with comments on how this study acted on or modified them.

1. Methods for attributing research impact to capacity building will be a starting point for enriching ACIAR's impact assessment process. The impact pathway should clearly describe how institutions and later projects used capacity built during projects.

We endorse that initial view by emphasising the importance of developing an impact pathway for each project, which has both *tactical* (achieving project outputs and outcomes) and *strategic* (longer term and potential spillover economic, environmental and social benefits, and building research for development capacity) results. In this report, we further define *aggregate capacity building* as part of future assessments of institutional capacity.

2. Two Vietnamese institutions, Research Institute for Aquaculture No. 1 (RIA1) and the Forest Science Institute of Vietnam (FSIV), are appropriate institutions for study, based on continuous engagement, numerous projects, John Allwright Fellowships (JAFs), and observable change.

Both institutions co-operated fully and enthusiastically in the study. Current and former staff were available, open to a broad conversation, and provided rich information and answers.

3. ACIAR projects typically invest 10%–40% of their total budget in capacity building, based on an analysis of the Vietnamese institutions and the projects they implemented. As defined in Gray et al. (2015), the complementarity of human capital with investments in research, technology, physical capital and institutional infrastructure makes evaluating only the investment in capacity building difficult. This complementarity (jointness) applies at both the input and output levels. These issues of jointness and underreporting make it difficult to obtain an exact project investment figure. The study's second phase will attempt to define reporting processes that might allow researchers to more objectively assess investment in capacity building.

This became a major output of the present study, which emphasises the more complete planning and reporting of capacity building needs, activities and results, and suggested reporting tables.

4. Published reports on the John Allwright Fellowship (JAF) program are based on mail-out surveys and case studies, and do not analyse long-term impacts on individuals or the institutions to which they contributed their capacity. These studies rarely asked how capacity had been applied. The organizational framework that ISNAR (International Service for National Agriculture Research) developed for agricultural research and development is a good starting point for measuring institutional change.

This study attempted to develop case studies based on a wider range of interviews to illustrate the main results. Integrating these approaches with the planned DFAT protocols for assessing the Australia Awards could provide further quantification of scholarship impacts.

5. The Independent Training Program Review (1998) recommended integrating the reporting of formal and informal training. Although tentative steps have been taken to report on informal training, they have been incomplete and difficult to summarise and analyse. The most easily identified initiatives are the addition in Part I of project budgets (1998–2002) and the elaboration of a Student Register (2006–2009). Project reporting of capacity building inputs, outputs and outcomes is variable. Some examples are found in the adoption studies (Appendix 2); specific examples are, however, only rarely identified.

We collected further examples on formal and informal capacity building. Administration and reporting of all capacity building has to start at the project level. Better identifying capacity building needs will allow better targeting, delivery, reporting and evaluation of formal and informal capacity building.

6. ACIAR projects uniquely combine research activities and capacity building, and their most significant legacies can be the capacity building and scientific impacts (Appendix 2, AS 003). Sometimes, capacity building is an explicit and essential part of the technology transfer from the project (Appendix 2, AS 005). In other cases, ACIAR projects establish productive networks of exchange and develop a soft infrastructure that becomes productive in later years (Appendix 2, AS 006). This scoping study concludes that a monitoring framework for capacity building is warranted.

The current study gathered further information and evidence to support the conclusion that a monitoring framework could be implemented. It makes recommendations about the format of a monitoring and evaluation framework. Evidence collected and presented in the case studies also supports the benefits of networks and soft infrastructure that lead to future collaborations and knowledge exchange.

### 3 Methodology

The research team reviewed project documents, proposals, reports and impact assessments to identify which scientists and students to interview and the skills they may have acquired during their involvement in ACIAR-funded projects. We prepared a list of interviewees in conjunction with the ACIAR country office in Hanoi. This list included project leaders, project scientists, John Allwright Fellows (JAFs), and John Dillon Fellows (JDFs). We discussed this list with Australian and Vietnamese project leaders to ensure it identified key project scientists. Appendix 1 presents the list of people interviewed and the projects they relate to.

We conducted eight interviews in Australia; in Vietnam, we conducted 22 interviews in person and two by phone. In most cases one person led the interview, while another took notes and checked that the list of relevant key questions had been answered. Each interview lasted approximately one hour. The whole research team reviewed these notes and presented the key points to the leaders of the Vietnamese Academy of Forest Sciences (VAFS) and Research Institute for Aquaculture No. 1 (RIA1) for further discussion. The key questions are in Appendix 2.

As the period of interest covered 20 years of funding, individuals fell into more than one category—as project scientists on earlier projects, project leaders on later projects, and as a JAF or JDF. Records of all the interviews are in a database held by ACIAR's Impact Assessment program, and may be available for further research.

## 4 Sector and Institute Overview

### 4.1 Fisheries and RIA1

Vietnam's fisheries supply protein food to the population and are a significant source of income for the nation. As wild capture resources have declined in recent decades, aquaculture production has increased in importance and volume.

Aquaculture first started on a small scale in the 1960s, and was an important source of food during the war. Aquaculture has become an important source of domestic food supply, employment and export earnings.

The main aquaculture species are pangasias (catfish), shrimp (white leg and black tiger), tilapia, carp, cobia, grouper, lobster, and various clams. Production reached 5,732,900 tonnes in 2012 (3,110,700 from aquaculture and 2,622,200 from wild capture). Total seafood export grew from US\$782 million in 1997 to US\$6.150 billion today. Aquaculture production grew from 173,000 tonnes in 1992 to 3.2 million tonnes today. The total area under aquaculture doubled between 2000 and 2012, with 750,000 ha of brackish water and 450,000 ha of freshwater used for aquaculture.

The fisheries sector employs more than 4 million people. This is made up of fishing (29.55%), aquaculture (40.52%), seafood processing (19.38%), and services (10.55%). Jobs increased by 150,000 jobs per year from 2001 to 2011. The target is for 2.5 million jobs in aquaculture alone by 2020.

There are three regional aquaculture research institutes under the Ministry of Agriculture and Rural Development: Research Institute for Aquaculture No. 1 (RIA1), which is responsible for fisheries in northern Vietnam; Research Institute for Aquaculture No. 2 (RIA2), responsible for the Mekong Delta; and Research Institute for Aquaculture No. 3 (RIA3), which focuses on Southern Coastal Vietnam. Two universities have strong fisheries departments and research programs: Nha Trang University (formerly the University of Fisheries) and Can Tho University, in the Mekong Delta.

RIA1 started as the Research Station for Freshwater Fish in 1963. This became the Research Institute for Inland Aquaculture in 1978 and the Research Institute for Aquaculture No. 1 in 1983. RIA1 has led ten of the 21 fisheries projects ACIAR has funded in Vietnam since 1998.

Dr Le Thanh Luu was the Director of RIA1 until 2013 and the project leader for all ACIAR projects at RIA1 until that time. Former Vice-Director Dr Phan Thi Van succeeded him as Director. She changed the way the Institute operates. The institute is now more flexible and mobilises resources more easily. Three functional departments under her direction (Planning & Financial, Human Resources, and International Co-operation) and nine research centres have a high degree of financial autonomy and responsibility. Centres can now source funds from the government, industry, international donors, and consulting services. Dr Van said that scientists are encouraged and have the right to explore research topics within their centres. RIA1 now has a stronger extension focus/pathway, with a new Technology Transfer Centre.

Both Dr Luu and Dr Van have built staff capacity and sought opportunities for their staff to participate in international projects and seek scholarships for overseas study. Strong leadership has been a characteristic of RIA1 over the last 20 years.

RIA1 has 254 staff (95 women), of whom 13 have PhDs, mostly from abroad, 55 hold a Master's degree, 130 a Bachelor degree, and 52 do not have tertiary education. At the time of writing, 20 PhD and 12 Master's students are studying overseas.

Many RIA1 personnel have worked in fisheries management positions at MARD (Ministry of Agriculture and Rural Development), and many former RIA1 staff are now in senior positions there. Dr Nguyen Huu Ninh, a former Vice-Director, was recently appointed Director of RIA3 in Nha Trang; Dr Bui The Anh is now in MARD Research Management; former Vice-Director Dr Tran Dinh Luan is now Vice-Director of Soc Trang Provincial DARD; and Dr Pham Anh Tuan, a former Vice-Director, is now Vice-Director of the Directorate of Fisheries with MARD.

RIA1 has received an increasing amount of funds from international co-operation over the last 15 years. Staff described how donors work in different ways. ACIAR built capacity through short courses, degrees, learning by doing, and providing unique technology. The Vietnamese scientists interviewed admitted that while ACIAR funding is not as large as other agencies', it is more focused on science. They appreciated ACIAR's unique way of managing projects. Other significant donors have been NORAD (Norwegian Agency for Development Cooperation), DANIDA (Danish International Development Agency), and, to a lesser extent, Spain, Finland, the UNDP (United Nations Development Program), and the FAO (Food and Agriculture Organization of the United Nations).

Several staff members believed international collaboration strengthened RIA1 with increased teamwork. Dr Van said: "Individuals are very clever, but groups are very effective." DANIDA programs and NORAD have had significant capacity building programs, with training courses and opportunities for PhD and Master's scholarships, but have not had ACIAR's ongoing and longer term research projects.

#### 4.2 Forestry and VAFS

Vietnam's forestry sector has developed significantly over the last 20 to 30 years. Vietnam's forest cover has declined significantly since the 1940s, and was reduced to 9.125 million ha (28%) by 1990. The rapid decline in forest area and degradation of natural forests led to significant government reforestation programs, notably Program 327 and the Five Million Hectare Reforestation Program. These programs increased forest cover to over 40% by 2012, with planted forests accounting for more than 25% of forest area. The standing volume of plantation forest increased from 14.5 million m<sup>3</sup> in 1995 to 73.5 million m<sup>3</sup> in 2010. Households own 24% of the forest land. This figure would be higher for planted forests—up to 50%. The forestry strategy to 2020 focuses on improving both the quality of forests and wood processing.

Wood processing has become an important employer and export earning industry for Vietnam. The industry increased by 16% each year between 2007 and 2013. Export revenue of wood products (furniture and chip wood) increased from US\$1.9 billion in 2006 to US\$6.2 billion in 2014. There are now about 3,500 medium- to large-scale wood processing

enterprises nationwide, employing about 300,000 labourers. Vietnam, however, still depends on importing high quality sawlogs for furniture making, and imports 40%–50% (4 million m<sup>3</sup> per year) of sawn logs.

The Vietnamese Academy of Forest Sciences (VAFS) has notably changed in the last 20 years. After some decades of slowly building its research strength and its scientists' education level, the Institute was upgraded to an Academy in 2012, and many research centres (such as the Tree Breeding Centre) have been upgraded to Institute level. This means they now have financial autonomy, which is particularly important for managing projects. VAFS has 650 staff, and about 60 have PhDs; approximately half of these have PhDs from overseas, and at least ten from Australia. ACIAR funded seven (and three Master's), and AusAID funded the remainder.

VAFS is the primary forestry research organisation in Vietnam, but two other research centres in the north of Vietnam were also active over the last 20 to 30 years. The Forest Research Centre (FRC) attached to Bai Bang paper mill focused on growing improved trees to be milled. This centre received significant support from Sweden, including funding for good infrastructure (tree breeding facilities), and also led one ACIAR-funded project on mixed species plantations. FRC is less prominent than it was a decade ago; it retains a focus on breeding and propagating eucalypts for supply to nearby landholders who grow trees for the mill.

The Central Seed Company, under the Ministry of Agriculture and Rural Development (MARD), also had a research group with good infrastructure that was more active in the 1990s. Its research is now weak, and it does not contribute research to the sector.

Universities have increased their research programs in recent years. Before the 1990s, universities were largely seen as teaching centres, and national research institutes carried out research. Now, however, universities can apply for research funds from MARD and MOST (Ministry of Science and Technology), and are trying to build their capacity in research. Forestry research universities include the Vietnam Forestry University, Thai Nguyen University of Agriculture and Forestry, Hue University of Agriculture and Forestry, and Ho Chi Minh City University of Agriculture and Forestry. While these institutions increasingly compete for research funds, VAFS is clearly the leading forestry research institute and has contributed the most knowledge to the sector over the last 50 years.

ACIAR has been the major sponsor for research with VAFS. SIDA–SAREC (Swedish International Development Cooperation Agency–Department of Research Cooperation) has also been a strong supporter, and began support early (from 1987–2008). This comprised small projects in tree breeding, mostly on pine species, and academic training and short-term training in collaboration with the Forest Research Institute and SLU (Swedish University of Agricultural Sciences). SAREC funded capacity building principally through short-term training, with less funding for research than ACIAR. This funding was, however, flexible in how it was used, and the Vietnamese had a high level of discretion over the researchable issue. The Center for International Forestry Research (CIFOR) has supported strategy development but not many practical skills. German funding mainly focussed on natural forests, assessing and classifying forests, planning land use and managing community forests.

The Japan International Co-operation Agency (JICA) also funded a significant project, the RENFODA (Rehabilitation of Natural Forest in Degraded Watershed Area in the North of Vietnam) project in Hoa Binh province. The project office was hosted at the Forest Science Institute of Vietnam (FSIV). The project was, however, more a development project, with FSIV providing expert knowledge, and it carried out little research.

When ACIAR's Forestry Research program began in Vietnam in 1993, ACIAR chose to invest in research on planted forests. Vietnam had suffered a prolonged period of deforestation, and the Government of Vietnam was keen to address the decline in the country's timber resources and to reforest degraded lands. Given the large area of land targeted for replanting, this was an area of significant need.

While improved native forest management to arrest the decline in native forest coverage and quality was another priority for the government, other donors (notably Germany) were already providing support in this field. As many of the opportunities for plantation species were from Australia and the region, Australia had the appropriate scientific skills and experience to share with the Vietnamese. The Australian Tree Seed Centre was also a significant repository for seeds from species and provenances of interest to the Vietnamese. Additionally, through Professor Kha and his team, CSIRO had established early on a productive working relationship upon which to build further collaboration.

The Research Centre for Forest Tree Improvement (RCFTI; now the Institute for Forestry Tree Improvement and Biotechnology) has been the key research partner for most ACIAR-funded projects in Vietnam. Although CSIRO and ACIAR met and investigated other FSIV departments, they did not find partners whose interest continued beyond the first discussion or two. This Research Centre continued to be engaged in most ACIAR projects, partly due to the success of the tree breeding partnership with CSIRO. It clearly has benefited over time, and became a strong institute within the Academy.

While this study focuses on VAFS, it is largely based on interviewing staff at the Tree Breeding Institute, which is one of, if not the, strongest institutes in the Academy. 18 of the 19 ACIAR-funded timber plantation forestry projects in Vietnam involved FSIV, and the tree breeding group led 14. Few ACIAR-funded forestry projects have been led by other institutions in Vietnam—only one project with FRC and a few on mangroves and *Leucaena* with other institutions.

Although projects emphasised tree breeding, Vietnamese research managers recognised early on that there was a need to better understand the techniques for processing plantation timber for sawn boards in order to produce higher value products relative to pulpwood. ACIAR made efforts to diversify the forestry research, and two wood processing research projects were funded—one in 1999 on sawing and drying plantation-grown eucalypts and acacia, and a more recent project on using acacia plantation timber for veneer. VAFS has also been involved in an agroforestry project led by ICRAF (World Agroforestry Centre), principally through a provincial research centre under VAFS.

## 5 Analysis on Individual Capacity Building

### 5.1 Perspectives on Capacity Building

In this analysis, we will distinguish between knowledge discovery and capacity building, as explained in the companion study (Mullen et al. 2016). ACIAR-funded research projects have these joint elements, with varying importance depending on the project's nature and objective: a capacity building component through formal and informal (learning by doing and mentoring) activities, resulting in scientists with more experience and strengthened research institutions, and a knowledge discovery component in the form of trials and experiments leading to new practices, technologies and tree species ready for farmers to use.

During our interviews, we aimed to identify what type of skills scientists acquired, and how they used them, and the respondent's views on how the ACIAR-funded project balanced capacity building and knowledge discovery. All the people we interviewed agreed that both aspects were necessary in a research project, but had different views on their importance. Gray et al.'s scoping study (2015) defined that 10% to 40% of the budget was allocated to capacity building, and an average of 17% for forestry and fisheries projects. Gordon and Chadwick assessed it at 20% as a general rule. Our results are different.

When we interviewed scientists in the Seeds of Australian Trees (FST/1993/118) and Domestication of Australian Trees (FST/1998/096) projects, a CSIRO project leader judged the balance between capacity building and knowledge discovery to be equal, whereas two Vietnamese scientists who participated in the project thought that the knowledge discovery activities were more important. The acacia polyploid project was designed to be a more research-oriented project, and both the Australian project leader and the Vietnamese scientists estimated that 80% of the project outcomes could be attributed to the knowledge discovery process and 20% to capacity building.

On the other hand, the Australian scientists who participated on the oyster project estimated that more than 70% of the project resources were allocated to capacity building, and only 25% to 30% of the project activities related to knowledge discovery. In contrast, a senior Vietnamese scientist thought it was more balanced, with a 50/50 split.

The differences in these estimates are understandable. The assessment of what is capacity building and what is knowledge discovery depends on the scientist's perspective. For example, the oyster project in Vietnam used a well-known Australian experimental approach, but Vietnamese scientists did not know of this approach or the possible results. Australian scientists would consider using this experimental approach in Vietnam to be informal capacity building, whereas Vietnamese scientists would regard it partly as knowledge discovery because both the experimental approach and the results would be new to them. What Vietnamese consider knowledge discovery, Australian project staff can sometimes describe as capacity building.

### 5.2 Categories of Capacity Building

Whereas the companion study focused on assessing the impact of capacity building activities associated with specific projects, our study interviewed scientists to identify the type of skills



that they had acquired through ACIAR activities more generally. We identified three categories of skills based on the interviews.

**Project-specific techniques** were essential for completing the funded research, including laboratory and field measurement techniques such as detecting markers, assessing wood quality, gel electrophoresis, grafting, nutrition analysis, and hatching techniques. We define these as tactical capacity building, because these skills are needed for the project to operate. In some cases, it would have been possible to identify this information via secondary data, using the project proposal or the annual report. In many cases, however, we found that the project documents did not clearly describe the skills gap that the project would address. Many interviewees reported that these skills were also applied or adapted for use in later research. These are concrete examples of technical skills that have contributed to technology development and release.

**Generic research methodologies** were essential for completing projects but were also of wider benefit: collecting and analysing data, laboratory and field organisation, managing activities, writing reports and scientific papers, critical thinking, preparing evidence for research proposals and identifying researchable issues. We define these skills as strategic capacity building as they are key to implementing an effective and efficient research program. It is not easy to assess the development of these generic skills from written project materials because possession of these skills is implied by the facts that the material was published and that the authors benefited from ACIAR's collaborative approach. The scientists interviewed during this study readily reported that ACIAR had helped them develop these skills, but they could not attribute clearly how this helped them to develop specific technologies. The interviewees also reported that these methodologies had been important in later work as spillovers from the original investment.

**Aggregate capacity** is the capacity to participate in and lead the research cycle from the conception of the research hypothesis, research design, implementation, discussion and review. Interviewees said this aggregate capacity included leadership (being appointed as a research leader); advocacy (being able to argue the case to undertake the research, attract resources, and promote the results); and gaining confidence from the project. This was most evident among scientists who had completed PhDs overseas in Australia, Sweden, Norway, Japan and other European countries where there was a prolonged and often intense need to work, think and write independently.

### 5.3 Case Studies

With the long-term capacity building in Research Institute for Aquaculture No. 1 (RIA1) and the Vietnamese Academy of Forest Sciences (VAFS), the scientists we interviewed had acquired their skills over several projects, both ACIAR-funded and not, and with formal postgraduate training. This process is best illustrated through a narrative of individuals who had different levels and roles in their engagement with ACIAR projects. The following cases studies—three from the forestry sector and three from the fisheries sector—illustrate the successes of young scientists whom ACIAR supported and the different trajectories their careers have taken. In all cases, involvement in a single project or a single training course was not enough to advance their careers or determine the high-level contributions they are now making to their country's research capacity.

In these six case studies, the impact on the individuals and their institutions is significant, as shown by interviews with their national and international counterparts and supervisors. It is more difficult to estimate, let alone quantify, how these individuals benefited farmers through the technologies and practices that they helped to develop. Based on the studies this report describes, there is a plausible link between the capacity developed and embodied in the individual scientists and their institutions' capacity to develop appropriate outcomes for the forestry and fisheries sectors, and evidence that these outcomes had an economic, social and environmental benefit. When asked about their contributions to individual technologies (such as a new variety of acacia), the most common response was something like "Yes, I contributed as part of a team".

### **Case Study 1: Dr Tran Dinh Luan**

*Dr Luan was the Vice-Director of RIA1 (Research Institute for Aquaculture No. 1) and was project co-ordinator in a large ACIAR-funded Aquafeeds project. This role relied on strong co-ordination across research partners and industry. He was a John Dillon Fellow (JDF) in 2011. In 2012, he moved from RIA1 and has since held many positions in other departments in the Ministry of Agriculture and Rural Development (MARD). Today he is Vice-Director of the Soc Trang Provincial Department of Agriculture and Rural Development. In consequence of his professional development, partly attributable to ACIAR, Dr Luan moved into senior management positions in the sector. While no longer involved with ACIAR, he values the experience and training he received, particularly in project management and partnerships. The JDF was well-timed and enabled him to put skills learnt into practice in the following five years.*

Dr Luan completed his Bachelor of Science in Aquaculture in 1998 at Nha Trang Fisheries University. He began working with RIA1 as a research scientist, and from 2002–2003 studied for a Master's in Aquaculture and Aquatic Resources at AIT (Asian Institute of Technology) in Bangkok. On his return from Bangkok he became involved in several international and Government of Vietnam-funded projects. From 2005–2010, he completed his PhD in Genetics and Aquaculture in Norway. Dr Luan has also attended international training courses in Israel (2001), the Philippines, Norway, and Finland (2008). From 2009–2012, he was the project co-ordinator for the ACIAR project: Improving Feed Sustainability for Marine Aquaculture in Vietnam and Australia (FIS/2006/141; Aquafeeds). After finishing his PhD, Dr Luan was promoted to head of several research centres, including a cold water centre in the Northern Mountains and a freshwater breeding centre in Hai Duong province. He also became Vice-Director of RIA1.

In 2012, Dr Luan moved out of research to the Department of Animal Health, working in fisheries health, a role with national responsibilities. After a short time as Vice-Director of the Aquaculture Department of the Directorate of Fisheries, he became Vice-Director of the Provincial Department of Agriculture and Rural Development in the southern province of Soc Trang. In this role he was involved in shrimp and catfish production. During 2016, Dr Luan returned to Hanoi to the Directorate of Fisheries within the Ministry of Agriculture and Rural Development.

Dr Luan is also active in teaching. Since 2005, he has taught courses at Hanoi Agricultural University, Vinh University and Nha Trang University. Subjects taught include project management (also as part of a Master's program at RIA1) and experimental design and data analysis in aquaculture, genetics and seed production. He currently supervises three Master's students and one PhD student per year. He has had up to nine Master's students at one time. In addition to teaching in Vietnam, Dr Luan has delivered a nutrition and feed production course in Ghana and Côte d'Ivoire funded by the Food and Agriculture Organization of the United Nations (FAO). He has also delivered training courses in Vietnam to both local and international participants on rice–fish culture, tilapia seed production, and low-cost formulated feeds. He also teaches aquaculture certification (to local and international standards) and sustainable development.

Until he left RIA1, Dr Luan averaged about one publication per year, and has published in one international journal and three international symposium proceedings.

Dr Luan values highly the skills and knowledge he gained through participation in ACIAR projects. He said that ACIAR projects changed the way research was conducted, particularly planning and exchanging information to solve problems. Before ACIAR's involvement in Vietnam, there was generally a more 'Eastern' cultural influence, which was less open and more focused on input. ACIAR gave Dr Luan and others opportunities to learn better project planning and reporting methods. He particularly noticed this change when he designed the giant grouper project, as it allowed him to discuss problems and opportunities with Australian researchers more easily (although he left RIA1 before the project began).

Dr Luan also found that the ACIAR project gave him the confidence to be more critical of government's recommendations to farmers and RIA1—for example, through the Aquafeeds nutrition project where, together with other members of RIA1, they created their own guidelines. This put constructive pressure on the policy makers in MARD who write the guidelines. The quality research results from this project and approach to dissemination were distinctive. As a result, MARD policy makers now understand the need to specifically regulate the contents/ingredients of fish feeds. Thus, the ACIAR project improved feed quality and its regulation.

As project co-ordinator, Dr Luan had to bring all the partners together. He enjoyed the challenge and the opportunity to engage with other research institutes in a framework that Government of Vietnam-funded projects struggle to achieve. The regional Aquafeeds forum, held annually, brought researchers, policy makers, provincial officers and industry representatives together. This was a significant learning opportunity and a successful part of the project. Industry part-funded the annual fora. They were a key opportunity to convey results from the project and to learn what other research participants were doing in this field too. These fora provided Dr Luan and others with invaluable opportunities to learn how to better present trials and results and the fora's methodological framework. They also learnt how to effectively communicate the results of their research.

The Aquafeeds project also helped Dr Luan with approaches to research proposals and implementing projects. He subsequently gained two government projects and four international projects: one from the American Soybean Association to the value of

US\$300,000, a Canadian-funded project worth US\$250,000, and two from Finland, each worth 500,000 Euros.

In summary, Dr Luan said his experience in the ACIAR project taught him better management skills and a more Western approach, helped him develop later projects, gave him a broader outlook, and showed him how research and industry can better engage.

Dr Luan recalled the JDF as a very memorable time. He was impressed by many things he saw, and he returned full of ideas, many of which he later implemented at RIA1 and elsewhere. He has used project management approaches such as ‘brainstorming with sticky notes’ at RIA1, and he now teaches project management in a Master’s Program. He was impressed by the leadership course at Mt Eliza Business School in Melbourne, and found it very insightful. He has applied many skills he learnt, e.g. how to build a team and guide people to work together, how to give staff and other project partners a chance to express their ideas, and, importantly, how to solve a problem with different ideas. He has used this with developing public–private projects. He keeps in occasional contact with his fellow Vietnamese colleague from that cohort, Dr Hai from the Vietnamese Academy of Forest Sciences (VAFS), and can more easily discuss their work challenges. They also share knowledge and experience on statistics analysis and software tools they both use (though not learnt from the JDF).

Dr Luan is pleased to be able to pass on the skills and ideas learnt from the John Dillon Fellowship, as he has found them to be both useful and not something most Vietnamese scientists get to experience. At RIA1, Dr Luan ran a science workshop and was vice-chairman of the Science Committee which determines priorities for government funding. Finally, as Vice-Director, Dr Luan has good relations with the private sector and arranges monthly workshops with them.

### **Case Study 2: Dr Nguyen Van Tien**

*Dr Tien first participated in an ACIAR project in 2003 as a junior researcher. At the beginning of the project, he was able to observe and learn important project management and partnership skills. Australian scientists noted how much he learnt and developed at this time. Two years into the project he went to Japan to study for his PhD. Upon his return from Japan, he immediately joined the follow-on ACIAR-funded nutrition project, first as a research scientist and later as the key project co-ordinator/administrator. In this role he clearly applied the skills and knowledge he learnt in the earlier project. Tien became instrumental in the success of the regional Aquafeeds fora, continuing these beyond the ACIAR funding. He is now Deputy Director of Aquaculture Surveying, Testing and Accreditation under the Department of Fisheries (DOF), leading quality control of the inputs in aquaculture. The ACIAR project framework provided Dr Tien with some fundamental project management tools and may have contributed to his selection for a PhD. On his return to Vietnam, the ACIAR project helped Dr Tien to immediately capitalise on new skills and knowledge from his PhD and build valuable aquaculture feed and nutrition networks in the region.*

After achieving a University Certificate from Hanoi University of Agriculture in 1994, Dr Tien started with RIA1 (Research Institute for Aquaculture No. 1) on a program of work and further study. He studied a Bachelor of Science (Aquaculture) at the University of Fisheries in Nha Trang, which he completed in 1997. During this time he was also working as a research assistant at RIA1, principally on tilapia sex reversal. He continued his work as a research assistant before gaining a scholarship to study a Masters of Marine Sciences in Denmark, from 1999–2001. On his return, he managed a DANIDA (Danish International Development Agency)-funded project on tilapia in Northern Vietnam. Dr Tien started his involvement with ACIAR on a project in 2003: Improving Feeds and Feeding for Small-Scale Aquaculture in Vietnam and Cambodia (FIS/2002/068), in which he was the team leader for the Northern Vietnam component. (The project also had components in Southern Coastal Vietnam, the Mekong Delta and Cambodia.) This project exposed Dr Tien to new approaches to planning research, framing a hypothesis, managing projects, and leading fish nutrition research through working with Australian scientist Dr Brett Glencross. Importantly, he learnt significant skills in project coordination and management in a project with multiple partners.

In 2005, he began a PhD in Marine Sciences in Japan, which he completed in 2009. His topic was on highly unsaturated fatty acids and minerals supplementation for sea bream larvae nutrition. Since his return to Vietnam, Dr Tien has been involved in several projects and played an important role in the second ACIAR feed nutrition project: Improved Feed Sustainability for Marine Aquaculture in Vietnam and Australia (FIS/2006/141). In this second ACIAR project he started as a research scientist for the RIA1 component, and then, in 2011, took over the role of Project Manager/Coordinator from Dr Tran Dinh Luan. Dr Tien has run the regional Aquafeeds fora under this project, and ensured these fora continued after the project funding finished.

RIA1 also assigned Dr Tien to provide consultant services on national and international projects. During 2014–2015, he was the Director of the Centre for Selective Breeding of Tilapia in Quang Nam Province. In 2016, he returned to RIA1 headquarters as the Deputy Director of the Centre for Aquaculture Biotechnology. He was recently promoted to the position of Deputy Director, Aquaculture Surveying, Testing and Accreditation under the Directorate of Fisheries (DOF). Dr Tien has been active in international conferences and publishes one or two articles each year.

Dr Tien described how his experience with an ACIAR project was important to him and helped him to improve his networking and team-building skills. He found this different from other international projects. Dr Tien and others have found good networking opportunities across Vietnam, Australia and other regional partners arising from ACIAR projects. He also acquired management and leadership skills and gained invaluable knowledge about scientific communication. He has had opportunities to present at conferences and write research papers for publication and industry fora. ACIAR scientists also encouraged him to publish internationally.

He also learnt useful models for engaging industry. Through the ACIAR project there was excellent industry exchange. Members of RIA1 delivered a nutrition master class to industry, in addition to the regional Aquafeeds fora. Industry part-funded these fora during the project; it now fully funds the fora, which are still run annually.

On-the-job training was strong. Dr Tien learnt a great deal from the NORAD (Norwegian Agency for Development Co-operation) project, although this was just capacity building, in contrast to the ACIAR project, which focused on research. He and others found that they learnt more from the ACIAR project in the longer term: he expressed a need for both long-term and short-term training, and stated that the long-term training ACIAR provided was effective. Dr Tien described how he gradually learnt about the process for selecting ingredients and formulating feed, and used this in experiments and other work. He also benefited from training courses in statistical methods and using laboratory equipment. He has used the nutrition modelling developed for tilapia with other species.

Dr Tien also learnt leadership skills, which he feels he absorbed through being involved in the project but which he has used subsequently. He maintains a wide network of contacts and regularly attends conferences and international symposiums. In Vietnam, many informal meetings with research partners and industry representatives were established through the ACIAR project.

Dr Tien suggested that a new project should have a clearly defined training component: it would be constructive to fund the principal researcher(s) to go to Australia to upgrade skills and knowledge, for a month or two. The timing of training could also be improved sometimes. Better planning would make training more effective.

### **Case Study 3: Dr Bui The Anh**

*As a young scientist, Dr Bui The Anh participated in an early ACIAR fisheries project in 1997 and then took up a John Allwright Fellowship (JAF) scholarship to study Inland Reservoir Fisheries at Deakin University. He has not been involved further with ACIAR since he completed his PhD. He has, however, been a successful researcher at RIA1 (Research Institute for Aquaculture No. 1), managing research programs, applied development projects, and consultancies using the skills he acquired during his period of support from ACIAR. He has now moved from RIA1 to a research management position in the Ministry of Agriculture and Rural Development (MARD) that provides a focal point for fisheries research across Vietnam. The experience and skills he learnt from his participation in an ACIAR project and a JAF more than 10 years earlier have enabled him to have a successful career that has helped farmers and the sector.*

Dr Anh started work as a research technician at RIA1 in 1994 and completed a Bachelor's degree in Aquaculture in 1997. After graduating, he joined an ACIAR project: Reservoir Fishery Development and Management in the Northern Mid-Highlands Region (FIS/1997/068) as team leader. He then successfully applied for a JAF which enabled him to study for his PhD at Deakin University, Warrnambool, from 2002–2005. During this period, there was also a second ACIAR project on reservoir fisheries in progress: Culture-Based and Capture Fisheries Development and Management in Reservoirs in Vietnam (FIS/2001/013). His PhD topic was closely related to these ACIAR projects and included a series of 14 small studies on managing Vietnamese capture fisheries. At the same time, he was involved in a study investigating models for culture-based fisheries (a semi-wild management approach). While studying in Australia, Dr Anh also managed a project funded by the Ministry of Fisheries on managing fisheries at four major reservoirs in Vietnam.

Dr Anh received an ACIAR–JAF returnee grant which allowed him to continue the experimental work from his PhD. At the end of that project, he found he had acquired sufficient skills to enable him to carry out his own research and build a small team that has now grown to become a research centre on biodiversity. When he returned to Vietnam, he was appointed to the position of Vice-Head of the Department of Inland Aquatic Resources. He became Head of the Department in 2009, a position he held until moving to the Ministry of Agriculture and Rural Development in 2013.

After his JAF, Dr Anh participated in numerous other projects in various roles. He co-wrote a proposal and managed a 4-year project funded by the Czech Republic on inland fisheries. During 2006 and 2007, he was consultant to an Asian Development Bank (ADB) project on the Son La Hydro-electric Dam. He has also worked as a consultant for private companies implementing development projects for both the national and provincial governments—for example, inland fisheries development at hydropower dams in Lai Chau, Quang Nam and Son La. Concurrently, Dr Anh continues in his role as chief technical advisor to a program on sturgeon production in Lang Son and Cao Bang provinces.

After 20 years of work and study associated with RIA1, Dr Anh wanted to extend his interests, and in this regard, he found RIA1 to be somewhat restrictive. When an opportunity arose at MARD to manage research programs across Vietnam, Dr Anh moved there to work as a Fisheries Extension Program Officer monitoring the implementation of extension programs throughout Vietnam. He currently holds the position of Fisheries Program Officer/Information Technology Development and is the focal point for aquaculture and fisheries research at the Department of Science Technology and Environment. In this role he contributes to the development of research strategies and 5-year programs for fisheries research.

The ACIAR project helped Dr Anh with reading and writing skills that he developed further at university. He found that writing skills were critical to his work; in particular, the thinking component of the writing process allowed him to develop his knowledge. He had two years to collect data. Before his PhD, he found it hard to access information in Vietnam but he found the opposite at Deakin University, with good access to the library, manuscripts, other students, researchers and supervisors.

During the project, Dr Anh learnt to develop and conduct research and to design experiments well. He found the project leaders and staff from Australia accessible and good to work with. He had many opportunities to ask questions. He acquired research management skills (such as research planning and design) that he could use in later projects and help develop capacity among staff, principally through working with other partners. He learnt how to evaluate staff better and how to encourage them to recognise and develop their skills.

One of Dr Anh's most important learning opportunities at this time was the chance to write papers and attend international conferences, in particular through the support and encouragement of international scientists such as Professor Sena S. De Silva and Dr Le Thanh Luu. Dr Anh considers the ability to present results, which he learnt from ACIAR, invaluable and that it has enabled him to carry out independent research. Since his JAF, Dr Anh has published one or two papers a year.

Dr Anh is now able to pass on his skills to younger students and scientists. He spends about 20% of his time employed by the Vietnam Agriculture University teaching and supervising undergraduate and Master's students in aquaculture, and this work is expanding. He teaches inland fisheries management, scientific writing and experimental design. He has also been active in RIA1 supporting programs to improve opportunities for young scientists to study overseas.

The ACIAR project developed improved management strategies for reservoir fisheries, such as guidelines for family-based businesses with open access to reservoirs. After the ACIAR project, RIA1 successfully gained financial support from MARD for several additional projects building on the outcomes from the original ACIAR project. These projects were also focussed on artisanal, family-based fisheries, providing guidelines for farmers, which Dr Anh considers were quite successful. He still manages projects and regards himself as quite influential (e.g., refining scope and changing direction—and what he described as adaptive management).

International projects have helped RIA1 in several ways, including improving project management so that the Institute has been better placed to apply for small project grants from the Ministry of Fisheries (i.e. with money from international donors). Dr Anh considered that the ACIAR-funded and other international projects also led to better research planning and greatly improved management skills, especially in relation to capacity building and training staff. RIA1 has supported Master's and PhD students to go to Australia, Norway, Denmark, the Czech Republic and many other countries. Project organisation and partnerships have improved too.

RIA1 has been good at exporting skills and staff to other areas, both within Vietnam and overseas, and Dr Anh is an example of this. In 2012, he was sent with other RIA1 staff to Rwanda, funded by the Asian Development Bank, to help build a tilapia selection program and develop reservoir fisheries. This was a medium-term assignment that was extended for a few months several times. The project produced around 1.5 million tilapia seeds. The project also gave Rwandan students the opportunity to go to Vietnam to study for a Master's degree that Dr Anh was involved in teaching.

Dr Anh maintains regular contact with Australian scientists, now mostly through conferences and workshops in Asia (e.g. in Bangkok, Cambodia and Sri Lanka) where most people he sees are colleagues and friends.

Dr Anh described how the ACIAR project helped his career: "It was a catalyst for many things." When he returned from Australia, with junior but valuable project experience and then a PhD, the Director of RIA1, Dr Luu, made him responsible for managing many projects, some quite large. "It was a lot of work, but good," Dr Anh said. He considers that the ACIAR training (both from the project and PhD) gave him the necessary skills and confidence to step up and manage projects, write proposals and lead teams effectively.

#### **Case Study 4: Dr Phi Hong Hai**

*Dr Phi Hong Hai was involved in seven ACIAR projects between 1999 and 2011, in the field of tree breeding and gene conservation. During most of this time he was with the Institute for*



*Forest Tree Improvement and Breeding. He started there as a young scientist, and became Vice-Director in 2005. In 2011, he undertook a John Dillon Fellowship (JDF). In 2013, he moved from the Institute to a role in the Academy as the Director of the Department of Planning and Sciences and was promoted to Vice-President in 2015. Dr Hai has been involved in many international projects, and received support for his PhD from the Swedish International Development Co-operation Agency (SIDA). Support from ACIAR, complemented by the JDF, has been significant through many projects. Dr Hai has moved into a senior management position in the Academy where he can apply the skills he learnt through his long experience in projects and the JDF.*

Dr Hai graduated from the Vietnam Forestry University in 1994 and began working with the Research Centre for Forest Tree Improvement (RCFTI) under Professor Kha and Dr Think, where he soon started work on international projects funded by SIDA and ACIAR. In 1996, he attended a training course on experimental design and analysis for forest tree improvement in Malaysia, organised by the CSIRO. That year he also attended an ACIAR-funded course on controlled pollination in acacias in Bangkok. His first major role in an ACIAR project came in the Domestication of Australian Trees (DAT) project, which began in 1999. Dr Hai spent more time learning from CSIRO scientists about trial design, trial establishment, monitoring, and data analysis. Stephen Midgley, Dr Chris Harwood and Khongsak Pinyopusarek were important teachers and mentors during this period, a relationship that continues today.

From 2001 to 2003, Dr Hai studied a Master's of Science (Tropical Forestry, Ecology and Silviculture) at Wageningen Agricultural University in the Netherlands. In 2004, he studied at the Swedish University for Agriculture Sciences in Uppsala, Sweden, completing his PhD in 2009. His field of study was forest genetics in *A. auriculiformis* species based on the research DAT project developed. Dr Chris Harwood was a supervisor. Dr Hai's area of research expertise is forest genetics, tree breeding, forest biodiversity, and gene conservation. He has contributed to 31 publications, in 16 of which he was the lead author, and nine are published in international journals.

In 2005, Dr Hai was appointed the Vice-Director of the RCFTI, where he was in charge of Scientific Research and Planning and International Co-operation. In 2011, he participated in a John Dillon Fellowship. Dr Hai has been involved as a project co-ordinator or project scientist in eight ACIAR projects and three AusAID-funded CARD (Collaboration for Agriculture and Rural Development) projects, primarily in collaboration with CSIRO scientists.

While in the role of Vice-Director of the RCFTI, Dr Hai was a project scientist for ACIAR. He was a key point of contact for Australian scientists, managed projects on a day-to-day basis, and provided guidance to younger project staff. He fulfilled this role due to the experience he acquired working on earlier ACIAR-funded projects and the strong relationship he developed with CSIRO scientists.

Dr Hai found the John Dillon Fellowship was a good learning experience. It provided new experiences and fresh approaches to team and personnel management. While he thought he had extensive project management experience, he still learnt a great deal from the project management course where he consolidated some skills and benefited from learning by doing.

In particular, he found he could use these skills as Head of Planning and Sciences at his institute and as leader of national projects. In this role he prioritised research and co-ordinated programs across the Institute. He also applied his high-level technical skills, built during participation in ACIAR projects and through his higher degree studies, across many projects and other research departments.

Dr Hai was appointed Vice-President of the Academy in 2015. He continues to use the management and scientific skills that were built in part through ACIAR's support and the John Dillon Fellowship. He is grateful to ACIAR for the opportunity to work with leading scientists, and the knowledge and networks this brought him.

### **Case Study 5: Dr Nghiem Quynh Chi**

*Over the last 15 years, Dr Chi has progressed from being a young project scientist with basic skills to a senior scientist in her organisation, overseeing a high-level research program that interests international research agencies and companies. This occurred through a long period of building capacity in projects and through postgraduate study supported by ACIAR. Her Institute director and key Australian scientists have continued to support her. Her capacity is such that she can now successfully seek and implement significant Government of Vietnam projects and build international collaborations, both in the public and private spheres.*

Dr Chi first started working at the Forest Science Institute of Vietnam (FSIV) in 1997 after graduating from university. She moved to the Research Centre for Forest Tree Improvement (RCFTI) in 2000. Her first involvement in an ACIAR project was in 2003 as project scientist in the acacia polyploid project: Development and Evaluation of Sterile Triploids and Polyploid Breeding Methodologies for Commercial Species of Acacia in Vietnam, South Africa and Australia (FST/2003/002). She worked for seven years on ACIAR-funded and other projects before taking up a John Allwright Fellowship (JAF) at the University of Tasmania (UTAS) in 2008.

Since her return to Vietnam in 2012, Dr Chi has held the position of Head of Division, Tissue Culture, in the renamed and expanded Institute of Forest Tree Improvement and Biotechnology. She has continued her participation in ACIAR projects and also manages significant Government of Vietnam funded projects. Dr Chi has five international publications, with her first in 2011, and another in progress. All these publications arise from her involvement in ACIAR projects or her PhD.

Joining the ACIAR-funded project in 2003 was Dr Chi's first experience on international projects. At the time her English was poor but she learned how to communicate and participate fully in the research, not just as an observer. She received strong support from her director, Dr Think, from senior colleague Dr Kien, and from Australian colleagues. Dr Chi described the experience as a long learning process. Planning projects was new to her, and she soon saw this as useful and important.

On the early projects she first learnt technical skills—for example, about breeding programs for different species. She attended courses on genetics Australian scientists delivered at her Institute, and spent three months at the University of Queensland (supported by the Crawford

Fund) studying quantitative genetics. Other short courses have included a seed technology course in Canberra for one month, training in microscopy and molecular genetics and other hybridisation techniques.

Dr Chi also participated in projects on tree breeding with eucalyptus and pinus species and seed technology AusAID funded under the CARD (Collaboration for Agriculture and Rural Development) program. There have been other minor international collaborations, including a small part in a SIDA–SAREC (Swedish International Development Co-operation Agency–Department of Research Co-operation) project.

Dr Chi spent four and half years in Australia at UTAS, studying for her PhD on the reproductive biology of acacia polyploids, supervised by Professor Rod Griffin. Her main achievement during that time was to acquire many new skills. Foremost of these were high-level communication skills—not just language, as Dr Chi learnt she also had to argue and defend her ideas, which was quite different from Vietnam. Her skills in reading and writing and presenting results in English also improved significantly: “I had a meeting every month with my four supervisors, which was really helpful for giving me direction and teaching me.”

Jane Harbard was the technical assistant in the ACIAR project in progress while Dr Chi was studying at UTAS. Dr Chi learnt many skills from her, particularly microscopy techniques. After her PhD, she returned to UTAS to carry out a further set of analyses, and upon completing her PhD she received a \$10,000 returnee grant from ACIAR to continue working on triploid plants. As a result of this grant, some triploids are now surviving. Dr Chi is proud that she finished her PhD on time, as it gave her a lot of confidence. She had three international publications and recognises the importance of Professor Rod Griffin and Dr Chris Harwood’s support.

On returning to work at the Vietnamese Academy of Forest Sciences (VAFS) in 2012, she was promoted to head of department, working on plant cell technology and managing a tissue culture lab with ten staff. The lab is active with a nursery full of ongoing trials. She also proudly displayed a flow cytometer that ACIAR funded.

Dr Chi successfully wrote the project proposal and won a Ministry of Science and Technology of Vietnam (MOST) project (US\$45,000 over three years) and a Ministry of Agriculture and Rural Development (MARD) five-year project worth US\$300,000. The MOST grant is for basic research, and requires recipients to submit two international papers for the project. For the MARD project, she must have two proven clones suitable for the Ministry to release. Dr Chi demonstrates confidence and clarity in justifying her research and impact to growers.

Dr Chi continues to maintain her contacts with Australian scientists and seeks to broaden her international engagement. In 2015, she went to Beijing with Dr Think, Dr Harwood and Professor Griffin to learn about triploids in poplars. She hopes to learn new techniques that can be used in Vietnam. Professor Griffin has an advisory role on the MOST project, illustrating how the network that ACIAR support created continues in a new form.

Dr Chi also has built up valuable skills and contacts in the region. She recently went to Thailand and Laos on a teak project. She has also taught tissue culture in Laos and Thailand as part of a collaborative eucalyptus clone trial with Kasetsart University, Bangkok. Thai

researchers visited Dr Chi's lab for ten days, and Dr Chi went to Thailand to follow up on their skills and procedures. In 2016, Dr Chi was awarded a prestigious Australia–APEC Women in Research Award to continue her work with UTAS.

Dr Chi learnt a lot from attending short training courses and also through on-the-job training. In the projects she worked on, she set up hybridisation orchards and trials, spending up to three months a year in Southern Vietnam, with visits and guidance from Dr Thinh and Dr Kien. Dr Chi already had a fair knowledge of basic techniques before the ACIAR projects, and the short courses allowed her to consolidate her knowledge and extend those techniques and skills. In comparing the skills learnt in a project with skills acquired during her PhD, Dr Chi said they were “all good . . . all useful sources of skills”. In her view, the best scenario is ongoing implementation of projects, communicating, becoming more confident about specific things, and then attending courses to consolidate her learning. Dr Chi found she needed confidence to take advantage of the training courses.

Dr Chi is now passing on her skills to her staff and to the Master's students she supervises. She feels she can converse with senior staff on more equal terms. In her experience, the Vietnamese system does not teach people how to write in an academic or technical way. Dr Chi can now help younger researchers with reports and articles both in Vietnamese and in English.

A new ACIAR regional project on acacia disease control, silviculture and breeding is starting soon, and Dr Chi is interested in breeding for disease resistance. It is a cross-disciplinary project across three centres/institutes within VAFS. Dr Chi values ACIAR projects for their opportunities for collaboration and learning new skills, as well as opportunities to help her colleagues attend training courses and apply for scholarships.

### **Case Study 6: Dr Nguyen Duc Kien**

*Dr Kien began working on ACIAR projects in 2002 and has been engaged in many projects since that time. While he studied for his Master's and PhD in Sweden, the topics were related to the ACIAR projects, and a CSIRO scientist co-supervised his PhD. The ACIAR projects provided a valuable long-term learning framework. While he has particular skills in the quantitative genetics of eucalyptus and acacia breeding, he has a broad understanding across disciplines in forestry and has valuable connections and private industry experience. He now provides a leadership role for many young scientists at the Vietnamese Academy of Forest Sciences (VAFS), and is Vice-Director of the Institute for Forest Tree Improvement and Biotechnology (IFTIB). Dr Kien provides consulting services for major forest companies in Laos and Indonesia.*

On graduation from the Vietnam Forestry University, Dr Kien joined the Forest Science Institute of Vietnam (FSIV) in 1997, working as a young researcher under Professor Kha and Dr Thinh at the Research Centre for Forest Tree Improvement (RCFTI). Dr Kien became involved in programs supported by Swedish International Development Co-operation Agency (SIDA) and then in 2002 joined the ACIAR-funded Domestication of Australian Trees (DAT) project. In 2003, he studied a Master's at the Swedish University of Agricultural Sciences (SLU) on tree breeding in eucalyptus. He continued his involvement in ACIAR

projects on his return, and has played senior roles in a SIDA project and a Ministry of Agriculture and Rural Development (MARD) project.

In 2005, Dr Kien received a scholarship from SIDA–SAREC (Swedish International Development Co-operation Agency–Department of Research Co-operation) and began his PhD, also at SLU. His topic was improving eucalyptus plantations grown for pulp production, and built on some of the learnings from the DAT project. CSIRO’s Dr Chris Harwood, who was involved in the DAT project, was a co-supervisor. The PhD program was a sandwich program, which allowed him to spend 50% of his time in Sweden and 50% in Vietnam.

Since completing his PhD, Dr Kien has gained two MARD-funded projects to the value of US\$260,000, for which he was the project leader—the first, from 2008–2012, on domestication and breeding of two native species and the second, from 2011–2015, on hybridisation of eucalypt species for improved productivity, wood quality and disease resistance. He was also a senior scientist on the National Tree Improvement Program from 2001–2015.

Major forest companies in the region value Dr Kien’s skills and knowledge. In late 2012, he began working half his time in Laos, for an Indian forestry company, Birla Laos, to co-ordinate a eucalypt breeding program from scratch, and also provide nursery and silviculture techniques. He stopped working in this role in 2014 when he was appointed Vice-Director of IFTIB. Before leaving, he trained an Indian colleague to replace him.

Dr Kien spends two weeks every two months providing consulting services to an Indonesian pulp and paper company, one of the largest in the region. The company wanted him to work full-time; he chose to stay with his role at IFTIB and work for them as a part-time consultant. This allows him to maintain his leadership position at IFTIB, continue his research interests, and be involved in a greater diversity of work.

Dr Kien thought the greatest benefit from working on ACIAR projects was to work alongside high-quality researchers, particularly Dr Chris Harwood, whom he first met in 1997. He learnt a great deal about trial design and data analysis skills from the DAT project, which he has been able to build on since. He also learnt all aspects of tree improvement and silviculture, so the learning was comprehensive. The ACIAR project, through Dr Chris Harwood, Professor Rod Griffin and Stephen Midgley, also gave him access to useful research and industry networks in the region and opened many doors.

Dr Kien has been involved in almost all projects at VAFS at some level, but his main involvement has been in the DAT and polyploid projects. In the DAT project he learnt from on-the-job training and through formal training courses, such as a 1998 course on genetics delivered by Chris Harwood and Kron Aken and a second in 1999 in Thailand. Dr Kien considers he learnt about half from the training courses and half from on-the-job learning, setting up trials and measuring and monitoring.

Dr Kien feels that the ACIAR project experience was as valuable as the skills and knowledge he gained through his PhD, which significantly increased his data analysis skills. This is one of his strengths, which he can use to guide other staff. During his PhD he also broadened his experience by attending courses—for example, in molecular techniques and plant diseases.

Dr Kien endeavours to transfer his skills to younger researchers. He finds it beneficial if they can take over some of his work, but he also wishes to provide staff with opportunities to develop. He uses project money to help his staff obtain Master's and PhD degrees. Where possible, he and his team endeavour to make funds go further; for example, taking a train to a hybridisation conference in China saved some money so more staff could attend.

Dr Kien is yet to do much formal teaching, but he does supervise one or two Master's students per year and one PhD student. He organises seminars by both internal staff and visitors about twice a month.

Dr Kien regards the ACIAR experience as important for him and his Institute. It has been the best source of knowledge for research, and he finds the long-term relationship beneficial as "they can discuss everything, and everyone learns a lot". ACIAR projects provide "flexibility to fail" which Government of Vietnam projects do not. These must deliver a technology to farmers, so people generally do research they know will work. It is hard to learn in that environment. Having an ACIAR project also makes it easier to get a Government of Vietnam project. Dr Kien considers that ACIAR projects are often seen as seed money that can mobilise Government of Vietnam funds. He says:

*We can show we have an impact with an ACIAR project, and that allows us to get a larger pot of funds for a MARD project. Increasingly, the Government of Vietnam can support applied research but still needs the seed money and money from collaborators for more technical aspects. ACIAR has also fostered greater interaction between departments. There is now much greater thought about sustainable management and cross-disciplinary approaches. Regional projects also allow us to maintain networks, which is hard with Government of Vietnam funding. We strongly believe we can now give as well as receive. Vietnam can now contribute and teach others in the region. Each generation needs an infusion of knowledge and experience. Now Vietnam can participate in that giving, not just receiving.*

## 6 Institutional Change

Strengthening the research capacity for development institutions in partner countries remains central to the ACIAR’s mandate. The 2015–2016 Annual Operating Plan writes: “Building capacity of agricultural research institutes in partner countries is one of ACIAR’s key priorities” (p. 106), and the 2015–2019 Corporate Plan says: “A key performance measure is the institutional capacity of partner research organisations” (p. 7).

This aspect of the study aimed to better understand the role of capacity building among the scientists, and the contribution they make to the institutions in which they work. Our hypothesis is that building an individual’s capacity leads to improvements in institutional function and performance as a direct or indirect result of the training (formal and informal) they have received. For the institution’s capacity to exceed the sum of individual scientists’ capacities, there must be gains from co-operation and teamwork.

The study only assessed certain aspects of the two institutions visited, and these are based on the framework for organisational capacity ISNAR (International Service for National Agricultural Research) developed (Lusthaus, Anderson and Murphy 1995, as reported in Horton and MacKay 1998). Some objective data, additional to the interviews, can be collected on research leadership; program planning; management and execution; resources allocation and management; and linkages and co-ordination with clients, partners, government policy makers and external donors. While the Vietnamese Academy of Forest Sciences (VAFS) and Research Institute for Aquaculture No. 1 (RIA1) have changed over the period under study (the last 20 years), without complete evidence it is impossible to fully assess whether change in individual capacity has contributed to that change. We can, however, describe what has taken place concurrently and what can be associated with ACIAR’s long-term engagement in research and capacity building.

<p><b>1. The External Environment</b></p> <ul style="list-style-type: none"> <li>• The administrative and legal environment</li> <li>• The external political environment</li> <li>• The sociocultural environment</li> <li>• The technological environment</li> <li>• The economic environment</li> <li>• Stakeholders</li> <li>• Infrastructure</li> <li>• Policy/natural resources environment</li> </ul>	<p><b>3. Organizational Capacity</b></p> <ul style="list-style-type: none"> <li>• Strategic leadership</li> <li>• Program planning</li> <li>• Management and execution</li> <li>• Resources allocation and management</li> <li>• Linkages and coordination with clients, partners, government policy makers and external donors</li> </ul>
<p><b>2. Organizational Motivation</b></p> <ul style="list-style-type: none"> <li>• The organization’s history</li> <li>• Mission</li> <li>• Culture</li> <li>• Incentives/reward schemes</li> </ul>	<p><b>4. Organizational Performance</b></p> <ul style="list-style-type: none"> <li>• The effectiveness with which the organization achieves its mission and goal</li> <li>• The efficiency of resource use</li> <li>• The organization’s sustainability in the terms of its continued relevance to its stakeholders</li> </ul>

Source: Lusthaus, Anderson and Murphy (1995).

**Figure 1.** Four dimensions of organisational assessment as adapted by ISNAR (from Horton and McKay 1998)

Over the period of ACIAR engagement, both VAFS and RIA1 changed substantially in terms of staff capacity and in their ability to attract, manage and deliver research projects, conduct multidisciplinary research, train staff, and build outreach programs to the public and private sectors in Vietnam and overseas. VAFS' staff numbers have changed little; but the number of permanent staff at RIA1 has declined. Research and extension facilities at both institutions have increased, which points to increased research output and increased efficiency of delivery for impact.

## 6.1 Strategic Leadership

The last 20 years have seen dramatic changes in the governance of Vietnam. The central government and their hierarchical structure have loosened their control; the economy has liberalised; and science and academia have opened up to international co-operation, new ideas and technologies. The opening up of science and academia was evident in the two institutes, which gradually increased international co-operation. They changed from acquiring resources and expertise from 'outside' to genuinely co-operating on an equal footing, with the result that Vietnam is now exporting its expertise in forestry and aquaculture to help develop overseas enterprises. In Africa, developments have occurred in conjunction with support from the Food and Agriculture Organization of the United Nations (FAO).

There was evidence of continuity of leadership; for instance, Professor Kha at the Vietnamese Academy of Forest Sciences (VAFS) took part in interviews despite having been replaced as Director. Likewise, Dr Luu, former Director of RIA1 (Research Institute for Aquaculture No. 1), was enthusiastic about the institution's future and the changes its new Director, Dr Van, had made. We could regard this as good strategic leadership by the former and current leaders, and improved governance by MARD (Ministry of Agriculture and Rural Development) and those responsible for these changes at the apex of the institutes.

Most of the project leaders and lead research scientists, some of whom are now in senior leadership positions in their institute, said the project and international collaboration improved research leadership skills, experience and opportunities to learn from overseas. The AusAID-supported CARD (Collaboration for Agriculture and Rural Development) program also valuably contributed to research planning and management.

## 6.2 Program Planning

We infer, based on our interviews and discussions with scientists, that the prioritisation and planning of research has become more consultative and is directed more towards the likelihood of success and benefiting both the industry sector and individual livelihoods. Formerly the Government of Vietnam directed much of the research without due regard for how the commissioned research would be applied or the need to work across disciplines and institutions.

Almost all respondents stated that experience from an ACIAR project improved both planning for other projects they managed and the institute's expectations about developing and implementing projects. They were able to apply their improved project management skills, and noted a big difference in working with other scientists who had also worked with ACIAR (and some other international projects). They clearly stated that ACIAR had positively influenced the way their institutes operated.



### 6.3 Linkages, Coordination and Networks.

There was evidence of regular and meaningful interaction with the private sector, provincial agencies, regional fora, the Food and Agriculture Organization of the United Nations (FAO), universities and countries conducting research to a higher international standard, notably Australia. There was no mention of collaboration with NGOs. This was in marked contrast to the situation 20 years previously when interviewees described the institutions as “government-led” and “closed”.

### 6.4 Institution Research and Capacity Building

This study has focused on two institutes that have been successful ACIAR research partners. They have been considered successful on the basis of positive project reviews and formal impact assessments that show high returns on investment from the adoption of technologies developed. The number of projects over a long period of time indicates satisfactory outcomes (without success, fewer projects would have been funded); and there have been many scholarship recipients.

This study has looked at two good examples of research collaboration with a view to understanding the impact of long-term capacity building and, further, to find out what can be learned from these successful institutes and projects to improve future collaboration for any ACIAR program.

What has been distinctive—and appears to be important for success—is the continuity of a collaborative research framework. Projects allow long-term connections that provide ongoing lower-level capacity building interspersed with higher-level capacity building inputs, for example, when scientists take up a scholarship for a Master’s or PhD.

Common feedback from the interviews strongly suggest that the research projects provide key tools for:

- Building capacity for long-term research thinking—building a research strategy.
- Providing an introduction to a new way of thinking—how to define a problem, plan and design a research project, design experiments, better methods for collecting data, improved data analysis, writing skills.
- Creating a focus on research output. This was an important change from the earlier period of collaboration.
- Updating skills through short courses and workshops.
- Providing some investment for research funds. This was particularly valuable in the earlier projects, but is less so now that the institutes can source funds from elsewhere.

Research planning, management and review skills are difficult to assess but are more important than project documentation reflects. Much effort is applied through mentoring, and John Allwright Fellowships (JAFs) can substantially increase the capacity of young scientists, especially in the generic skills of planning and critical thinking based on sound evidence. The projects provide for iterative capacity building (e.g. relatively short inputs, short courses, a narrow scope of activities). The significant capacity building change occurs through an

MSc or PhD. In summary, the core skills learned from overseas study that each of the respondents emphasised were:

- Taking responsibility to plan research
- Learning how to access information
- Writing
- Communicating ideas (discussion and presentation)
- Analysing data

It does not seem to matter a great deal how the MSc or PhD is funded, although there were some benefits gained from a combination of an ACIAR-funded project and an ACIAR-funded scholarship. While ACIAR has funded some scholarships for scientists in these institutes, AusAID and other donors – such as SIDA–SAREC (Swedish International Development Co-operation Agency–Department of Research Co-operation), NORAD (Norwegian Agency for Development Co-operation), and JICA (Japan International Co-operation Agency) – have also been significant funding organisations during this period. Other Master’s and PhD programs were seen as valuable but lacked the depth of the interaction commonly observed with the JAFs.

The ACIAR research project framework is important for:

- Identifying and nominating the most promising scientists.
- Guiding selection of an appropriate topic and supervisors. While not essential, the scientists have benefited to a greater degree from their overseas studies where research is related more to their institute and, more importantly, the right networks are developed.
- Providing stronger connections and support networks for the students in Australia.
- Frequently providing an activity and project for returning students to immediately apply and consolidate their skills.
- Providing support and mentoring for returning scientists to apply for projects from the Government of Vietnam and other donors.

When scholars participate in ACIAR projects after their return from overseas study, ACIAR project funds (and other donors) can leverage the investment in formal training. Greater benefits from postgraduate capacity building can be realised when scientists are engaged in ACIAR projects, with higher-level outputs observed. Examples include:

- Dr Nguyen Van Tien at RIA1 (Research Institute for Aquaculture No. 1), who demonstrated good management of the Aquafeeds project, which followed his earlier experience with an ACIAR project and subsequently consolidated during his PhD in Japan.
- Dr Nguyen Duc Kien at the Vietnamese Academy of Forest Sciences (VAFS) and his role in the current agroforestry project. After earlier ACIAR project experience and

completing his PhD, he has demonstrated the confidence to provide high-level effective advice to less-experienced researchers at the Academy and other research partners in the project.

- Dr Nghiem Quynh Chi in her current role on breeding for disease resistance. Her own observations and comments from others indicate that on her return to work at VAFS after her PhD, she was able to rapidly use her newly refined skills both on ACIAR projects and Government of Vietnam-funded projects.

An important conclusion of this study is that all these activities interact with each other:

1. Research projects build appropriate capacity through on-the-job training and identifying suitable staff for more formal training.
2. Research projects provide Australian staff with the knowledge and experience to effectively supervise students studying in Australia on Vietnam's research priorities.
3. Short training courses make capacity building more effective and can assess potential research partners' capacity.
4. Returning graduates become effective leaders of new research projects.

Given the above, and that the rates of return estimated in traditional impact assessment returns are estimates of the returns from all the activities of a project (trials, capacity building, infrastructure), we argue that there is no theoretically or empirically sound way of attributing some share of this overall rate of return between these alternative uses of funds.

Some (see, e.g. Gordon and Chadwick 2007) have suggested some subjective ways of doing this based on subjective assessments of shares of budgets or of benefits. On the other hand, the people we interviewed broadly agreed on the short-and long-term benefits of capacity building ACIAR provided, as evidenced in the stories from the case studies.

Traditionally, ACIAR impact assessments focus on the returns to the specific technology developed over the course of a project or a series of projects. It is likely that these rates of return understate the real rate of return, because some of the resources are used to build capital stocks of infrastructure, knowledge and, in our case, human capacity. The benefits accrue when these capital stocks are used in developing additional technologies at a later stage or in incrementally improving institutional processes, as described above.

We argue, then, that the long-term value of producing good research for development scientists could well be greater than the welfare gains a single project produces when these scientists use the capacity built at a later stage and outside a specific ACIAR project.

Capacity building and knowledge discovery are thus inextricably linked. It is not possible to clearly separate the welfare returns between the skills development and knowledge discovery. It is joint. Generic transferable skills and specific discipline skills cannot be separated when assessing impact. Good generic skills are developed at the same time as learning good scientific skills. For example, upon revisiting IAS 27 on Acacia Hybrids in Vietnam, we found that the skills built for seed collection and vegetative propagation techniques *and* the new genetic material all contributed to the strong welfare returns reported in that impact assessment. The combination of knowledge discovery and capacity building and the findings

for tactical and generic skills are a key feature of ACIAR investment, and contribute to ACIAR's recognised success as a donor.

A distinctive feature of the relationship between VAFS and Australia has been the stability of staff on both sides. The initial contact with CSIRO was through the Australian Tree Seed Centre of CSIRO, with Mr Stephen Midgley. Other key CSIRO scientists who have worked with the Forest Science Institute of Vietnam (FSIV) for more than 20 years are Mr Khongsak Pinyopusarek and Dr Chris Harwood. Dr Rod Griffin has also played an important role in the acacia hybrid program, starting in the early 1990s and again through the mid to late 2000s until now. In Vietnam, Professor Le Dinh Kha and Dr Ha Huy Think led the development of the Research Centre for Forest Tree Improvement (RCFTI). These two scientists have been the principal collaborators for more than 20 years, and Dr Think is still the Director. Younger staff who will take over from Dr Think when he retires have also been extensively engaged in ACIAR projects. The CSIRO scientists are now mostly retired, and as forest research capacity in Australian institutions such as CSIRO declines, it is uncertain how this strong partnership will continue.

We see the same pattern at Research Institute for Aquaculture No. 1 (RIA1). Dr Le Thanh Luu (former Director) provided strong, consistent leadership for a long time. Dr Luu led the early fisheries projects and collaborated with many Australian partners. There was also consistency with Australian research partners for specific fields. Dr Sena de Silva worked with RIA1 on inland reservoir fisheries for a long time. Dr Brett Glencross, although based with different employees in Australia, has worked with RIA1 for almost 15 years on fish nutrition. Dr Wayne O'Connor is now implementing a second project on oysters that will take the collaboration up to 10 years. The Vietnamese project scientists highly appreciated these long-term partnerships, which effectively build capacity that the institutes and project scientists need. Both of these institutes have a level of rapport and trust between the Australian and Vietnamese projects scientists beyond what is commonly observed in other projects.

DFAT's tracer studies (ASDiV 2009) concluded that there were fairly low levels of continuing contact by Vietnamese scholars with other Australian students, lecturers and other international students. They highlighted ACIAR as a particularly frequent catalyst for relationships to develop, supporting our conclusion that long-term relationships exist and are a key ingredient for the longer term research success.

Besides ACIAR, VAFS has attracted support from SIDA-SAREC (Swedish International Development Co-operation Agency-Department of Research Co-operation), the Japan International Co-operation Agency (JICA), and the German Corporation for International Co-operation (GIZ). All have had significant impact, but ACIAR provided the most consistent support over the last 20 years. In all cases, Government of Vietnam research funding complemented and maintained support, which is becoming increasingly competitive. RIA1 has had support from DANIDA (Danish International Development Agency), NORAD (Norwegian Agency for Development Co-operation), the Czech Republic and others. In the same way ACIAR has been the most significant source of technical knowledge and research capacity.

NORAD support has been particularly helpful for capacity building for research and extension, through the project: Building Advanced Research and Education Capacity for RIA1. Now in its third phase, it provides training in a wide range of skills—from boat driving and diving to statistics and English. NORAD and DANIDA fund workshops, upgrade facilities and conduct training, and are often more focussed on extension. ACIAR has provided longer term support from colleagues in Australia and conducted longer term research. ACIAR would focus on one sector (e.g. reservoir fisheries, genetics, feed nutrition), and RIA1 staff learnt longer term research strategies from this approach.

RIA1 staff commented how international experience had changed the way RIA1 operates. Now people are working in groups around problems, not as individuals. They have also broadened the research funding base, with a greater diversity of budget sources, from projects, industry, government and consultancies. Many staff have now been trained internationally, principally in Australia, Norway and Denmark. Publications have also increased, and staff noted how working with international scientists taught them much and gave them opportunities they didn't have before to be involved in publications and international networks.

Both institutions have strong programs to build their staff's capacity through undergraduate and postgraduate training and seeking scholarships for the best staff to train overseas. The Research Centre for Forest Tree Improvement (RCTFI) and RIA1 leaders have focused on providing opportunities for younger staff and future leaders. Such a strong emphasis by institute leaders is rare.

ACIAR has clearly been an important partner of both organisations. It has been almost continuously engaged in Vietnam, with a series of research projects, scholarships to study in Australia, collaboration in regional projects and short training programs. ACIAR is well regarded for promoting leadership skills, research strategy skills, project planning and management, project implementation, scientific communication skills, a higher level of scientific publications, networking and team skills. All these have built the capacity of the scientists applying these skills today. This occurred through iterative projects built on the success of previous projects, in fields and teams where there were strong partnerships and that understood the long-term opportunities and results.

An alternative approach would have been for ACIAR to have committed resources in advance to two institutions that showed potential 20 years ago and to have funded a program of research and capacity building, without exposing the institutions and scientists to rigorous peer review or open competition embedded in the ACIAR approach. VAFS and RIA1 have succeeded, but it would have been impossible to anticipate their success or the many internal and external factors that enabled their success. If ACIAR had taken such a long-term institutional approach to FSIV and RIA1, selection of projects would inevitably have been less performance-based and projects would probably have been spread more broadly across departments. If ACIAR had persisted with projects across all sections, it is likely that many would have failed. It also would have been more challenging to support the best scientists for higher degree studies, whether funded by ACIAR, AusAID or other donors.

## 7 Conclusions and Recommendations

### 7.1 Capacity Building Needs and Skills Assessment

ACIAR has increasingly recognised the importance of capacity building and will increase emphasis on capacity building in its new ten-year strategy. The project documentation includes a specific section on the effect of capacity building for planning and reporting. The ACIAR guidelines for developing project proposals clearly state that

*Capacity-building impact is a change in the knowledge and skills of individuals that has occurred through their participation in the project and its training elements. For the impact to be fully realized, the participants would use the new knowledge and skills in areas outside the scope of the project.*

Capacity building needs, activities, outputs and outcomes are, however, often poorly described in project plans and not always well reported in annual and final reports. The project proposals that we reviewed for this study included a generic capacity building statement and often lacked specific capacity building interventions.

**Recommendation 1:** We recommend that project proposals more explicitly describe capacity building activities as part of an impact pathway. When preparing projects, project teams should clearly identify skill gaps and what skills or new knowledge project staff would like to acquire during the project to achieve the desired result.

Projects should consider capacity building elements with the same attention as economic or environmental impacts during project planning, implementation and review to capture and assess capacity building needs, progress and outcomes. We have developed sample tables to guide the project development (Appendix 4).

We suggest that teams carry out a capacity and a training needs assessment at the start of a project or program and on engagement with a new institute to identify gaps and define strategies to address these gaps. This assessment would list all project staff with more than 10% time on the project, identify which skills they will acquire during the project, the benefit of having these skills, and describe the activities that will allow the scientists to learn these skills.

### 7.2 Recording Capacity Building

Capacity building is typically poorly reported and generally undervalued for the benefit it brings project participants. More of a project budget is spent on capacity building than budgets reflect. To reflect the significance of this aspect of project implementation, we recommend budgets emphasise the profile for these activities. Some projects should include capacity building as an objective with its own budget, activities, planned outputs and expected outcomes within and beyond the project's scope. This would particularly apply to projects working in a new area or with new partners. Reporting of capacity building should include formal and informal elements. It should recognise the large mentoring component by

documenting the number of ‘contact’ days between scientists as an indicator of capacity building activity.

**Recommendation 2:** Where capacity building activities are clearly known at the start of the project and are a significant part of the project, these activities should be identified as an objective and clearly budgeted separately to other, more typical research objectives. This would help the Project Leader and Research Program Manager to define better the type of capacity building activities to be conducted.

### 7.3 Institutional Capacity Building

While ACIAR aims to build institutional capacity through projects, change can only be observed after many years, successive projects and significant long-term support from ACIAR. If ACIAR wishes to demonstrate this goal is being met, it should periodically assess institutions with a long history of collaboration. This study reported on Institutional Capacity Building in VAFS (Vietnamese Academy of Forest Sciences) and RIA1 (Research Institute for Aquaculture No. 1) based on a broad range of individual and collective interviews. The detailed case studies had a greater focus on individual capacity building. A more refined methodology could likely be developed, using the ISNAR (International Service for National Agricultural Research) framework (Figure 1) as a starting point.

**Recommendation 3:** Investigate a methodology and assess institutional change after 10–15 years of engagement as a performance indicator: to “measure institutional capacity of partner research organisations”. Given the long co-operation in many countries, it would be feasible to select two institutions to review each year.

### 7.4 Post-Graduate Study

Higher degrees at International Institutions can provide a substantial “quantum” leap in the young scientists’ capacity, especially in the generic skills of planning and critical thinking based on sound evidence. Where this occurs within a framework of a project or series of projects, there is the potential for significant benefits to both the ACIAR project outcomes and the partner research institution.

**Recommendation 4:** The capacity building plan for projects should identify (funded and unfunded) opportunities for Master’s degrees and PhDs, which can be filled as candidates and funding (e.g. John Allwright Fellowships) become available.

### 7.5 Short Courses

There was consistent strong feedback on the value of short courses as part of ACIAR support. Many scientists participated in courses the project funded to obtain specific skills, both in-country and overseas, and in ACIAR-funded soft skill courses which involved scientists from different fields.

Short courses were particularly useful for scientists who already had practical experience in the field and were keen to better understand the underpinning science and further research applications.

**Recommendation 5:** Short courses should be continued and planned as part of informal and formal capacity building in projects. ACIAR should allocate funds for more general short course training, such as scientific writing and data analysis skills, while discipline-specific skills could be funded through projects. These courses can particularly help scientists who do not have the opportunity for MSc or PhD programs.

#### 7.5.1 Long term focus

Continuity in collaboration and stability of good leadership has been a fundamental part of the high level of capacity building observed at VAFS (Vietnamese Academy of Forest Sciences) and RIA1 (Research Institute for Aquaculture No. 1). Had there been a significant break in project funding, a change in focus, or changes in partners, capacity building would likely have been less successful.

**Recommendation 6:** ACIAR should continue to fund programs with a long-term view; it should look at each project in the context of the potential for long term collaboration. It should foster long-term stable partnerships. Where there are gaps in project funding, small activities that continue the relationship can help successfully implement future projects.



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## 4.1 APPENDIX 1: Project list - People interviewed and projects they participated in.

### 4.1.1 FORESTRY PROJECTS WITH VAFS/FSIV

FST/1986/030: Hybridisation and vegetative propagation of tropical acacias

Rod Griffin, Prof Le Dinh Kha

FST/1992/027: Australian acacias for sustainable development in China, Vietnam and Australia

Prof Le Dinh Kha, Dr Ha Huy Thinh, Stephen Midgley

FST/1993/010: Physiology and genetic improvement of *Acacia auriculiformis*

Prof Le Dinh Kha, Dr Ha Huy Thinh, Stephen Midgley, Chris Harwood

FST/1993/118: Seeds of Australian trees

Stephen Midgley, Chris Harwood, Le Dinh Kha, Ha Huy Thinh, Phi Hong Hai

FST/1994/041: Minimising disease impacts on eucalypts in South-East Asia

Dr Nguyen Hoang Nghia

FST/1995/124: Potential insect threat to plantations of acacias and eucalypts in tropical Asia

Prof Le Dinh Kha, Dr Ha Huy Thinh

FST/1996/005: Development of domestication strategies for commercially important species of Meliaceae

Dr Khongsak Pinyopusarek, Nguyen Hoang Nghia, Le Dinh Kha, Ha Huy Thinh

FST/1997/024: Insect resistance and silvicultural control of the shoot borer, *Hypsipyla robusta*, feeding on species of Meliaceae in Southeast Asia and Australia

Dao Ngoc Quang, Nguyen Hoang Nghia

FST/1998/085: The taxonomy of the shoot borer, *Hypsipyla robusta* and allied species in the Asian/Australian region

Dao Ngoc Quang

FST/1998/096: Domestication of Australian trees for reforestation and agroforestry in developing countries

Stephen Midgley, Chris Harwood, Le Dinh Kha, Ha Huy Thinh, Phi Hong Hai

FST/1999/095: Improving the value chain for plantation-grown eucalypt sawn wood in China, Vietnam and Australia: Genetics and silviculture

Dr Ha Huy Thinh, Dr Phi Hong Hai, Nguyen Duc Kien, Le Son, Dang Phuoc Dai

FST/2001/021: Improving the value chain for plantation-grown eucalypt sawn wood in China, Vietnam and Australia: sawing and drying

Dr Nguyen Quang Trung

FST/2002/112: Domestication of Meliaceae species in Southeast Asia and Australia, particularly management of the problem of *Hypsipyla robusta* attack

Dr Khongsak Pinyopusarek, Nghiem Quynh Chi

FST/2003/002: Development and evaluation of sterile triploids and polyploid breeding methodologies for commercial species of *Acacia* in Vietnam, South Africa and Australia

Rod Griffin, Jane Harbard, Le Dinh Kha, Ha Huy Thinh, Phi Hong Hai, Nghiem Quynh Chi, Tran Duc Vuong

FST/2006/087: Optimising silvicultural management and productivity of high-quality acacia plantations, especially for sawlogs

Chris Beadle, Tran Lam Dong

FST/2008/007: Advanced breeding and deployment methods for tropical acacias

Rod Griffin, Jane Harbard, Ha Huy Thinh, Phi Hong Hai, Nghiem Quynh Chi, Le Son, Duong Thanh Hoa

FST/2008/039: Enhancement of production of acacia and eucalypt peeled and sliced veneer products in Vietnam and Australia

Dr Nguyen Quang Trung

FST/2010/034: Agroforestry for livelihoods of smallholder farmers in north-western Vietnam

Dr Nguyen Duc Kien

#### 4.1.2 FISHERIES projects with RIA1

FIS/1997/068: Reservoir fishery development and management in the northern mid highland region, Vietnam

Dr Le Thanh Luu, Bui The Anh

FIS/1998/050: Integrated aquaculture in the highland region of Vinh Phuc Province, Northern Vietnam

Dr Le Thanh Luu

FIS/2000/018: The economics of developing reservoir aquaculture in Vietnam

Dr Le Thanh Luu, Bui The Anh

FIS/2001/013: Culture-based and capture fisheries development and management in reservoirs in Vietnam

Le Thanh Luu, Bui The Anh

FIS/2002/068: Improving feeds and feeding for small scale aquaculture in Vietnam and Cambodia

Nguyen Van Tien, Le Thanh Luu

FIS/2002/077: Improved hatchery and growout technology for marine finfish in the Asia-Pacific region

Le Thanh Luu, Dinh Van Trung

FIS/2005/114: Building bivalve hatchery production capacity in Vietnam and Australia

Wayne O'Connor, Mike Dove, Le Xan

FIS/2006/141: Improving feed sustainability for marine aquaculture in Vietnam and Australia

Brett Glencross, Tran Dinh Luan, Nguyen Van Tien, Le Thanh Luu

FIS/2010/100: Enhancing mollusc production in Northern Vietnam

Wayne O'Connor, Mike Dove, Vu Thi Lien, Dang Thi Lua, Nguyen Viet Khue,  
Nguyen Thu Hien, Mai Van Tai, Tran The Muu

FIS/2012/101: Developing technologies for giant grouper (*Epinephelus lanceolatus*) aquaculture in Vietnam, the Philippines and Australia

Pham Thi Van, Tran Dinh Luan, Nguyen Huu Ninh



## 4.2 APPENDIX 2: QUESTIONNAIRE

Sample for RIA1 (Research Institute for Aquaculture No. 1). Questions for VAFS (Vietnamese Academy of Forest Sciences) were identical.

### **Key Questions for Respondents in Vietnam – Individual interviews – RIA1**

We have a list of respondents that ranges from senior staff to ex-scholars and fellows and list of key questions. The emphasis on different questions will vary with their relevance to each respondent. We will take notes during the interview, but respondents are welcome to write comments or points under the questions below.

#### *Institute*

- 1. How has RIA1 changed in last 20 years?** For example: numbers of staff, research training, international PhDs, organisational structure, research management, project management, numbers of publications, supply of stock to farmers, data from annual and other reports.
- 2. Have other research institutions been active in the same period and what did they contribute?** RIA2, RIA3, Universities?
- 3. What role has RIA1 played in the changes in the fisheries sector?** How has it disseminated knowledge? Have staff been consulted by industry and government?
- 4. What are the main inputs of knowledge and capacity to RIA1:** DANIDA, Norway, ACIAR, Government of Vietnam, others?
- 5. Is there a systematic program for long term capacity building?** Do you assess/report on capacity in the Academy?
- 6. What other institutions do you work with?** : Provincial government, universities, private sector, Worldfish? How does RIA1 knowledge reach farmers through these institutions? What are the extension activities of RIA1?

- 7. How important have the ACIAR projects and networks been in the development of RIA1?** Possibilities include increased collaboration and international networks. What aspects have been most useful in the short and long term?

*Project Collaboration*

8. How did you engage with the ACIAR Project leaders and team? Can you give specific examples of how that worked?
9. Did leading the ACIAR project change the way in which you or others manage research projects? (*for project leaders*)
10. What aspects of the project have been most useful for you, the institute and the sector/country?
11. Can you give some specific example of where some formal (training courses, M.Sc. and Ph.D.) or informal training (on-the-job, mentoring) has worked very well? Can you give details on how you use the skills? *Please think about a key skill that you acquired on ACIAR projects and how did you use this knowledge?*
12. Are there examples of capacity built in the project that was not used then, but has proved useful later and in other projects?
13. What was your position before, during and after the projects you were involved in, and what impact has the participation in ACIAR projects had on your career?
14. How does your involvement in the ACIAR project (s) compare with other project experiences?
15. Do you still have contacts with other scientists in the ACIAR project – in Vietnam, the region and Australia? (This question relates to collaborative research networks.)
16. Are there publications and reports that we can look at for further information?

***Questions for John Allwright Fellows***

17. What were you doing before the JAF and what are you doing now?
18. Did you have experience of an ACIAR project before and after being a JAF?
19. What are the key skills you learnt during your JAF scholarship?
20. Can you give examples of capacity that you developed during your JAF:
- a) that had immediate application on return to Vietnam
  - b) has been useful later
  - c) has contributed to your career development
21. What networks did you develop during your scholarship and how have they been maintained?
22. How is your current research / position funded?

***Questions for John Dillon Fellows***

23. What are the key skills you learnt during your JD fellowship?
24. Can you give examples of capacity that you developed during your JDF:
- a) that had immediate application on return to Vietnam
  - b) has been useful later
  - c) has contributed to your institute
  - d) has contributed to your career
  - d) you have not yet been able to apply

**25.** What networks did you develop during your fellowship and how have they been maintained?

**26.** How do you pass on the skills you learnt during your fellowship to others?

## 4.3 APPENDIX 3: Previous studies of higher degree scholarship programs in Vietnam

### 4.3.1 Tracing Alumni of Australian Awards in Vietnam

A tracer study of Australian scholarship alumni in Vietnam was conducted in 2011 to follow on from previous tracer studies conducted in 2002, 2005 and 2008, using a revised instrument that incorporated AusAID's focus on key outcomes (ASDiV 2011). The 2011 study gives increased attention to relevance and use of skills and knowledge in the workplace, the impact of scholarships on alumni careers, and evidence of specific things that alumni have done since returning using the benefits of their study in Australia. It also considers the extent to which the scholarship program has encouraged person-to-person and organisation-to-organisation links with Australia.

The 2011 Tracer Study involved an online survey of alumni and seven focus groups of representative types of alumni (public sector, private sector and CSO/International Agency) to explore issues more qualitatively. It also cross-matched program data against responses to explore issues in more depth and to avoid asking alumni questions for which the answer was already known. It collected a small selection of case study 'snapshots' to highlight examples of particular alumni experience that reflect some of the main themes emerging from the data.

The survey was sent to 2,062 alumni, including 133 alumni listed as untraceable on the alumni database but for whom working email addresses were recorded. 796 recipients (38.6%) responded. After comparing respondent characteristics to the total alumni population, the survey concluded that the respondent population was representative of the Australian scholarship alumni population and the population surveyed, except that it over-represented women, private sector alumni and alumni in education positions and significantly under-represented alumni in senior positions.

Key findings of the 2011 Tracer Study:

#### *4.3.1.1 Current Employment*

- 83% of public sector alumni return to their original employers. This means that public sector alumni tend to have vastly longer lengths of service with their employers than do other alumni. Other alumni are more likely to change employers more frequently but also more likely to gain management positions more quickly.
- Of those alumni in Vietnam, 63% have returned to their original employers. This did not apply to most undergraduate level alumni because they were not generally employed before they studied in Australia.
- Being in a senior position (defined as director level positions and above) was significantly related to length of service, but this was not true of alumni gaining management level positions. The median time for a non-government alumnus in a management position to be with their organisation was 3–4 years, while for government alumni it was 10–20 years.
- Contrary to expectations, Vietnamese companies have the highest percentage of senior alumni. This is often because they own the companies.
- Allowing for a greater number of female respondents in the survey, several gender differences were still noted. A much larger percentage of women (47%) than men are in management positions than in senior positions (32%), and a greater percentage of women (73%) in management positions are mid-career than men (64%). Conversely, a greater

proportion of men alumni in management positions are older alumni. The data may reflect a change in perspective towards women in leadership positions.

- 83 respondents were overseas (11.6% of the population), but just over half of these (51%) were studying. Most of those overseas for other reasons are expected to return to Vietnam in the medium term. Most of those studying overseas are in Australia, and of those, most are on further AusAID scholarships, particularly Australian Leadership Awards Scholarships (ALAS) scholarships.
- A growing number of alumni are now at formal retirement age, and a significant number of alumni will be in this situation in the next few years. Many will continue to work in other capacities but the scholarship program should consider this issue.

#### *4.3.1.2 Contribution*

- Respondents reported a high degree of relevance of their study to their previous experience. The study also identified examples of respondents who undertook fields of study that were vastly different to their previous experience precisely because the knowledge and skills were not available in Vietnam (e.g. Remote Sensing, Quality Assurance).
- The type of contribution that alumni make is highly related to their employment type. High levels of contribution in teaching and learning was associated with university lecturers, although other types of public sector alumni, in addition to lecturers, contributed to the area of research. Contributions to the promotion of gender equality, an identified outcome for ASDiV, were more related to alumni in NGOs and international organisations compared to all other employment types.
- 33% of all respondents identified changes to systems that they had introduced, and there were many interesting examples to support their case. This was not associated, however, with either seniority or whether alumni were in management positions. Public sector alumni were significantly more likely to report such changes.
- More respondents (374) reported they applied their skills and knowledge outside work than inside work (199). This was partly because respondents understood the question in two different ways. While some gave examples of how they had done things in other contexts, many referred to how they had personally developed through study and the consequences of this growth. They particularly frequently cited developing English language abilities, research skills, teaching skills and critical thinking. Focus groups repeatedly mentioned the importance of these 'soft-skills' as well.
- 62% of alumni think their study is relevant to their positions and, with a few exceptions, there is a good match between fields of study and fields of work. A similar percentage thinks that their study has helped them meet their organisation's needs. Public sector alumni are most likely to say this.

#### *4.3.1.3 Linkages and Perceptions*

- Across both men and women, approximately 57% of alumni are in touch with other Vietnamese alumni but there are low levels of continuing contact with other Australian students, lecturers and other international students.
- 51% of all respondents said their organisations had some ongoing relationship with organisations in Australia, and about two thirds of alumni in these organisations were involved in these relationships. Such relationships were most common amongst university alumni, and ACIAR was a particularly frequent catalyst for relationships to develop.

- Respondents remain overwhelmingly well disposed towards Australia and reflect positively on their study and living experiences in Australia. Despite the low levels of ongoing contact with people met during study, a fifth of all alumni have returned to Australia at least once.
- Most respondents professed an interest in participating in alumni events, although only half had actually done so in the last 12 months.

In summary, the study found that most alumni have returned to Vietnam and are in employment relevant to their original study. Australian scholarships do not markedly enhance promotion prospects for public sector alumni, but other alumni who typically seek new employment on return are usually in higher level positions.

People-to-people links with Australians were infrequent, although more prominent amongst men than women. Men may have more opportunities to socialise while in Australia but this issue needs to be further researched. There was a reasonable level of organisation-to-organisation links, particularly in universities and some government departments. The presence of other forces such as ACIAR or ALAF funding was important in supporting these links.

Since 2011 DFAT has developed a Global Tracer Facility for the Australia Awards which provides a template for the survey and development of case studies for alumni of the program. The motivation was to standardise the process and compare data over time and between countries. The facility remains unfunded but has been tested by country programs in South Asia and in Mongolia (Geoff Lacey pers. comm.).

#### *4.3.1.4 Tracing PhD students funded by Sweden*

Sweden (Swedish International Development Co-operation Agency, 2009) has evaluated the impacts of its postgraduate training across all research fields by tracing the career path of Vietnamese researchers who obtained a PhD within their research programme, and to identify factors that affected them as PhD holders, positively and/or negatively, including SIDA support. The study was conducted by a combination of remote questionnaire survey and in-person interviews in Vietnam. Other objectives were to identify lessons learnt from the research co-operation, and to suggest how this support could have been improved and how SIDA could monitor/trace the progress of PhD holders who have received Swedish research support. The study was initiated in September 2008.

The study identified and traced 37 PhD holders (out of 40–45 who completed their PhDs between 1987 and 2007). The survey developed a web-based, self-administered questionnaire, tested it, and e-mailed it to these researchers. The questionnaire included personal data, educational background, views on the PhD training, career path after PhD completion, current position, usefulness of research results in terms of implementation, policy or innovations, and suggestions.

33 people (23 men and 10 women) answered the survey. The disciplines represented were health sciences (10 men and 7 women), agricultural and forestry sciences (10 men and 3 women), geotechnology (1 man), and social sciences (2 men). In addition to the web-based questionnaire, 20 interviews were conducted in Vietnam in November and December 2008 (in Hanoi, Hue, Ho Chi Minh City and Can Tho), with PhD holders representing the various disciplines and with representatives from line ministries involved. The interviews were

designed to help interpret the quantitative data from the survey and to identify mechanisms that affected the results.

The majority of those surveyed had followed the “sandwich model” approach for PhD training, dividing their time between Sweden and their home institution. They had remained active at their home institution while being connected to a supervisor at a university in Sweden.

Instead of studying abroad for four or five years, which is common in scholarship programmes, the home-based research also brought research activities to the researcher’s home institution, as well as equipment and sometimes library and information and communication technology (ICT) facilities, which could support continued research after the candidate graduated.

All the 33 PhD holders have continued to do research after PhD completion. All but three people (who were conducting post-doctoral studies in Canada and Australia) who answered the survey were carrying out research in Vietnam, mainly at the research institute or university where they were based as PhD candidates.

Most PhD holders (97%) reported that their research had been important and useful for Vietnam. There was even evidence that some research results directly reduced poverty. For example, the agricultural science researchers directly implemented new techniques and innovations to help poor farmers, which the Ministry for Agriculture and Rural Development (MARD) also disseminated through their extension system to large areas in Vietnam. Health science research had led to policy recommendations, such as tuberculosis control programmes. In one case, the Ministry of Health (MOH) had issued a nationwide regulation for Good Pharmacy Practice based on research findings from one of the bilateral research projects.

Research results are not confined to findings that can be applied immediately. Research, apart from producing new knowledge and innovation, provides tools for systematically dealing with knowledge. It builds analytic capacity, which is essential for alleviating poverty.

Some of the PhD holders are department or division heads at universities (40%) or professors / associate professors (20%). Some PhD holders/researchers are also based at line ministries such as the Ministry of Health (MOH) and the Ministry of Agriculture and Rural Development (MARD), where they mainly have positions within the ministry’s policy unit.

#### 4.3.2 Review of the John Allwright Scheme (2008)

This report builds on the previous review and evaluation surveys of the John Allwright Fellowship (JAF) scheme carried out in 1998 (Falvey et al. 1998) and 2004 (Harvey and Skerritt 2004). The 2008 evaluation recorded an overwhelmingly positive response from both fellows and institute directors about both institutional and individual benefits. Major findings included:

- Many (74%) fellows returned to their home country after they completed studies, maximising the opportunities for building capacity in alumni home-country institutes.



- Almost all (99%) fellows indicated that they were facilitating the transfer of knowledge and skills within their institute or workplace.
- Most (93%) institute directors and fellows agreed that the skills and knowledge acquired during postgraduate studies were highly relevant to their positions.
- Most (81%) of fellows had been promoted since they returned to their home country, and directors (78%) and fellows (85%) agreed that the promotion was directly due to successfully completing postgraduate qualifications.
- Fellows were almost unanimous (99%) in their strong satisfaction with their overall experience in Australia. Directors were also strongly satisfied with the fellows' postgraduate studies.
- Almost all (95%) fellows indicated that the fellowship was a positive experience. Both fellows and directors identified research and writing skills, increased flexibility and openness to new ideas, and the network of professional contacts as major benefits resulting from participation in the scheme.
- Fellows and directors proposed continuing and possibly expanding the JAF scheme, increasing the stipend, and greater pre-departure English language support for fellows.

#### 4.3.3 Review of JAF Fellows (2004)

ACIAR conducted a detailed survey of recipients of postgraduate scholarships between January and April 2004 to evaluate how the program affected the awardees and their institutions in terms of employment and career paths, and also to gauge how the former fellows benefited their research institutions and whether their leadership brought wider national effects. Information gained helped to identify options for improving ACIAR's postgraduate awards program. The approach was to interview both the former fellows and the Directors of the organisations for which they then worked. The survey covered all former John Allwright Fellows who had successfully completed their degrees and returned to their home countries.

Major findings included:

- The success rate of John Allwright Fellows was high—91% of those who originally accept an award complete the higher degree.
- Over three-quarters of the Fellows returned to their original countries and were working in a relevant position.
- Most (80%) former Fellows were employed by the one who released them to undertake the ACIAR fellowship. The fellowship had achieved one of its primary aims: to build capacity in the home country research institutes.
- Almost all (92%) former Fellows regarded their ACIAR fellowship as totally or strongly related to their employment. Almost all former Fellows (98%) and Directors (96%) agreed that they were passing on skills and knowledge gained from their fellowship to other staff.

- Most (78%) former Fellows have been promoted since their return from Australia. Most (80%) former Fellows consider their promotion to be totally or strongly related to skills and knowledge gained in their Australian course. Some of the Fellows had proceeded to positions of national influence.
- Almost all (98%) former Fellows were able to undertake the course of their choice, and 81% had kept in contact with their supervisors.
- Directors also commented positively on the Australian study. 98% expressed extreme/strong satisfaction with the Australian degree, and 94% agreed that the Australian training compared favourably with training offered in other countries.
- Almost all (98%) former Fellows felt that undertaking the fellowship met their expectations. Major benefits, both personally and for their institution, were skills and knowledge gained from the course, development of research skills, personal growth and cultural experience, gaining a qualification, and networking. Directors ranked research experience, exposure to scientific methods and specific skills, and knowledge gained from the degree as important benefits.
- Former Fellows suggested different ways of improving the scheme. Most wanted more scholarships, more sandwich courses/field work, and support for training networks and professional contacts on return. Directors made similar suggestions but added that in some cases the courses/research projects needed to be more relevant to the particular developing country. ACIAR has already addressed most of these suggestions over the last 5 years.

Although the survey results were extremely positive, they do not provide a benefit/cost ratio for the investment in the same way that economic impact assessment of projects does. This makes it difficult to judge (using return on investment as a criterion) whether ACIAR's current level of investment is appropriate or whether it should be increased or decreased.

There are few studies on economic returns of postgraduate study in technological areas. Howard Partners' external evaluation of the Cooperative Research Centres Programme (July 2003) showed that in the period up to June 2002, 2,875 postgraduate degrees had been awarded to CRC postgraduate students, and of these 1,655 had taken up employment with industry or end-users.

An Outcomes Survey showed that 72% of research users were satisfied or very satisfied with CRC graduates' qualities and capabilities. The survey, however, did not analyse the economic returns from the several hundred million dollars invested in their awards.

Similarly, the National Health and Medical Research Council Performance Measurement Report 2000–2003 provides information on the numbers of postgraduate awards and their completion rates, but no information on economic benefits of postgraduate training. The results of CGIAR's Evaluating Capacity Development project, co-ordinated by ISNAR (International Service for National Agricultural Research), were published in 2003. Although it analyses six case studies in different developing countries, it makes no economic analyses of these case studies.

#### 4.3.4 Review of Recipients of JAF 'Returnee Grants (2005)

ACIAR initiated a small grants scheme in late 2000 for former John Allwright Fellows who returned to work in their home country after completing their postgraduate studies. The scheme, partly the result of a 1998 external review of ACIAR's training program, provides grants of up to \$10,000 for an activity that continues, or is related to, the research done within the ACIAR project with which a fellow was associated. The funding is primarily aimed at developing small-scale research projects in the fellows' institutions that may catalyse longer-term support. It should also help further fellows' research careers by supporting activities that extend, or are related to, their postgraduate study. One or more of a range of different types of activities, which must clearly benefit the applicant's institution and the applicant's own career, are eligible for funding, including:

- an in-country research and development project
- a link to a research project in a second country
- a link to research in Australia
- travel support to an international conference (evidence of submission and acceptance of a paper related to the applicant's JAF studies must be provided).

Small research and development projects are the most common type of activity supported. In designing their projects, applicants need to show how the activity links to related work in their institute and/or how it could catalyse funding support from other local and international sources.

An ACIAR survey of awardees completed in September 2005 evaluated the effectiveness of the returnee award for the fellows, focusing on its impact on their research careers. This publication gives the results of this survey and a summary of the activities the fellows undertook under their awards. A structured survey was used, as shown in Appendix 2. The survey revealed that the fellows did indeed find their award helpful in launching their research careers in their home countries. It provided the fellows with opportunities to collaborate with other researchers, purchase equipment to improve the facilities in their institution, and to re-establish themselves in their home institution by undertaking a small research project.

Between the inception of the small grants scheme in 2000 and 30 June 2005, 46 of the John Allwright Fellowship holders who returned to their home countries after completing their studies became eligible to apply for a returnee award. 32 of them have received an award. All of those who applied for an award were provided with funding support. In several cases, senior ACIAR staff worked closely with applicants to focus their applications to meet the scheme's objectives and to help design the experimental program proposed. Of the 14 former fellows who did not take advantage of the award, five had instead become leaders of large ACIAR projects soon after their return home, while two took up senior positions in their home countries and thus did not have time to directly lead a small project. Four former fellows migrated to third countries soon after completing their studies in Australia, leaving only two who did not take up an award after returning to their home countries.

4.4 APPENDIX 4: Sample tables for inclusion in project documents.

4.4.1 A. Design Document

Name and Position(1)	Skills to Acquire (2)	Method of Training (3)	Application of Skills
Project Scientist name	<ul style="list-style-type: none"> <li>• Analysis</li> <li>• Planning</li> <li>• Writing</li> </ul>	<ul style="list-style-type: none"> <li>• OJT by A</li> <li>• Short Course on B</li> <li>• Degree in C</li> <li>• Participation in D</li> <li>• Presentation to E</li> </ul>	<ul style="list-style-type: none"> <li>• Activities 3 and 4 (T)</li> <li>• Objective 2 (T)</li> <li>• Future Projects (S)</li> </ul>

1. List all project personnel in Australia and PC who will spend more than 10% of their time on the project. Include students who may be associated with the project who may benefit but whom the project does not directly fund.
2. List the technical, management and communication skills that will be improved in the course of the project.
3. Identify the activities that will result in skills improvement.
4. How will the skills be utilised? List those that are essential for project delivery (Tactical, T) and also those with longer term or broader application outside the project (Strategic, S)

4.4.2 B. Annual reports

Name and Position(1)	Skills to Acquire (Planned)	Method of Training (3)	Progress in Year
Project Scientist	<ul style="list-style-type: none"> <li>• Analysis</li> <li>• Planning</li> <li>• Writing</li> </ul>	<ul style="list-style-type: none"> <li>• OJT by A</li> <li>• Short Course on B</li> <li>• Degree in C</li> <li>• Participation in D</li> <li>• Presentation to E</li> </ul>	<ul style="list-style-type: none"> <li>• Short course delayed</li> <li>• Two months in Southern Region selecting trial sites with A and B</li> </ul>

#### 4.4.3 C. Final Report

Name and Position(1)	Skills Acquired (2)	Impact on project delivery	Expected longer term impact
Project Scientist	<ul style="list-style-type: none"> <li>• Analysis of randomised trails</li> <li>• Planning and running workshops</li> <li>• Writing for international journal</li> </ul>	<ul style="list-style-type: none"> <li>• Seed trials analysed</li> <li>• Extension leaflet designed</li> <li>• Workshop organised (led team)</li> <li>• <i>Nature</i> paper published</li> </ul>	<ul style="list-style-type: none"> <li>• Apply for JAF</li> <li>• Remedial teaching course</li> <li>• Group facilitations</li> <li>•</li> </ul>

(1) Note any change in position, responsibilities, promotions, since project started

