INTERNATIONAL FOUNDATION FOR SCIENCE

MESIA Impact Studies

Report No. 9



Science in Vietnam

An assessment of IFS grants, young scientists, and the research environment

Eren Zink

www.ifs.se

IFS

The International Foundation for Science, IFS, is an international, non-governmental organisation, founded in 1972. The mission of IFS is to contribute to strengthening the capacity of developing countries to conduct relevant and high quality research on the sustainable management of biological and water resources. This may involve the study of physical, chemical, and biological processes, as well as relevant social and economic aspects, important in the conservation, production, and renewable utilisation of the natural resources base.

The strategy to achieve this objective is to identify young, talented scientists who have the potential for becoming the future research leaders and lead scientists in their nations, and to effectively support them in their early careers.

The primary form of support, and the entry point to the "IFS system", is the small grant awarded in international competition. Once a Grantee, the researcher can be supported in many other ways - invited to workshops, purchasing services, travel grants, training, scientific contacts, participation in networks, publishing reports, etc. More information about the activities of IFS, as well as research grant application forms, are available at www.ifs.se.

To date, more than 4,500 researchers in Africa, Asia and the Pacific, and Latin America and the Caribbean have been awarded research grants by IFS.

Cover photographs (from left):
A researcher examines buffalo embryos at the Institute of Agricultural Sciences for South Vietnam; Monuments to scholars conferred mandarin status at the Temple of Literature in Hanoi; Rice paddies and a village in the central part of Vietnam along the main railway connecting Ho Chi Minh City and Hanoi. (Photos by Eren Zink)

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Contents

Preface

The International Foundation for Science (IFS) was one of the first organisations to explicitly address the needs of young scientists in developing countries. The IFS programme was conceived in the 1970s as a response to the brain drain: unfavourable conditions in scientific institutions in these countries resulted in the migration of many of the most promising young researchers. IFS created an alternative by offering competitive research grants with supporting services and occasional workshops.

For over 30 years, the mission of IFS has been to contribute to strengthening the capacity of developing countries to conduct relevant and high-quality research on the sustainable management of biological and water resources.

By 2008, IFS had awarded 6,500 grants to over 4,500 young scientists in the developing countries of Africa, Asia and the Pacific, and Latin America and the Caribbean. Supporting the IFS mission are over 1,000 volunteer experts and scientists, well-established in their fields, who currently review applications and provide valuable comments that are forwarded to all applicants.

In order to measure the impact of IFS support for developing country scientists, a monitoring programme was established at the IFS Secretariat in 2000. The Monitoring and Evaluation System for Impact Assessment (MESIA) produces and analyses data on grantees and undertakes surveys of the conditions under which young scientists work. To date, nine impact studies (MESIA Reports) have been published, including this study on Vietnam (see page 78).

As of January 2008, IFS had 113 grantees in Vietnam who had received a total of 146 grants. We decided to carry out an impact assessment of IFS support to Vietnamese scientists, following the established MESIA model. This study assesses IFS Grantee career and scientific advancement, the research infrastructure at scientific institutions where IFS Grantees work, and grantees' perceptions of the IFS programme.

The author of the study is Mr Eren Zink, PhD student at the Department of Cultural Anthropology, Uppsala University. Mr Zink is on leave from IFS where he has served as Scientific Programme Coordinator for Social Sciences. He was involved in the development of the MESIA methodology and is co-author of several of the earlier MESIA reports. Mr Zink is currently carrying out his dissertation research in Vietnam on the practice of science and the livelihoods of scientific communities in the context of climate change.

Stockholm, September 13, 2008

Michael Ståhl
Director
International Foundation for Science

1. Introduction

Science in Vietnam is a product of a rich history of higher education and exchange of ideas that stretches back in time some 1400 years. From the very beginning, higher education was a complex and powerful institution for achieving visions of a better Vietnamese future. This has been true for the Confucian meritocracy established more than a millennium ago, for the French colonial *mise en valeur* that both challenged traditional systems of learning and promoted French colonial visions, and for the ambitions of Vietnam's current government to become a powerful competitor in the global knowledge economy.

In comparison to the long history of science and higher education in Vietnam, the 28-year history of the International Foundation for Science (IFS) involvement in Vietnam is quite brief. But, in terms of the history of Western collaboration with Vietnam following the Vietnam–American War, IFS has been involved for a long time. During this time, IFS has worked in a scientific landscape that is shaped by Confucian ideas, kinship and hierarchy, as well as by modern ideologies and economic trends. This landscape is fashioned by shifting patterns of international collaboration that result in different generations of scientists being trained in various languages, and in a variety of scientific cultures. It is this history and culture of science that influences the dreams and visions of the Vietnamese scientific community. It also influences what an organisation such as IFS can contribute to national science capacity.

This report, the ninth in the series of MESIA Impact Studies (see Text Box 1), has multiple purposes and may be of interest to a variety of audiences. Firstly, it is an overview of science and research environments in Vietnam that will be of use to persons and organisations wishing to work in the field of science and technology policy in Vietnam. This is also an impact assessment of IFS support to 113 scientists in Vietnam since 1980, which will be of interest to audiences with a specific interest in IFS. Furthermore, this study seeks to foresee ways in which IFS, or other organisations supporting science in Vietnam, could strengthen research capacity there even more. Depending on the reader's interest, s/he will pick and choose sections of the report that are most relevant to her/his own needs.

Persons already familiar with IFS will know that the organisation primarily supports young researchers at the beginning of their scientific careers to work in fields relevant to the sustainable management, con-

Text Box 1

The MESIA Impact Studies

To better evaluate the impact of IFS activities, a Monitoring and Evaluation System for Impact Assessment (MESIA) was established at the IFS Secretariat in Stockholm, Sweden. The main objectives of MESIA are to assess the achievements of the grantees and the effect that grants and other forms of support provided by IFS have had on grantees' scientific careers. These reports are a tool for evaluation of the success of IFS in achieving its goals, and also research instruments meant to identify avenues for future development in the IFS programme. A conceptual framework and a set of guidelines have been elaborated in order to allow international comparisons (Gaillard 2000). These guidelines, with some innovations, have inspired the approach used in this study.

See page 78 for a list of reports published to date from the MESIA Impact Studies. All these reports are available in PDF format on the IFS web: www.ifs.se

servation or utilisation of biological and water resources. The science that IFS supports includes both the social sciences and the natural sciences, but generally excludes engineering and medical sciences (see Text Box 2). While readers will find that this report attempts to describe the general scientific landscape in Vietnam, they will also quickly realise that the focus of the report is in fact on the scientific community that is of greatest interest to the IFS programme.

The IFS programme of support is built around an international research grants competition that annually awards some 200-300 research grants to young researchers in developing countries around the world. There are no quotas for grants to any particular country. Since 1980, up to 12 grants have been awarded to Vietnamese scientists annually (See Figure 1).

In the early years of IFS support to Vietnam, IFS was one of very few organisations from the western side of the iron curtain to be active in supporting Vietnamese science (Abuza 1996). Since the onset of *Doi Moi*[1] in the mid-1980s, and especially since the fall of the Soviet Union, the number of international organisations that are active in Vietnam has increased dramatically. Nevertheless, IFS remains rather unique as a programme that supports the establishment of young researchers from a broad range of disciplines to become experienced scientists in their home country.

Several data sources underlie the analysis and conclusions in this report. A literature review was taken of scholarly writing on Vietnam, science and development policy reports, Vietnamese media sources (in English), as well as government documents. In addition, new data on science in Vietnam was generated using a questionnaire survey of IFS Grantees[2]. These data were complemented with data from IFS' own databases, CVs and publication lists submitted by grantees, and publication data available from ISI databases of international journal publications.

This study also contains a significant qualitative research component. More than two weeks were spent in Vietnam for the purposes of meeting IFS Grantees and other representatives of the scientific community there. During that time, I met with some 30 IFS Grantees in the cities of Can Tho, Ho Chi Minh City, Hue, Hanoi, and Hai Phong. Meanwhile, representatives of approximately 25 research institutions, universities, NGOs and government offices were met for detailed discussions. Numerous other brief meetings were also held.

The results of this study are presented in the six chapters that follow. Chapter 2 provides a historical overview of higher education and science in Vietnam during the past 1400 years. Obviously, it is not possible to cover all aspects of this rich history in any significant detail in such a short space. In-

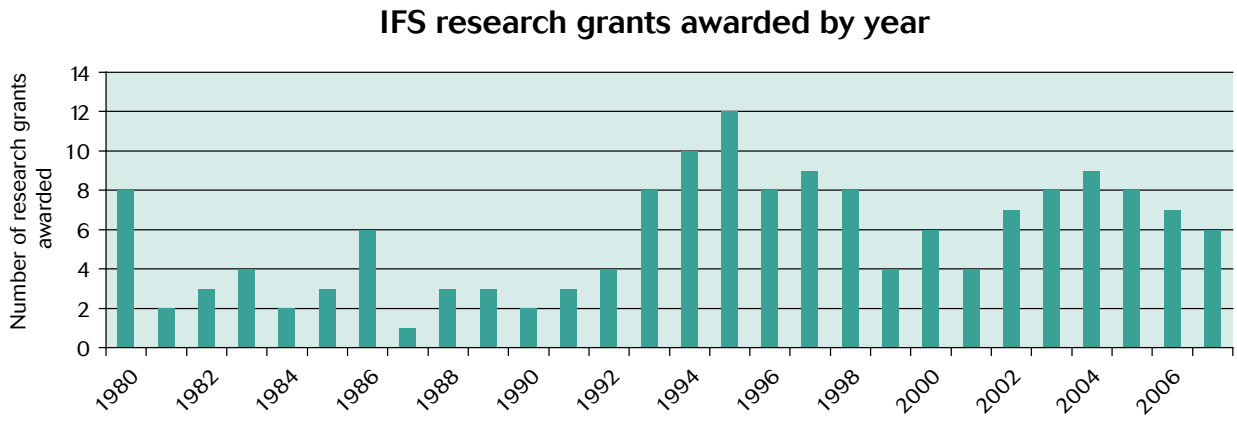


Figure 1 IFS research grants awarded to Vietnam by year (1980 - 2007)

[1] *Doi Moi* was a policy first adopted by Vietnam in 1985, and is roughly translated as "renovation." One key outcome has been the adoption of a market economy that has gradually become more closely linked to the global economy. It has also resulted in the opening of Vietnamese society to greater interaction with Western countries.

[2] The term "IFS Grantee" is used to describe persons that have received an IFS grant for a scientific research project. Unless otherwise specified in the text, this term does not differentiate between persons that have already completed their IFS project and those that are still being actively supported.

stead, I have chosen a few significant events, institutions and processes that I believe also shed some light on the organisation and content of contemporary science and higher education in Vietnam.

In Chapter 3, readers will learn more about the characteristics of IFS Grantees in Vietnam, and how they resemble or differ from the general population. I also discuss the sampling strategy of this study, and to what extent it reflects the overall population of IFS Grantees in Vietnam, and the general population of Vietnamese scientists.

Chapter 4 returns to the topic of science in Vietnam. Here, I sketch the contours of the contemporary scientific landscape. Though the focus is general, many references are made to the experience of IFS Grantees and young scientists within this general scientific environment. The data presented here arrive from a variety of sources, and speak both to the general scientific community and to IFS Grantees in particular.

In Chapter 5, the reader will find an assessment of IFS support to scientists in Vietnam. In this assessment, I summarise and discuss the opinions and experience of IFS Grantees. My primary intention is to convey grantees' own ideas and concerns.

Chapter 6 builds upon the findings of previous chapters to suggest possible avenues along which IFS, or other organisations supporting science in Vietnam, could contribute to a strong scientific community. The recommendations made here have their origins in the suggestions of grantees and other scientists that have participated in this survey.

Finally, Chapter 7 provides a brief summary of what I consider to be the most important findings of this report. Some readers may find it more expedient to begin with the summary and then refer to previous chapters to the extent that they would like more information.

Text Box 2

Summary of the IFS Programme

IFS is a research council with international operations and the mission to build the scientific capacity of developing countries in sciences related to the sustainable management of biological and water resources.

The IFS Mission Statement should be interpreted widely, to include topics in both natural and applied sciences such as agriculture, soil science, forestry, biodiversity, environmental chemistry, natural products, food science, animal husbandry, veterinary medicine, aquaculture, marine resources, as well as social or economic studies of the management of natural resources, or the production and transfer of knowledge for sustainable development.

At IFS, we believe that the interests of both science and development are best served by promoting and nurturing the research efforts of promising young science graduates, who have the potential to become leading scientists in their countries.

Since 1974, we have provided more than 4,500 Research Grants to over 6,500 young scientists in some 100 developing countries in Africa, Asia and the Pacific, and Latin America and the Caribbean.

Acknowledgements

On behalf of myself and IFS as a whole, I would like to extend our heartfelt gratitude to the many scientists in Vietnam who generously contributed their scarce time, sometimes hours or even days, to complete questionnaires, discuss science, and even to locate hard-to-find colleagues. Without their open and sincere cooperation, as well as generous hospitality, this study would not have been possible.

MESIA is the brainchild of Dr Jacques Gaillard, former Deputy Director of IFS, and currently working with IRD in Paris. His work has been an important influence on the production of this report, as well as on my own understanding of science in developing countries. Parts of this report have benefited from the insights of my PhD supervisor at Uppsala University, Dr Jan Ovesen. I would also like to thank the IFS staff for their support and suggestions and in particular the efforts of Dr Richard Hall, Mr Henrik Hovmöller, Dr Ingrid Leemans, Mr Brian Porter, Dr Michael Ståhl, and Ms Pirkko Tolamo.

Lastly, I would like to express my deep gratitude for Dr Anna Furó Tullberg's contributions to the MESIA Impact Studies at IFS. Without her sharp intellect, kindness and generosity, this report and several others would surely never have been written.

2. Historical overview of Vietnamese science and higher education

Education, learning and science have long and rich histories in Vietnam. They have been the organising principles of empires, the backbone of revolution, and the tools of colonial dominance. Current science and higher education in Vietnam are only the most recent manifestation of this tradition and history. Hence, in order to understand the contours of the Vietnamese scientific environment today, it is also useful to look back at the history that has shaped it.

The overview that follows will provide a historical context that stretches back more than 1000 years into Vietnamese history[3]. Then, as now, science and higher education were closely intertwined with culture, politics, international networks, and visions for the future.

Confucian influences

During the millennia between 111 BC and 938 AD, China ruled over much of what is now Vietnam[4]. Thus, China has had an important influence on the culture, economy, and political administration of contemporary Vietnam (Altbach 1989; King and Wilder 2003; Osborne 1999; Woodside 2006). The presence of Chinese administrators in Vietnam and the incorporation of the Kinh people into the Chinese sphere of influence, made a deep impression on the form of higher education that was to dominate in Vietnam until the early 1900s (King and Wilder 2003; Woodside 1976).

State-sponsored formal education in China and Vietnam can be traced back to the year 622 AD. It was then that the Chinese monarch instituted a system of civil service exams for selecting administrators in the Chinese bureaucracy. The exam system also had the effect of spawning the establishment of a wide range of schools dedicated to training young men to take the exams (Nakayama 1984). Winners in this new merit-based system could enter the elite world of the emperor's state bureaucracy. These bureaucrats are known as *mandarins*.

Aspiring mandarins' command of classic Confucian philosophy, religion, ritual and classic literature were the primary subjects that were evaluated during several tiers of exams (Do 1995; Furnivall 1943). In addition, the exams tested moral virtue, skills in writing poetry, and capacity to recite classic Confucian texts verbatim. The goal of the system of education and exams was not to produce scholars that would generate new ideas and new knowledge, but rather to produce bureaucratic administrators that would document history, adhere to moral standards, reproduce state authority, and advise the Chinese emperor (Nakayama 1984; Woodside 2006).

The civil service exams were to become an enduring institution, both in China and in Vietnam. During the time of Chinese domination, schools were in place in Vietnam to train potential exam-takers. Although the schools were primarily attended by sons of Chinese functionaries, there were occasional Vietnamese students there as well (Hac 1995). As long as Vietnam was under the rule of Chinese dynasties, exams were administered in China. And, while most exam-takers from Vietnam were Chinese, some elite Vietnamese (i.e. Kinh) were able to travel to China, both for purposes of study and to take the exams (Hac 1995; Woodside 2006).

[3] The country of Vietnam is populated by 54 ethnic groups, the dominant group being the Kinh people (86% of the entire population). A limitation to this overview is that it primarily concerns itself with the history of the Kinh people, and does not specifically address other ethnic groups.

[4] At this time, the area was called "An Nam", or The Pacified South (Do 1995).

Meanwhile, the texts that were the foundation of the mandarin exam system were also the foundation of a tradition of documentary science in China (as well as in Korea, Japan and Vietnam). This tradition emphasised the recording and categorisation of phenomena, events and practices (Nakayama 1995). In contrast to what would develop in Europe, this science was not characterised by a strong analytical tradition that searched for laws of causal relationships. Rather, in the Chinese scientific tradition[5], it was more important to document the full range of natural phenomena, in particular extraordinary events that might carry omens for the rulers (Lloyd 2004; Nakayama 1984).

Independence from China and educational continuity

The era of Chinese rule and the educational system designed to draw Confucian scholars northward to the imperial centre came to an end in 938 AD with the battle of Bach Dang. The Vietnamese general Ngo Quyen and his army emerged victorious over the southern Han army, and the one thousand year-long period of Chinese domination over Vietnam came to an end (Hac 1995). From 938 AD until the founding of an Indochinese colony by the French, there is a rich history of Vietnamese (Kinh) empires and internal competition among smaller Kinh states. During this time as well, the Vietnamese continued to face threats from Chinese imperial ambitions (Taylor 1998).

While there is a great deal of political discontinuity during this period, there is nevertheless much continuity in terms of the forms of educational institutions, learning, and documentary science. With the exception of a roughly 100-year interlude directly after the defeat of China (Do 1995), the Confucian schools and civil service examinations continued to operate. During the Ly dynasty (1009-1225), a renewed emphasis was placed on education, and this resulted in the building of the Temple of Literature (1070) in Hanoi. Shortly thereafter, the first traditional university was opened (the Royal College at the Temple of Literature) and the exam system was reinstituted (Berlie 1995; Dang, et al. 1995; Do 1995).

Photo: Eren Zink

The gateway to the Temple of Literature in Hanoi

The method and content of the education and exams in Vietnam were very similar to those available in China at the same time. In similar conditions during the period of Chinese rule, the content of the education was primarily religious, ritualistic, and philosophical. More practical, applied sciences such as mathematics, astronomy and medicine were discouraged and perceived to be of a lower status (Nakayama 1984).

Beyond the explicit purpose of training mandarins, the institutional apparatus to educate and evaluate young scholars was also one of the important ways in which the state influence extended to the villages and towns in pre-colonial Vietnam. In particular, village schoolteachers constituted important nodes of the network of state power. This became particularly apparent to the French as they embarked upon their Indochinese colonial project, and it is a primary reason why education was to become a key arena for colonial politics (Kelly 2000a; Woodside 1976).

[5] To what extent Chinese learning at this time can be defined as science is debated by historians and philosophers of science. However, while it is difficult to argue that there was a science very similar to modern science, it is evident that "there were analogous ambitions -- in relation to understanding, explaining, predicting a wide variety of phenomena" (Lloyd 2004:23).

Colonial education(s)

The onset of the French military campaign to colonise Indochina probably did not come as a great shock to the local people. Europeans had been visiting to explore, trade and missionise in Southeast Asia for centuries (Hac 1995). At the same time, an array of Southeast Asian empires had more or less continuously been a military threat to the Vietnamese empire(s). Instead, what must have been shocking to the Kinh people was the scientific and technological superiority of the advancing French soldiers. This superiority facilitated decisive military victories over the Vietnamese empire and its sub-states of Cochinchina, Annam, and Tonkin (Osborne 2004; Pelley 2002).

The French conquest began in 1858. Despite their vast technological superiority, the French consistently encountered resistance from the Vietnamese Emperor[6]. And, while the emperor maintained a standing army, the first contact with the French military units was often made by local militias that had been mobilised by teachers in the Confucian schools of the towns and villages. "The teacher in Vietnam, in short, was the backbone of a political network that was capable of organising armies" (Kelly 2000a).

In the end, however, neither schoolteachers nor standing armies were effective against the superior weapons of the French military. In 1859, the city of Saigon fell and by 1867 the state of Cochinchina was formally organised as a colony of France. The French continued their campaign northward, and Tonkin and Annam conceded to protectorate status in 1884. Three years later Cochinchina, Tonkin, and Annam were amalgamated with Laos and Cambodia to form the French colony of Indochina (Berlie 1995:156).

Having achieved a military victory, the French colonial administration devoted much of its energy to building an educational system in Indochina. The first civil governor of Indochina gave the instructions that "no sacrifices could be more useful and fruitful than those which the colony should make to familiarise Annamese with French ideas of morality, science, and economics" (cited in Furnivall 1943). And, in some years, expenditure on education reached 15% of the total expenditure on the colony (Kelly 2000a).

To a great extent, this French investment in education was a politically motivated response to the strength of the pre-colonial educational system. As we have already seen, the organisational structure of traditional Vietnamese schools had previously proven to be a military threat to the colonisers. In addition, the traditional schools were designed to produce civil servants trained in a philosophy and science that the French did not find relevant to the needs of the colonial project (Furnivall 1943; Hac 1995).

The traditional schools were allowed to continue their existence in Tonkin and Annam (they had been dissolved in Cochinchina in 1859)[7] until the early 1900s. Nevertheless, their importance began to wane since the colonial administration did not recruit employees from among the cohorts of newly examined graduates (Aldrich 2002; Woodside 2006).

Instead, the colonial administration sought to build an educational infrastructure that would produce agricultural labourers and mechanics with basic technical skills, as well as colonial functionaries that could support the colonial bureaucracy (Do 1995; Furnivall 1943; Hac 1995; Kelly 2000b). French administrators foresaw that these products of the educational system would fuel the development of the Indochinese economy. Meanwhile, the schooling would not encourage Vietnamese students to question the colonial monopoly on power, nor give them the technical and scientific capacity to allow them to produce modern technology themselves.

[6] The capital at the time was the city of Hue in the state of Annam. The seat of power had been moved to Hue during the 1800s from Hanoi with the expectation that this would strengthen the emperor´s position in relation to his recently acquired territory in the south (i.e. Cochinchina). However, the move to Hue was to cause problems for the emperor in maintaining a strong position in relation to his subject territories to the north. While the Vietnamese empire here is presented as a rather homogenous whole, in fact it was rather segmented and smaller kingdoms within the empire had at times different positions with respect to the appropriate response to French colonial ambitions. A more detailed description of the situation is available in Taylor, K. W. (1998) Surface Orientations in Vietnam: Beyond Histories of Nation and Region. *The Journal of Asian Studies,* 57, 949-978.

[7] The traditional system of education collapsed in Cochinchina along with the successful military conquest by the French. It was at this point that the Emperor in Hue withdrew all his state representatives, including teachers (Furnivall 1943).

Despite colonial investments, the new schools failed to attract students in large numbers (Furnivall 1943). In fact, during the course of the entire colonial period, only 3% of the population of Vietnam was in direct contact with colonial schools (Woodside 1976).

A key reason for the lukewarm reaction to colonial schools may have been that, despite the interest among the Vietnamese, the fruits of Western science were largely absent from the school curriculum. While, in other realms of everyday life, the power of modern science was blatantly obvious. The green fingers of globalised botany were on display at botanical gardens in Saigon and Hanoi as well as in commercial plantations (Bonneuil 1997; Osborne 1999). Railroad construction was moving mountains, spanning rivers and winding across the rice paddies between Hanoi and Saigon (del Testa 1999). French tropical geographers criss-crossed the highlands mapping nature and ethnic diversity (Bruneau 2005). And, doctors were vaccinating villagers and opening hospitals to dispense Western medicines throughout the colony (Monnais-Rousselot 2002; Trankell and Ovesen 2004). In short, Western science was changing both the physical appearance and the concepts used to understand Indochina. These changes intimately affected the Vietnamese people, who assisted in the projects, were the objects of them, and looked-on as bystanders.

Although colonial schools were not attracting students in large numbers, education had not lost its value in the eyes of the colonised Vietnamese. Rather, students were looking for educational opportunities elsewhere. During the early 1900s, the traditional Confucian schools continued to attract students (St. George 2003). These schools kept the knowledge of the Chinese script alive in the colony, and by so doing, maintained channels of communication open between Vietnam and China.

The fact that Vietnamese students could read and write Chinese, created opportunities for them to travel to China for education. It also allowed them to import ideas and texts from China that were unintelligible to colonial authorities (Kelly 2000a). Interestingly, in the early 1900s, much western literature and philosophy arrived in Vietnam via China and in Chinese. The liberal ideas contained in these texts served to undermine the legitimacy, and highlight the hypocrisy, of the brutal colonial project.

At the same time, children of the Vietnamese elite were finding their way to France, where they were educated in a political and cultural climate that was much more tolerant than they experienced at home (Liên 2002). Still other students were attending independent, free schools in Vietnam or leaving to study in Japan. The latter were offering a militaristic training in advance of a foreseen movement for independence from France (Munholland 1975; Sinh 1988). Both Vietnamese free schools and Japanese schools promised to fulfil the popular vision that science and technology were the keys to an independent Vietnamese nationhood (Kelly 2000a).

Faced with a population that demanded access to education, and concerned that the alternatives to the colonial system were a threat to colonial authority, the administration sought new solutions to the problem of education. One of these was to close the free schools. Another was to limit Vietnamese access to foreign schools. A third solution was to reform the colonial educational system and offer opportunities for higher education within the colony.

The University of Indochina

Higher education was first offered in the colonies in 1906 with the founding of the University of Indochina. The university was a compromise among many different interests. The father of the university was the Governor General of Indochina, Paul Beau. In his vision, the university would be an infrastructural investment that would contribute to the economic growth of the colony (Kelly 2000b). It was also a concession to native demands for more opportunities, and an attempt to stem the flow of those seeking higher education out of the colony.

Meanwhile, many colonists viewed the university with suspicion. They worried that a more highly educated native population would prove a threat to their own status and employment opportunities within the colonial administration (Kelly 1987). Beau worked to alleviate these suspicions, but he ultimately failed and political pressure forced the closing of the new university upon the arrival of a new Governor General in 1908 (Kelly 2000a; St. George 2003).

Photo: Brian Porter

The University of Indochina (now Vietnam National University) was established in 1906

In 1917, at roughly the same time that the mandarin exams were finally abolished in the North and the traditional schools closed, the university was reopened. The language of university instruction was French. From this time on, the student population typically numbered in the hundreds. Prior to World War II, the types of education offered by the university varied according to the needs of the colonial administration. The quality of education seldom equalled that offered in France. At different times, training programmes in medicine, agriculture, veterinary sciences, public administration, law, business, and fine arts were among the offerings (Kelly 1979).

Continuing worries about the political activities of Vietnamese students in France (Thao 2002) and the risk that they posed to the colonial project resulted in a decision to upgrade the University of Indochina during the 1930s. At this time, some of the faculties, e.g. medicine, gained formal equivalence within the French educational system with university faculties in France (St. George 2003).

However, it was not until the eve of the Japanese invasion that further concessions were made and degree training in the natural sciences was offered at the university. In 1941-42, the natural sciences were included as a faculty at the University of Indochina. The faculty had seven teaching staff (including five professors), and 113 students (26 of them being French). Students could choose a course of study that would lead to one of three diplomas: general mathematics, mathematics-physics-chemistry, or physical, chemical and natural sciences (Thao 1995).

During World War II, the Japanese allowed France to continue to administer most of Indochina's domestic affairs, including education. However, in early 1945, the Japanese overthrew the French. In the short interlude before Japan was cast out of Vietnam by Allied forces, a new administration introduced a number of educational reforms with long-lasting effects. These included making Vietnamese with *quoc ngu* script[8] the official language of instruction, and for the first time creating a dictionary of scientific terms in Vietnamese (St. George 2003). It was also the first time that the faculty of the university was predominantly Vietnamese. Previously, teaching positions had been reserved for individuals with a French doctorate, thus drastically limiting opportunities for would-be Vietnamese professors (Do 1995).

As we have seen, the importance of science and higher education as well as its highly contested nature during the first half of the 20th century, was a direct result of the sophistication of the educational system that existed in Vietnam over the course of more than 1000 years, prior to the colonial project. Access to scientific training was one of the most highly contested and carefully restricted areas in the colonial education system. This is evident by the fact that over 30 years had to pass before the colonial university offered Vietnamese students any training in the natural sciences.

The colonial retreat

The August Revolution of 1945 and Ho Chi Minh's declaration of independence of the Democratic Republic of Vietnam on September 2, 1945, marked the beginning of the end of French colonialism. Despite the fact that Nationalist Chinese and British troops facilitated the return of France to Viet-

[8] *Quoc ngu* is the romanised script for writing Vietnamese. It did not become commonly used until well into the 20th century. Previously, a Vietnamese variant of the Chinese characters had been used in traditional schools and literature.

nam right after World War II, the French occupation that followed was marked by an escalating war and ultimate defeat at the battle of Dien Bien Phu in 1954 (Osborne 2004). Unsurprisingly, given the political turbulence of the time, higher education was in some disarray.

Shortly after the declaration of independence, the new government of the Democratic Republic of Vietnam (DRV) renamed the University of Indochina 'the University of Hanoi' and prepared to reopen it with a Vietnamese faculty teaching in Vietnamese. However, by December 1946, the French military had forced the DRV authorities and supporters out of the cities and into the countryside (Osborne, 2004).

Whereas the French did not quickly reopen schools and universities, the DRV was able to do so at dispersed locations in the countryside. Students studied part-time and supported the war effort part-time. Of particular importance for the war effort were the schools of medicine and foreign languages. At the same time, a phenomenally effective general literacy campaign was launched among the peasantry in the countryside (Marr 1993; Woodside 1983).

Higher education was given a further boost when the Chinese Communist Party ascended to power in 1949, and China and the Soviet Union recognised the DRV in 1950. This newfound diplomatic legitimacy allowed the DRV to move its higher education institutions to more sheltered territory along the Chinese border in the north, and opened the door for Vietnamese students to go to Soviet and Chinese universities for their higher education. The first group of students went to the Soviet Union in 1951, and in 1953, 49 students went to the Soviet Union, 149 to China, 4 to Poland, and one to Bulgaria. These first groups of students sent abroad would go on to become vice ministers, university directors, and generals during the 1980s and 1990s (Marr 1993).

The French had reopened the University of Hanoi in 1950 and the model for the University of Hanoi remained the French university system. The ongoing war meant that the attention of France was not focused on education during this time. Four years later, following the signing of the peace accords that divided Vietnam between North and South, most French faculty members went south to teach in Saigon (Marr 1988).

Higher education and science in a divided country

The year 1954 marked the end of Western colonialism in northern Vietnam. Vietnam was temporarily divided into North and South with the understanding that elections would be held within a few years time to decide the fate of the country as a whole. However, the referendum was never held. Struggle and war would continue to cloud the future of the Vietnamese people as the political machineries of the north and south, together with their international allies, vied for supremacy.

One result of this division was that from 1954 until 1975 there existed, in what today is Vietnam, two separate systems of higher education and two separate scientific communities. In the north, the Democratic Republic of Vietnam (DRV) continued to develop the educational system that had been operating in the countryside and along the border with China. Now, however, the DRV was also able to operate in the cities, including in the capital of Hanoi. Meanwhile, in the south, the Republic of Vietnam developed a system of higher education that maintained close ties with the French system of education and research, and later with the American system.

Science in the North, 1955-1975

After the Geneva Accords, the DRV was home to three universities: the University of Hanoi, the Teacher Training College of Hanoi, and the University of Technology of Hanoi (Hac 1995). These institutions were complemented by 14 additional tertiary level institutions, each under its own government ministry, following investments made by the USSR during the late 1950s (Marr 1988). In fact, the growth in higher education and research in the DRV during this turbulent period was largely due to support from its allies.

During the 1950s and 1960s, Vietnam was engaged in higher education exchange with both China and the USSR, including its satellites. Meanwhile, the DRV was exploring options to reform the educational system. The two models being considered

Photo: Eren Zink

An old microscope donated by the Soviet Union gathers dust in a research institute

were the Soviet and the Chinese systems. The Chinese system was designed to achieve greater egalitarianism within Chinese society, and to foster home-grown science and technology that would contribute to greater Chinese independence from foreign interests. Meanwhile, the Soviet system fostered the creation of an educated elite and sought to be a world leader in advanced technology. The Soviet Union's system of higher education and research found the hierarchies created by higher education to be an asset, and encouraged a competitive spirit that would drive the frontiers of technology forward (Woodside 1976).

Ultimately, the Soviet system was adopted and adapted to the needs of Vietnam. Until 1967 the universities were the sites of research, but in that year the system of education and research was reorganised along the lines of the Soviet model so that henceforward research would primarily be carried out at national research centres (Dang, et al. 1995).

Universities and research institutions were often monodisciplinary. This was partly a result of the adoption of a Soviet model. However, it was also to some extent an adaptation to the wartime situation where institutions were kept relatively small and dispersed in order to minimise the devastation of wartime bombing campaigns.

As in the USSR, it was expected that education should be "national, scientific and popular" (St. George 2003). This meant that educational opportunities should be available throughout the country. Education should be scientific in that it should have a technical focus and contribute to economic growth and modernisation. Furthermore, a popular educational model was one that combined study and research with labour in the factories, thereby moderating the elitist tendencies of higher education.

Despite an ideological position that advocated applied and technical sciences, the best scholars often chose the pure sciences like physics and mathematics (St. George 2003). There are several interesting explanations why technical, development-oriented, educational programmes were less popular, despite the position of the state. On the one hand, educational programmes in the applied sciences often required access to equipment that was unavailable (St. George 2003). On the other hand, the DRV economy was based on small-scale agriculture and there was little modern industry that could absorb newly trained applied scientists (Woodside 1983). Alongside these arguments, one must also consider the weight of the Confucian academic tradition in Vietnam that prioritised intellectual and academic pursuits over and above more applied ones connected to agriculture and production.

The realities of the Vietnam-American War meant limited opportunities of developing the system of higher education and research in Vietnam (Hac 1995). Nevertheless, as of 1974, approximately 85,000 people in the DRV held tertiary degrees (Marr 1988).

South Vietnam, 1955-1975

Following the Geneva Accords of 1954, most of the staff at the University of Hanoi (previously University of Indochina) moved to the University of Saigon (Do 1995; Marr 1988). This proved to be the

primary institution of higher education in South Vietnam. It was an open university that enrolled any person passing the entrance exams, and it was an academic institution focussing on arts, basic sciences and professional disciplines, rather than on technical training (St. George 2003).

Other new universities in the South included the Catholic University of Da Lat (established 1958), the Buddhist Van Hanh University (established 1964), and the public University of Can Tho (established 1966). In the early 1970s, the Thu Duc Polytechnic University was built outside Saigon. This institution had a greater focus on applied sciences, laboratory work and hands-on experience in economic and industrial issues of importance for the fledgling country (Do 1995).

In general, the universities in the south were firmly controlled by the South Vietnamese government. Meanwhile, international links were strongest with France and the USA as a result of various exchange programmes (St. George 2003).

In 1974, just prior to the fall of the Republic of Vietnam, some 70,000 persons held tertiary level degrees (Marr 1988). However, the legacy of this era was limited for the science and education context of contemporary Vietnam as many of these people fled in what one could call a massive brain drain (Marr 1993), and after the Northern victory many of the institutions were dismantled or significantly reorganised based upon the Soviet and Northern model (St. George 2003).

Reunification, Doi Moi and the fall of the Soviet Union

After political reunification of the country, government officials were faced with the task of reunifying two systems of higher education and research that had grown somewhat far apart. This is a task that is, to some extent, still ongoing.

The Communist government's solution to the ideological disparities between the North and South was to "re-educate" faculty members of universities in the South (Jamieson 1993; Marr 1988). Younger faculty members, all of whom had been conscripted into the South Vietnamese army, were sent to re-education camps to learn Marxist ideology. Meanwhile, older faculty members were required to attend political training from December 1975 until April 1976. Following their re-education, natural scientists could usually return to their positions. Social scientists, on the other hand, found it more difficult to return to their work as they were perceived as having been more or less permanently corrupted (Marr 1988).

With reunification, the links between Vietnamese scholars in the south and their counterparts in the West were abruptly severed. Although a few students were sent to the West for training in English and French during the late 70s, this too came to an end due to the political fallout of the Vietnamese invasion of Cambodia in 1979 (Abuza 1996). Until 1990, Vietnam mainly upheld science and higher education links with the USSR and its satellites in Eastern Europe. Only 200 Vietnamese students studied in the West during the 1980s (Abuza 1996).

Vietnamese investments in primary and secondary education had enjoyed great success, and one outcome was a large demand for tertiary level education. However, the Vietnamese system could only meet 5-10% of the demand. The Soviet Union and Eastern European countries were important supplements to domestic capacity (Fraser 1984). On average some 2400 students were sent abroad for tertiary education annually (Abuza 1996).

The onset of *Doi Moi* in 1985 is a watershed moment in recent Vietnamese history. This is when the tightly controlled Vietnamese economy was first opened up and a market economy began to blossom. However, the effects of *Doi Moi* were felt only gradually, even well after the collapse of the Soviet Union. For example, Dang (1995) writes that:

> *all universities and colleges in Vietnam are controlled by the state, which, through the MOET[Ministry of Education and Training] and other ministries, determines curricula, assigns staff, provides resources and assigns tasks including state-funded research activities. At the national level, research responsibilities that draw upon state financial support are formally assigned as follows: SRIs [state research institutions] undertake research in the fundamental sciences and technologies that*

> *have been classified as priorities by such organs as the SCST [State Committee on Science and Technology]; research institutions or equivalent units responsible to various ministries undertake R&D activities often with an emphasis on application; and higher education institutions undertake limited fundamental research and R&D activities according to their fields of study and expertise and increasingly under contract to other organisations.*

Doi Moi ushered in great changes in Vietnam, changes which continue to unfold more than two decades later.

Recent trends in science and higher education

In tracing a history of science and education in Vietnam, I have highlighted some of the Confucian, French colonial, Japanese and Soviet influences. To varying degrees, these traditions linger in modern Vietnamese science. In addition to the philosophical traditions, the languages mastered by scholars during the first half of the 20th century (Chinese, Japanese, French, and Russian) have had significant consequences for the kinds of international networks of Vietnamese science which have emerged during recent years. In this section, I will highlight some recent trends in science and higher education that will serve as an introduction to a more detailed discussion in the following chapters.

Distribution of universities and institutions

Presently, the greatest concentration of research centres and universities, as well as scientific production, is in and around Hanoi. A smaller but significant focus is in and around Ho Chi Minh City (Wagner 2007).

To an outsider, the distribution and names of science institutions in Vietnam can appear somewhat chaotic. History is to blame for this. The adoption of a Soviet-styled organisation of research and higher education in the 1960s led to a plethora of monodisciplinary research institutions and universities organised under a wide range of government ministries (Dang, et al. 1995). Meanwhile, the reunification of the North and South Vietnam in 1975 complicated matters still further. In many cases there was a duplication of the Northern research structure founded on the remnants of the Southern research infrastructure. In the 1990s, the resulting diversity of institutions carrying out research and higher education was identified as a problem for the future of science (Dang, et al. 1995). As a result, the recent history of scientific institutions in Vietnam has been one of reorganisation, mergers, and name changes.

In addition to these changes, the segregation of teaching and research that was adopted in the 1960s, is in the process of being eliminated (Tran 2006a). It is increasingly recognised that higher education benefits from an active research environment, and that researchers benefit from engagement with students. Hence, it is now expected that staff of research institutions will also be affiliated with a university, where they will devote approximately 30% of their time to teaching. Conversely, university lecturers are now expected to carry out research during 30% of their time. This is leading to a range of new linkages and institutional agreements between universities and research institutions, something that has not existed previously.

Resources for science and education

Since the mid-1980s, the funding of both scientific research and higher education is progressively becoming more diversified. Whereas during the 80s, almost all funding was channelled directly from the state, the last 20 years have seen an opening of possibilities for private funding, self-funding, and direct foreign funding. While this may have resulted in additional funds becoming available for science, other factors are working to reduce the human resources available for doing science.

Increasing enrolment numbers at universities are resulting in increasing demands being placed upon university teachers. During the period 1995–2005, university enrolments increased from approximately 300,000 students to 1,300,000 students. This increase has placed great demands on university staff, and further limits the time they have available for doing research. By comparison, during the same time the teaching staff only increased from approximately 23,000 to 48,000 (Tran 2006a).

In the meantime, whereas during the 1980s a scientist could expect to be assigned a job following completion of his or her training that would carry

with it a salary and benefits sufficient to support themselves and their families, by the 1990s, this was no longer necessarily the case. It is estimated that two lecturers with two children were able to support their family based upon their combined government salaries for only 10 days of each month (Berlie 1995). As time has passed, this situation has hardly improved (Bezanson, et al. 1999). The fact that teachers and researchers have become more dependent on other sources of income also reduces the human resources available for doing science.

Diversification of international collaboration

As has been demonstrated in the previous pages, educational and scientific exchange with other countries have a long history in Vietnam. The years since the beginning of *Doi Moi* have been no different. However, the changes that *Doi Moi* brought were not immediately felt in the educational sector. Until 1990, the USSR and a number of aligned countries remained the primary destination for Vietnamese students who studied abroad. Approximately 2,400 went abroad for tertiary studies each year (Abuza 1996).

The collapse of the Soviet Union in the early 1990s entailed drastic changes for Vietnamese collaboration in higher education and science. No longer was the Soviet Union able to supplement the Vietnamese educational system, and no longer was the Soviet system available to accept young Vietnamese scientists and other scholars.

In the meantime, the demands being placed on Vietnam to adapt to a world market economy created a need for more trained Vietnamese economists and business administrators. Western countries were most forthcoming with opportunities for training Vietnamese in these fields. Hence, international education exchange experienced a huge shift away from the USSR with its heavy focus on the natural sciences and medicine, to the West with a focus on economics, planning and administration. Western donors initially had little interest in supporting natural science and medical fields, and the lack of opportunity for training in these fields created something of a crisis (Abuza 1996; Bezanson, et al. 1999). This crisis is in the process of abating now, as many more opportunities are arising for natural scientists to train abroad.

Photo: Eren Zink

A new student center at the internationally well-connected Can Tho University

Whereas during the 1980s the government of Vietnam maintained a total monopoly on who was permitted to study abroad, and what kind of relationships would exist between Vietnamese and foreign institutions, during the early 1990s, this monopoly was being rapidly eroded. Universities and research institutions were allowed to independently establish relationships with foreign institutions. Furthermore, students were allowed to finance their training abroad with private funds or scholarship funds from foreign sources. Previously this had been the domain of the Vietnamese government (Abuza 1996). As a result of this diversification, there has been a more than eight-fold increase in the number of students being trained abroad since the early 1990s (Table 1).

Table 1 Number of tertiary level students from Vietnam studying abroad (1999 - 2005) *

Year	Students
1999	8,293
2000	9,220
2001	9,890
2002	12,117
2003	14,604
2004	16,644
2005	20,558

* Source: UNESCO

Science for development

In the 1980s, science was planned by the central government with the expectation that it should lead to increased production. However, state-owned industries and agriculture and scientific activities were under different ministries. Communication and knowledge transfer was expected to occur through the central government offices. Since this time, however, a great deal has changed.

In 1991, investments in science and higher education were cast in a new light. They began to be seen as investments in the socio-economic infrastructure for development. And, the constitution of 1992 places education and science as key determinants of national progress. Furthermore, in 1996, the Vietnamese Communist Party asked the science and technology sectors to do more than advise leadership, and to also encourage enterprises to use new technologies, attract new manpower to science, and improve currently available technologies (St. George 2003). In addition, international cooperation in science and technology is understood to be a key component of plans for achieving national development goals (Tran, et al. 2007).

The Vietnamese government continues to explore ways to further dismantle the barriers between science and technology and private enterprise for the benefit of national economic development. Furthermore, these efforts are regularly highlighted in national news media, as well as in policy documents (Vietnam 2003b; Vietnam 2006). Nevertheless, a recent evaluation of the state of science-industry linkages found that communication and coordination between the two sectors is still rather limited (Tran 2006a).

Summing up

The organisation of contemporary science and higher education in Vietnam rests on a foundation of Vietnamese, Soviet, Western European, North American, and Chinese influences that are both historical and contemporary. This mosaic is further complicated by generational differences among scientists that often include having been scientifically trained in widely differing environments and scientific cultures.

In this chapter, I have briefly surveyed some historical and contemporary trends that shed light on the current context in which Vietnamese scientists work. This overview helps us to understand how Vietnamese science fits into the global organisation of science. It also demonstrates that, for centuries, both science and higher education in Vietnam have, as elsewhere, been highly politicised and subject to strong forces, both domestically and internationally. And, as was the case more than 1000 years ago, science and education continue to be important tools for achieving a Vietnamese vision of the nation's future.

Photo: Eren Zink

3. Characteristics of the IFS Grantee population

The following pages include a description of the population of 113 IFS Grantees that have been supported at some time during the period from 1980 until 2007, and comments on the sample of IFS Grantees that have been surveyed. This is followed by chapters containing a more detailed description of the context in which IFS Grantees work, based primarily upon a questionnaire survey in which 72 grantees participated, and meetings and interviews with 30 IFS Grantees. As mentioned previously, the term "IFS Grantees" as used in this report is inclusive of scientists that are currently working with IFS support, as well as those that have received support in the past but no longer do so today.

With some minor exceptions that are discussed below, it is believed that the sample of grantees surveyed during this study is representative of the general population of IFS Grantees in Vietnam. However, given that IFS Grantees are selected from a limited number of scientific fields based upon an international research grants competition, there are bound to be important differences between the population of scientists discussed here, and the general population of scientists in Vietnam.

IFS Grantees are primarily selected based upon the scientific quality of research proposals that they have written in either English or French. Since 1980, up to 12 research grants have been awarded to scientists in Vietnam annually, reaching a total of 113 grantees in 2007. While the annual rate of success of research proposals from Vietnam varies from year to year, during the ten-year period 1998-2007, the rate of success averaged 26%.

At the beginning of this study, accurate contact information was available for only about one-third of the entire population of current and former grantees. However, an extensive tracer study revealed that of 113 IFS Grantees in Vietnam, at least 99 (88%) are currently living and working in Vietnam. Of the remaining, 5 (4%) are confirmed deceased and for 9 (8%), no information was available.

All nine missing grantees were male. Four of the nine were awarded research grants during the early 1980s and are likely to be retired. No evidence was found that any of the remaining grantees had left Vietnam for a career in another country, but this cannot be definitively ruled out. In any case, one can conclude with certainty that brain drain of IFS Grantees from Vietnam is negligible, if not non-existent.

As of 2007, 66 grantees were considered former grantees. In other words, they had no active IFS-supported research project. Meanwhile, 47 grantees are considered current grantees because they are currently working on an IFS-supported project or are in the process of completing their report on an IFS project.

Regional distribution

IFS Grantees in Vietnam are distributed throughout the country (Table 2), with the largest concentration living in Hanoi (52%). Other major concentrations

Photo: Eren Zink

Hanoi is the capital city, and home to about 1/2 of IFS grantees

of IFS Grantees are found in 12 different institutions and universities in Ho Chi Minh City (19%) and in one university in Can Tho (16%) This distribution reflects a more general trend in Vietnam where research institutions and universities are concentrated in the capital city of Hanoi, with a significant number of important institutions also located in the country's economic hub Ho Chi Minh City. Can Tho is a comparatively small city located in the Mekong Delta. IFS Grantees are over-represented at the internationally well-connected Can Tho University.

Table 2 Geographic distribution of IFS Grantees in 2007 *

City	% of total
Hanoi	52%
Other Northern City	6%
Hue	4%
Nha Trang/Dalat	4%
Ho Chi Minh City	19%
Can Tho	16%

* When information was not available, last known address was used

Research areas

IFS Grantees carry out research on the sustainable management, use or conservation of biological or water resources. For administrative purposes, IFS divides its research programme into a number of "scientific research areas." These areas currently include Animal Production, Aquatic Resources, Crop Science, Food Science, Forestry/Agroforestry, Natural Products, Social Sciences, and Water Resources. These administrative categories contain a wide range of sub-thematic disciplines.

In Vietnam, the largest single research area for IFS is Animal Production (Zink and Leemans 2008), which is twice the size of the next largest area (Figure 2), Natural Products. Social Sciences and Water Resources are two "new" areas for IFS that have only been supported since 2002, together accounting for 10% of IFS Grantees in Vietnam. Meanwhile, Rural Technology is a research area that was supported by IFS from 1974 until 1990. This research area makes up only 3% of IFS Grantees in Vietnam.

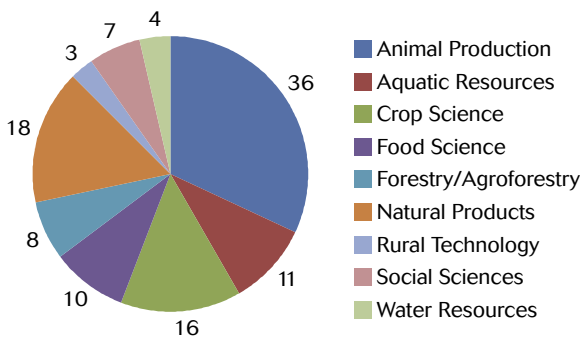


Figure 2 IFS grantees in Vietnam by research area

Table 3 Percentage of female IFS grantees, by research area

Research Area	% female
Animal Production	36%
Aquatic Resources	18%
Crop Science	25%
Food Science	60%
Forestry/Agroforestry	25%
Natural Products	11%
Rural Technology	0%
Social Sciences	29%
Water Resources	25%

Gender distribution

Most IFS Grantees in Vietnam are male. While the general trend at IFS has been a steady increase in grants to women scientists over the years, this is not the case in Vietnam. There the numbers are rather static: 28% of all grantees are women, and 29% of all grantees during the period between 2002 and 2007 were women. By comparison, in all of South and Southeast Asia during the period 2002-2007, 40% of IFS Grantees were women.

Table 3 indicates the percentage of female IFS Grantees in Vietnam for each research area. The food science area stands out as an area where women are overrepresented, whereas natural products research and aquatic resources research stand out as areas where women have little representation.

Few statistics are available on the number and status of women in science in Vietnam. However, according to UNESCO Science and Technology statistics for 2002, a head count of Vietnamese researchers reveals that 43% of Vietnamese researchers are women (UNESCO 2008). Taking this number as a reference, one can tentatively conclude that women are under-represented in the IFS Grantee population. This said, some care must be taken in making this conclusion given that the UNESCO definition of researcher does not match the IFS definition of a person eligible for an IFS grant[9].

Age distribution

At the time of the award of their first IFS research grant, the age of grantees in Vietnam has ranged from 23 to 46 years of age. The average age of a Vietnamese scientist at the time of the first grant is approximately 36. During the period 2003-2007, however, the average age has dropped to 33.

[9] UNESCO defines researchers as "professionals engaged in the conception or creation of new knowledge, products, processes, methods and systems, and in the planning and management of R&D projects. Post-graduate students engaged in R&D are considered as researchers" (quoted from www.uis.unesco.org, accessed February 5, 2007). This definition of researchers includes researchers that are not eligible for IFS support. For example, these might include persons older than 40 years of age, persons that only have a Bachelors degree, and persons working in fields not supported by IFS.

Table 4 Ages of participants in the questionnaire survey

Age range	No. of grantees	% of all grantees
26 - 30	4	4%
31 - 35	12	11%
36 - 40	12	11%
41 - 45	20	18%
46 - 50	24	21%
51 - 55	23	20%
56 - 60	10	9%
61 - 65	2	2%
66 - 70	4	4%
71 - 75	2	2%
Average age	47 years	

In 2007, the age of IFS both new and old (i.e. former) grantees ranged from 30 years to 73 years. The average for entire populations was approximately 47 years of age. Slightly over one quarter of the grantees are still young by the IFS definition (i.e. 40 or younger), with the remainder being older than 40 years of age (Table 4). One should note that the age eligibility requirement of 40 years is a criterion for applying for a first IFS grant. Grantees may apply for a second or third grant even if they are older than 40 years of age.

Survey Sample of IFS Grantees

A survey of IFS Grantees in Vietnam was carried out from August until December 2007. During that period questionnaires were sent by email and regular post to 89 IFS Grantees in Vietnam. The population of 89 was selected based upon the availability in August or September 2007 of an email or postal address provided by the grantee, or by a colleague or acquaintance of the grantee. In the meantime, interviews and discussions were held with 30 IFS Grantees during a two-week visit carried out in October/November 2007. Of these, 27 grantees had also participated in the questionnaire survey.

As of December 2007, 72 grantees had completed the questionnaire and returned it to IFS. This response rate of 81% is considered to be excellent (see Table 5 for comparisons with other IFS Impact Assessments).

Survey Bias

Most surveys based upon a subset of a population can be expected to hold some biases. In this survey, obtaining a high response rate has been the primary strategy for limiting bias (see Table 6 for

Animal production is an important scientific field for IFS in Vietnam

Photos: Brian Porter

Table 5 Response rates to IFS questionnaire surveys

Grantee population sampled	Questionnaire response rate (%)	Report
Sub-Saharan Africa	50	MESIA Impact Studies Report No. 2 (2001)
Mexico	76	MESIA Impact Studies Report No. 3 (2001)
Tanzania	50	MESIA Impact Studies Report No. 4 (2002)
Cameroon	81	MESIA Impact Studies Report No. 5 (2003)
Food Science Grantees	37	MESIA Impact Studies Report No. 7 (2006)
IFS/OPCW Grantees	77	MESIA Impact Studies Report No. 8 (2008)
Vietnam	81	MESIA Impact Studies Report No. 9 (2009)

a summary of grantee participation in the study). And, while it is difficult to conclude with certainty what biases might be present in this sample, some suggestions can be made if we compare the characteristics of the population of 72 questionnaire responders to the living grantee population in Vietnam (five persons are confirmed deceased).

Based upon data available at IFS, one can surmise that the sample has some bias towards younger grantees, and grantees that are still actively involved in an IFS research project. The average age of the 36 grantees that have not submitted a questionnaire is approximately 53 years, compared to 44 years for participants. In addition, while 87% of all grantees with an active IFS project completed a questionnaire, only 51% of all grantees that have finished their IFS project (i.e. former grantees) submitted a questionnaire.

It is also possible that there is a minor bias towards grantees that have remained in science versus those that have left science. Some non-participants are known to have left science to work for private companies in Vietnam, to enter retirement, or due to other family or personal reasons.

Table 6 Description of the grantee population in this study

Total number of grantees	113
Confirmed deceased grantees	5
Grantees sent questionnaires	89
Grantees participating in questionnaire survey	72
Grantees met and/or interviewed during study	30
Total number of grantees participating in the study	75

Despite these minor differences between the characteristics of the questionnaire sample and the overall population of IFS Grantees in Vietnam, the robust participation of grantees in the survey was sufficient for IFS to be confident as to the generalisability of the data to the population of IFS Grantees in Vietnam as a whole.

4. Practicing science in contemporary Vietnam

In a previous chapter, I highlighted historical and contemporary trends that shape today's scientific landscape in Vietnam. In this chapter we will explore the contemporary context in which science is practiced in Vietnam. Unlike previous chapters, this chapter will more narrowly focus on science in the fields currently supported by IFS.

A priority objective of this study was to obtain a better understanding of Vietnamese science in the fields that IFS supports. Towards achieving this end, the following pages will synthesise and discuss IFS Grantee perspectives on the purposes of and conditions for working in science in Vietnam today. As mentioned previously, care should be taken in generalising the results presented here to the Vietnamese science community as a whole, as this survey limited itself primarily to fields of science and the kinds of scientists that are supported by IFS.

Unfortunately, there are few available studies that contain detailed data on science and scientific production in Vietnam. As a result, it has not been possible to make extensive comparisons between the population of IFS Grantees, and the general population of Vietnamese scientists. It is hoped that the data and discussion provided in this case study will be of use for future research on the scientific landscape in Vietnam.

The purpose of science

Science in Vietnam is very strongly linked to national development and efforts to attain industrialised nation status. This is evident from statements of government officials, as well as from scientists' own beliefs about the purpose of their work.

Among grantees, 70% agreed to a statement that scientific research in Vietnam should mainly lead to useful technologies, whereas only 11% disagreed. Support was also strong (62% agreed) for the idea that scientific research in Vietnam should mainly lead to economic development; 10% disagreed with this statement and 28% were neutral. By comparison, there was much less agreement among IFS Grantees about the statement that scientific research in Vietnam should mainly lead to new scientific knowledge. Here, 46% expressed agreement, while the majority were either neutral (42%) or disagreed (12%).

Photo: Eren Zink

Vietnamese scientists conduct socio-economic research to understand the challenges faced by shrimp farmers near Nha Trang

In another question we asked grantees about the importance of science for economic development. Here we find a strong belief that science contributes to economic development in Vietnam. A large majority (71%) believe that science is very important in this respect, the remaining believing it is somewhat important. No grantee expressed the opinion that science is not important for Vietnam's economic development.

Responses were disaggregated by age, gender, and type of institution where grantees work. None of

these factors had a strong effect on the likelihood of a grantee agreeing or disagreeing with the statements provided.

Influencing choice of research topic

A researcher's choice to pursue a particular topic is not made in a vacuum, free from external influences. As shown above, most scientists hold beliefs about the purpose of science that are related to Vietnamese national development. In addition to these beliefs, governmental and institutional priorities, training, personal history as well as other beliefs exert both subtle and overt influences on a scientist's choice of research topic (Zink, in press). In this study, we try to ascertain what factors are most important in influencing IFS Grantees' choices of research topics.

In interviews, grantees often explain that a personal experience in their past moved them to become concerned with how to solve a particular problem, be it in relation to toxins in the soils or the suffering of poor rural farmers. The results of the questionnaire survey also supported the observation that the researchers themselves are a primary influence in the choice of topics.

The questionnaire survey asked grantees what most influences their choice of research problem, and asked them to rank nine possible preselected sources of influence. Table 7 shows the likelihood that each source of influence was identified as being one of the three most influential factors. From this chart we see that grantees credit their home institution, the agency funding their research, and the researchers themselves as having the greatest influence on their choice of research topic. Irrespective of if we subdivide the sample according to gender, age (40 years and under vs. 45 years and over), work place (research institution vs. university), we find that the same three influences rank among the highest.

Photo: Eren Zink

With IFS support, researchers in Ho Chi Minh City study the medicinal properties of scorpion venom

Notably, while the questionnaire survey indicates that funding agencies have considerable influence, in interviews grantees indicated that IFS was not a major factor in deciding what kind of research project to pursue. This apparent discrepancy is probably due to the broad range of topics supported by IFS, and the fact that IFS does not prioritise specific research topics for support.

If we compare women and men with respect to factors influencing their work, we see some clear differences. Men mention companies and businesses as a major influence 27% of the time, women only 9% of the time. On the other hand, women mention international science organisations 50% of

Table 7 Most important influences on scientists' choice of research topic *

Source of influence	Likelihood of being among the 3 most influential forces
The researcher's home university or research institution	68%
Science funding agencies	61%
The researcher himself/herself	60%
Vietnamese government ministries	43%
International science organisations	39%
International development agencies	24%
Scientists and research teams from other countries	24%
Companies and businesses	22%
Non-governmental organisations (NGOs)	11%

* Relates to Question 9 in the Questionnaire (see Appendix 1)

Table 8 Most important influences on scientists' choice of research topic, university staff vs. research institute staff *

Source of influence	University	Res. inst
Science funding agencies	80%	58%
The researcher's home university or research institution	64%	73%
The researcher herself/himself	60%	58%
Vietnamese government ministries	32%	50%
International science organisations	24%	46%
International development agencies	20%	19%
Scientists and research teams from other countries	20%	27%
Companies and businesses	12%	23%
Non-governmental organisations (NGOs)	12%	12%

* Relates to Question 9 in the Questionnaire (see Appendix 1)

the time, while men do so only 35% of the time. These data suggest that men may be more oriented towards the domestic business market, whereas women are more engaged internationally.

The weight of different influences is also different at different ages. The most important difference between grantees aged 30-40 and those aged 45 and above was their relationship to scientists and research teams from other countries. Younger scientists rated these groups as being of major importance 41% of the time, while only 11% of senior researchers feel that research teams from other countries significantly influence them. This finding can most likely be explained by the fact that young researchers are often engaged in PhD or Masters training programmes abroad, whereas older researchers are more engaged with their home institutions.

We have also disaggregated the sample according to their affiliation with either a national university or a national research institution (Table 8). Persons that indicated an affiliation with both types of institution were left out. The findings of this study are that science-funding agencies have greater influence at universities (80%) than they do in research institutions (58%). Meanwhile, researchers at government research institutions are more influenced by companies, international science organisations and government ministries than are their counterparts in the universities.

Given the different histories of national research institutions and national universities, this is not a surprising result. Since the adoption of a Soviet model, universities have been primarily teaching facilities, and they are only recently becoming engaged in research on a larger scale. In addition, they generally have much less research funding from national sources than do research institutions (Tran 2006a). One result is that they are more dependent on funding agencies when they set their research priorities. Meanwhile, research institutions with longer research traditions and more research funds are also more likely partners for both companies (see NIST-PASS 2000) and international science organisations.

Given the rapid growth in the Vietnamese economy during the last decade, it is notable that companies and businesses rank low as influences of scientific research. This is an area of concern for the Vietnamese government, and an area where many believe Vietnam must improve if science and technology is to have a positive impact on development (Bezanson, et al. 1999; SGGP 2007; Tran 2006a).

In 2000, the National Institute for Science and Technology Policy and Strategic Studies (NIST-PASS) found that private enterprise was involved in 17% of research projects at research institutions and 6% of research projects at universities (NIST-PASS 2000). The findings of this study indicate that private enterprise remained a lesser factor in science in 2007. In addition, this study draws attention to the even more marginal importance of private enterprise for the work of women researchers (see above).

Most important fields of science in Vietnam

The most recent five-year plan for science and technology in Vietnam identifies IT, biotechnology, materials science, robotics, energy, food technologies and remote sensing as priority areas for

scientific research (Huu 2006). In addition, during the course of the year 2008 and after the questionnaire survey was completed, adaptation to climate change is fast developing to become one of the hottest topics for science in Vietnam.

There is some overlap between the science priorities identified by the Government of Vietnam and the areas supported by IFS (eg biotechnology and food technologies), and this is also reflected in grantees' indications of what they feel to be the priority research areas in Vietnam (Table 9).

Table 9 Most important fields of science in Vietnam as identified by IFS Grantees *

Field	% of grantees agreeing
Environment (including pollution)	32%
Biotechnology	27%
Agriculture	24%
Medicine and health	14%
Animal sciences	12%
Water	9%
Food safety	9%
Social sciences (related to agriculture/ environment)	9%
Information technology	8%
Aquatic resources	5%
Forest science	3%
Natural disasters	3%
Energy	2%

* Relates to Question 8 in the Questionnaire (see Appendix 1)

The grantees were often rather general in their response to this question. The most frequently mentioned areas for scientific research were environment, biotechnology and agriculture. Many of the areas mentioned (water, food safety, social sciences, animal sciences, etc) are more specific categories that could also be included in environment or agriculture.

Perhaps the most interesting result is that medicine and health ranked high among the most important fields of science according to IFS Grantees. This is surprising because IFS in general does not support health or medical research, with the exception of some related fields such as sanitation, ethnobotanical research, and natural products chemistry.

Given the growing attention being paid to mitigation and adaptation to climate change in the Vietnamese media in 2007 and 2008, one can also expect these issues together with "natural disasters" to become increasingly important fields of scientific investigation in Vietnam. The Vietnamese Government is also acting on climate change by issuing the National Target Programme to Respond to Climate Change that includes recommendations for scientific research. As of November 2008, this programme was in final draft form and awaiting the signature of the Prime Minister.

Challenges and opportunities in science

In many respects, conditions are very good for carrying out research in Vietnam. Researchers I met during this study were generally keen to put their skills to work in producing new scientific knowledge for the benefit of their country. Meanwhile, the Vietnamese government recognises science capacity as a key component in its plan to achieve development goals. Going beyond recognition, they are also investing in scientific equipment and financing the training of a new generation of scientists, both at home and abroad. Another positive indicator for science in Vietnam is that the country is not beset with many of the problems – at least not systematically - that IFS Grantees in other countries identify as being inhibitors to scientific work (Gaillard and Tullberg 2001; Gaillard, et al. 2001; Gaillard and Zink 2003; Gaillard, et al. 2002; Zink and Gaillard 2005). Nevertheless, there remain important challenges for Vietnamese scientists to overcome. This is particularly true for young scientists.

In the following sections, I highlight a range of challenges and opportunities as they were described by scientists participating in the questionnaire survey,

Photo: Eren Zink

A well equipped research lab in Hue, Vietnam

interviews, and group discussions. Significant time is spent discussing the issue of scientific livelihoods and research project funding, as these represent the major challenges to doing research in Vietnam.

Identifying challenges and opportunities: the questionnaire survey

IFS has identified a number of potential challenges to doing research that are more or less valid for the countries in which IFS is active. In order to measure the significance of these potential challenges in Vietnam, survey responders were asked to weigh the importance of the challenges for their own work. The results of this request are presented in Tables 10 and 11. Readers will note that a lack of research funding was not listed as a possible answer in this closed question. Rather, some of the symptoms of a lack of funding were listed. Funding as a general issue will be discussed in a later section.

According to grantees, the only serious problem on this list was inadequate salaries for scientists. More than half (60%) of IFS Grantees find this to be a serious or obstructive problem. Low salaries have a negative impact on research because scientists are forced to spend what should be research time in other activities that can supplement their income. Seen from another perspective, low salaries mean that a scientist's research priorities must compete with his or her ambitions to have and raise a family (this issue is discussed in greater detail in the section on scientific livelihoods below).

The other potential problems were all identified as generally being small in nature. Minor exceptions were broken equipment and access to scientific publications, with approximately 1 out of 3 grantees identifying these as being serious or obstructive problems.

Table 10 Possible challenges to doing research and their level of importance for IFS Grantees *

Challenges	No problem	Small problem	Serious problem	Obstructive problem
Access to research equipment in your institution	52%	31%	10%	7%
Difficulties to import scientific equipment	37%	37%	21%	5%
Broken equipment/equipment repairs	19%	47%	28%	5%
Access to expendable supplies	31%	44%	19%	7%
Lack of time	27%	59%	10%	3%
Lack of technician(s)	36%	46%	17%	2%
Difficulties in doing fieldwork	38%	52%	10%	0%
Access to vehicle	59%	31%	7%	3%
Access to scientific publications	24%	42%	32%	2%
Lack of sufficient salary	3%	37%	42%	18%

* Relates to Question 23 in the Questionnaire (see Appendix 1)

Table 11 Possible challenges to doing research and their average level of importance for IFS Grantees on a four point scale (1 = no problem, 4 = obstructive problem) *

Challenges	Average answer	Average for university staff	Average for research institute staff
Access to research equipment in your institution	1.7	1.6	1.6
Difficulties to import scientific equipment	1.9	1.9	2.0
Broken equipment/equipment repairs	2.2	2.2	2.1
Access to expendable supplies	2.0	2.3	1.7
Lack of time	1.9	1.9	1.8
Lack of technician(s)	1.8	2.1	1.7
Difficulties in doing fieldwork	1.7	1.7	1.7
Access to vehicle	1.6	1.7	1.3
Access to scientific publications	2.1	2.0	2.2
Lack of sufficient salary	2.8	2.8	2.7

* Relates to Question 23 in the Questionnaire (see Appendix 1)

With respect to the latter, in response to another question, 51% of IFS Grantees indicate that they have insufficient access to up-to-date scientific literature. This despite the fact that 68% have access to bibliographic databases via the Internet. Such a result indicates that the bibliographic databases available are not sufficient for the needs of IFS Grantees.

In other respects, Vietnamese researchers are generally confident that they have the equipment, facilities, and training that they need to do high-quality research. This is a positive result of government and other investments in scientific equipment in many institutions, and young people have benefited from what they feel were cutting-edge training opportunities abroad.

A grantee's age and gender do not appear to affect how they answered survey questions about challenges encountered in doing research. Nevertheless, we will see in later sections that both factors have a significant influence on scientific productivity as well as research budgets.

Meanwhile, some differences were noticed in responses by grantees who work in a research institution versus those who work in a university (Table 11). In the university environment, grantees were slightly more likely to see access to expendable supplies, lack of technicians, or access to vehicle as a more significant problem. However, even these differences were relatively minor.

It is somewhat surprising that the symptoms of a lack of research funding, expendable supplies and access to a vehicle were not identified as a greater problem for grantees. In interviews and discussions of the IFS grant size, these have been identified as important limiting factors. This result is interpreted as an indication that a scarcity of scientific research funding is of secondary importance in comparison to the fact that scientists do not earn enough of an income from science to actually do scientific research (both issues are discussed in more detail in following sections of this report). If scientists were to earn a basic salary that covered a significant amount of their living expenses, then it is predicted that the scarcity of research funding would become a primary limiting factor.

The survey suggests that if the situation were to change and Vietnamese scientists were able to earn a living from doing science in public institutions, they would have both the time[10] and the infrastructural resources to do science. However, they would still lack funding to purchase supplies and visit their field sites. As it stands now, the doubled effect of a lack of salary and a lack of research funds are the key limiting factors to achieving greater scientific productivity in Vietnam, especially among the younger generation.

Scientific livelihoods

Most IFS Grantees work as scientists, either at a public university or at a public research institute, and sometimes at both simultaneously. Only two grantees indicated that they were employed full-time in other types of institutions[11]. One worked at a national NGO while the other worked for a private company. It was not uncommon for grantees to work at several different kinds of organisations at the same time (see Table 12).

Table 12 IFS Grantees' place(s) of work*

Type of organisation	% of grantees
Public research institute	55%
Public university	53%
International organisation	9%
National NGO	6%
Private company	5%
Private university	5%
Private research institute	2%

* Relates to Question 37 in the Questionnaire (see Appendix 1)

Vietnamese scientists' salaries are very low, and as a result, scientists find it difficult to live on their government salaries alone (Moock, et al. 2003; Norlund, et al. 2007; Tran 2006a). This is particularly true in urban areas like Hanoi and Ho Chi Minh City, where the cost of living is much higher than in small towns and cities. The average salary for a person working in the public sector in science and technology is USD 104 per month (Vietnam 2003a). This is equal to slightly more than USD 3

[10] They would have more time because they would be engaged in fewer extra income earning activities.

[11] They had both completed their IFS research some time previously.

per day. By comparison, poverty in Vietnam is defined as a person surviving on less than USD 2 per day (UNESCO Institute of Statistics 2008).

All in all, 83% of grantees consider their salary as scientists to be inadequate to support a family. For women, this number rises to 89%. Sixty-three of the seventy-two questionnaire respondents volunteered information regarding their income as scientists in 2006 and/or their total household income during 2006 (Table 13). The average grantee earns about USD 215 per month from his/her work as a scientist.

This amount, though not extravagant, given the cost of living in major Vietnamese cities, is much higher than the national average income for persons in the science and technology sector in 2006. Hence, it seems that grantees in their responses are including both government salaries as well as other sources of income such as consultancies and projects.

Table 13 Average annual income of IFS Grantees (USD) *

Category of grantee	Scientific income	Total household income
All grantees	2,586	5,238
Male grantees	2,825	5,296
Female grantees	1,885	5,090
Grantees 40 years old or younger	1,911	3,937

* Relates to Question 40 in the Questionnaire (see Appendix 1)

If we separate men from women, we see that male grantees earn 50% more from their work as scientists than do women. Meanwhile, grantees under 40 years of age earned approximately USD 159 per month in 2006. Household incomes are roughly the same for male and female grantees, but much lower for grantees under the age of 40.

In general, scientists earn their livelihoods from a wide range of other activities that include teaching evening classes at private schools, consultancies, and running their own small businesses. The latter might be related to their scientific work. For example, at least one IFS Grantee has a small factory producing medicines from natural products.

Small salaries have a number of negative implications for science in Vietnam. One obvious result of this situation is that free time and time for research are easily consumed by the demands of other livelihood activities. Neither doing research nor disseminating the results of research can pay the bills.

Another is that it becomes very difficult to convince promising young scientists to pursue a career in national universities and research institutions. The most promising candidates are often the first to take jobs in the private sector. There, salaries can be ten times (or more) those available in the public sector, and also have the advantage of leaving evenings and weekends relatively free for other non-work activities.

Even those who do choose to remain at the national universities and research institutions may not continue to pursue a research career. The fact that research does not pay creates a tendency for scientists to see the completion of a PhD as the end of their time as active researchers, and the beginning of their efforts to become economically solvent. A PhD is one important means of establishing one's status as a scientist and one's credibility as an expert in a particular field. This creates economic opportunities that are related to science, though not involving actual research. It also coincides with a period in the lives of both men and women when it is socially important to establish a family and begin to provide for them economically. For many, the award of a PhD marks the end of their time as active researchers.

IFS Grantees are to some extent an exception to this tendency. They are often individuals who have decided to devote significant portions of their time to doing research, and continue to do so after their PhD. However, interviews and meetings reveal that they are only partial exceptions. Even when they remain in research, there is a clear tendency for current IFS Grantees with a PhD to become leaders of a research group where much of the research funded by the IFS grant is actually carried out by junior colleagues working on their Masters degrees. In fact, one can argue that it is the IFS grant itself that permits these still young researchers to become leaders of small teams.

One exception to this tendency, however, is the case of social scientists carrying out research using qualitative research methods. Due to the nature of their research, there are indications that they

remain active in day-to-day research activities to a somewhat greater extent.

While scientific salaries are low in the public sector, grantees do find some advantages to working in this environment. These include job security, social benefits, and retirement benefits. In addition, a position at a university or research institute is useful for marketing oneself as a consultant to companies, government, and international organisations.

Research funding

The general lack of research funding to purchase supplies and arrange fieldwork is a key problem inhibiting Vietnamese scientific research output. This problem is particularly acute for younger scientists at the early stages of their research career, and it is probably only second in importance to the low salaries discussed above.

It is not uncommon to find young scientists freshly returned home from a PhD programme abroad surrounded by newly purchased, state-of-the-art scientific equipment. Despite the potential that these resources promise, they have little or no money to purchase the chemicals and other supplies that they need to carry out a full-scale project. In the social sciences, young scientists suffer from a similar problem. They often lack the money they need to travel to and stay at their field sites.

While research funds do exist nationally, for younger researchers there are few opportunities to access them. Repeatedly, scientists interviewed commented that young researchers face a strong disadvantage in accessing national sources of funding. In order for a young scientist to access such funds, he or she needs a well-connected senior researcher to apply for the funding on his or her behalf. Young researchers complain that the government neither values them nor invests in their research.

In fact, the situation is more complex than this. The government does invest in sending young researchers abroad for training. Furthermore, it appears that it often relies on young researchers, through informal communication networks, to generate innovative new ideas that can push Vietnamese science forward.

Nevertheless, after interviews with a wide range of scientists, both grantees and non-grantees and at different stages of their career, it appears that the hopes pinned on the next generation of scientists are being partially thwarted by the persistence of a scientific hierarchy and bureaucracy that favours seniority over youth, and kinship/social networks over competence. This leads to a situation where young scientists look for other opportunities to use their scientific competence outside public universities and institutions. This said, it is also clear that there is an awareness of the problem and that many actors are working to incrementally make improvements in the system.

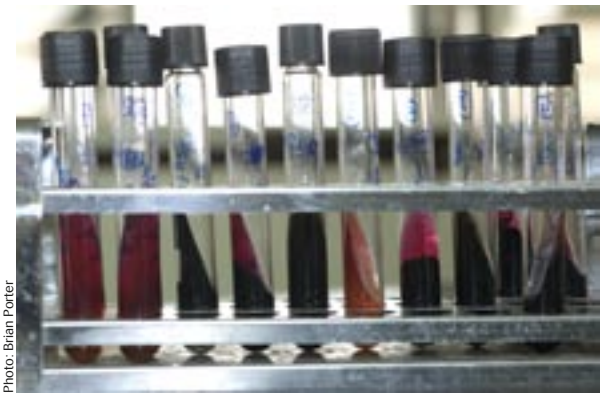


Photo: Brian Porter

Many research labs are well equipped, but researchers lack funds to purchase chemicals and other consumables

International sources of research funding are also difficult for young researchers to access, though for different reasons. Because they are excluded from national research funding competitions, young researchers do not generally have previous experience of carrying out the full cycle of a research project. This includes designing a project and raising funds to cover its implementation, completing the project, and communicating the results. This lack of experience is a handicap in international research grant competitions and is reflected in the weakness of many research grant proposals. Furthermore, for the majority of young scientists met, expressing oneself in written scientific English (or French) is a considerable challenge. Many scientists felt that their English skills were not sufficient to clearly express their ideas about scientific work, and that there is a lack of resources available locally that would help them to overcome this obstacle.

In general, young researchers have difficulties in accessing research funds, even when they are available from national and international sources. In national competitions, young researchers cite

problems that relate to a scientific tradition that emphasises seniority and hierarchies. This scientific tradition also poses problems when young scientists wish to compete internationally for grants. In these competitions, young scientists are obstructed still further by the fact that English is a relatively new scientific language in Vietnam.

Research budgets

In the previous section, I argued that, for young scientists in particular, finding research funds is a key problem. In this section, we will take a closer look at the research budgets of scientists that have at some time point in their career been supported by IFS.

For the period 2002-2007, 52 IFS Grantees reported having research budgets totalling USD 5.7 million. Included in this total are an estimated USD 300,000 in IFS research grants. The mean 5-year budget for each scientist participating in the survey was over USD 100,000.

As Table 14 shows, some grantees have been very successful at accessing research funds. The extreme success of one grantee, the director of a university-based research institute, skews the results towards a predominance of foreign funding. If this outlier were excluded, research funding would be rather evenly divided between domestic and foreign sources.

Fifty-four grantees reported detailed information about their research funding during the year 2006. This amount totalled slightly more than USD 1.1 million. This results in a mean research budget of USD 20,392 per annum per reporting grantee. If one were to assume that non-reporters did not have a budget during the year 2006, then the mean research budget would equal USD 15,294.

Table 14 Grantee research budgets (in USD) during the previous five years (2007) *

No. of grantees reporting a research budget	52
Total amount of funds	5,686,415
Mean amount	107,291
Median amount	24,650
Total amount from domestic sources	1,953,025
Domestic funds as % of total funds	34%
Mean amount from domestic sources	37,558
Largest single budget from domestic sources	650,000
Total amount from foreign sources	3,733,390
Foreign funds as % of total funds	66%
Mean amount from foreign sources	71,796
Largest single budget from foreign sources	1,780,000

* Relates to Question 25 in the Questionnaire (see Appendix 1)

What is perhaps more interesting than the absolute amount of funding available during 2006, is how it was distributed (Table 15). Approximately 52% of this funding was from national sources. Nationally, most funding comes from national public funds. However, a small but significant amount is sourced from the researchers' home institutions. A negligible amount is from national private sources.

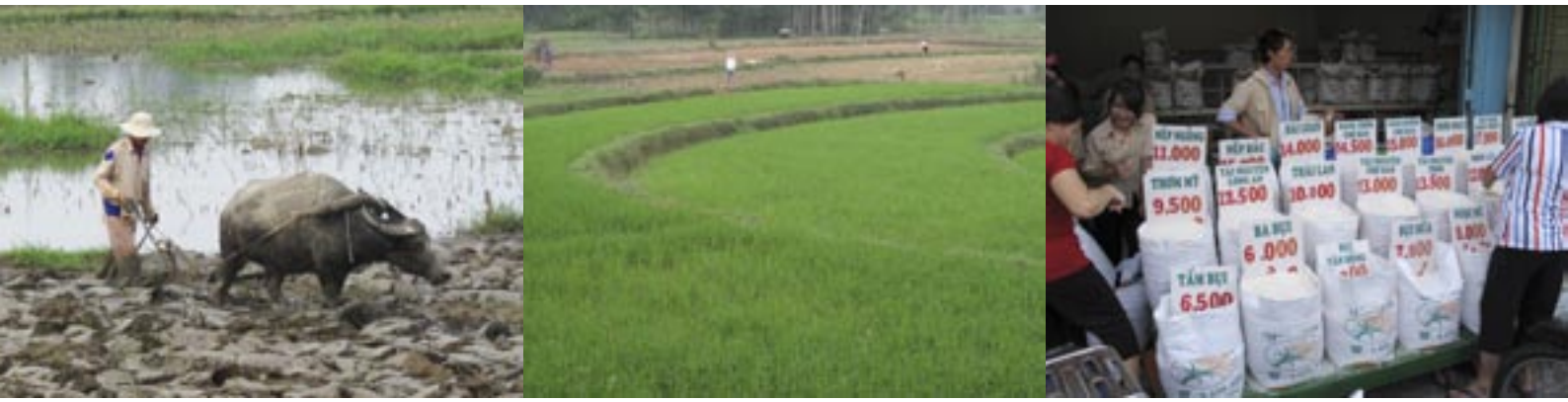
Nearly half of the funding was identified as coming from international sources (44%). By comparison, a recent study of Vietnamese universities found that 25% of scientists' research funds originated from international sources (Tran 2006a).

Given that only 17 of the scientists reporting international funding sources in 2006 were at that time actively engaged in an IFS project, the percentage of all research funds in 2006 that were sourced from IFS is well below 10%, and probably closer to 5%.

Table 15 Percentage of research funds originating from different sources for IFS Grantees in Vietnam during the year 2006 *

Source	All grantees	University staff	Research Institute staff	Men	Women	Grantees aged 40 or less	Grantees over 40
Home institution	11%	9%	28%	12%	11%	3%	14%
National public funds	40%	42%	29%	41%	31%	22%	45%
National industry or foundation	1%	1%	0%	1%	0%	0%	1%
Foreign industry or foundation	3%	0%	6%	3%	1%	11%	0%
International organisation	41%	48%	37%	38%	57%	59%	35%
Other	4%	0%	0%	4%	0%	5%	3%

* Relates to Question 24 in the Questionnaire (see Appendix 1)



Photos: Brian Porter

Vietnam is the world's second biggest exporter of rice. Scientists can contribute towards further improvements in quality of rice and the efficiency of production.

These figures indicate that IFS Grantees are far more successful at obtaining research funding from international sources than is the general population of researchers in Vietnam.

When comparing grantees that work primarily for a university with those that work primarily for a research institute (Table 15), we see some differences in sources of research funding. While both rely upon national sources of funding for slightly more than half of their research funds, we see that grantees at universities receive small amounts of support from their home institution (9%) in comparison to national public funds (42%). Colleagues at research institutions on the other hand seem to have much more funding available from the home institution (28%). This trend may soon come to an end, however, as the Vietnamese government places more pressure on research institutions to generate their own research funds, and rely less upon direct disbursements from the ministries.

There was a large difference in the research budgets of male grantees and female grantees during 2006. Whereas the average amount for men (non-reporters included) is nearly USD 20,000, for women it is less than USD 7,000. If we look at the sources of funds as well, we see that women are much more dependent upon international organisations for their research funding than are men (57% of the budget vs. 38% for men).

One can conclude that international support is of greater importance to women scientists than it is to men. This is not to say, however, that women are more successful at accessing international sources than are men. The absolute amounts of research funding disbursed from international organisations to men remains higher per man than it is per woman.

Researchers that were under 40 years of age in 2007 were much more dependent on international or other sources of support than were other groups. Only 25% of their reported funding was from Vietnamese sources, with the remaining coming from abroad. Meanwhile, more than 60% of their older colleagues' funding came from domestic sources. Scientists younger than 40 had a mean research budget of USD 11,500 in 2006, while those over 40 had an average budget of USD 17,400. These data support claims made by grantees in the interviews that young scientists are less likely to have access to national government funds than are senior scientists.

The data presented here demonstrate that IFS Grantees are successful in obtaining research funding throughout their career, and that they are more successful at obtaining funding from international sources than the general population of scientists in Vietnam. It also indicates that older men are able to access more research funding than both women and younger researchers.

IFS Grantees' success in raising research funds is tempered by the challenges faced by younger scientists, and women scientists in particular. For these groups, average research budgets are lower than the amount (between USD 15,000–20,000 per research project) that many Vietnamese scientists believe is necessary in order to carry out science that is publishable in international journals.

Communication and partnership

This study indicates that networks and scientific communication are key factors influencing scientific research in Vietnam. Nearly all (98%) IFS Grantees carry out their scientific work in partnership with other scientists. Often these partnerships are multidisciplinary in nature (Table 16), and three out of four IFS Grantees work in multidisciplinary research teams that include economists, geographers, sociologists and other social scientists. In addition to disciplinary diversity, IFS Grantees have diverse international networks that are important both in terms of their work and their training.

Table 16 How often do IFS Grantees work in multidisciplinary teams? *

Response	% responding
Never	3%
Sometimes	48%
Usually	49%

* Relates to Question 44 in the Questionnaire (see Appendix 1)

At the same time, IFS Grantees believe that scientific networks and communication are in need of further support and expansion for the healthy productivity of the scientific community in Vietnam. When asked if they agree that Vietnamese scientists are strong participants in international science, only 38% of grantees responded in the affirmative. Similarly, when asked if Vietnamese scientists formed a strong domestic community, only 37% agreed. For both of these questions, most were neutral or in disagreement.

In this section, we will examine data from a number of sources to understand what patterns of scientific networks and communication currently do and do not exist in Vietnamese science. Particular attention is paid to international linkages. In a later section, we will listen to grantees' suggestions of what IFS could do to further support both national and international links in Vietnamese science.

Scientific publications

Scientific publications are an important means of sharing research results and contributing to the expansion of scientific knowledge. In Vietnam, as in much of the world, scientific publications are also a measure of a scientist's individual productivity and a basis for determining whether or not they should be promoted in their work.

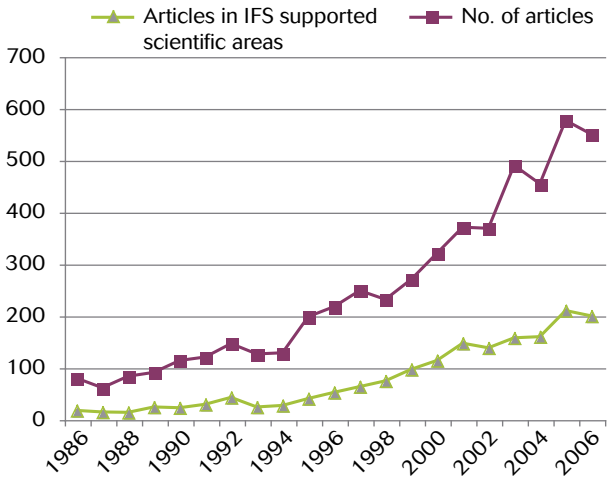


Figure 3. ISI journal articles published by Vietnamese authors over time (1986 - 2006)

There are many kinds of scientific publications, including conference proceedings, books, textbooks, posters, etc, but in this section we focus primarily upon journal articles. Furthermore, we discriminate between two broad categories of journals. Firstly, there are the high-prestige journals that are listed in the ISI database of international journals. Using the ISI list of journals as an indicator of quality is not without its pitfalls and biases. In particular, these include a bias towards English-language publications, poor coverage of journals that focus on issues of national relevance, and little coverage of social science journals (Dahdouh-Guebas, et al. 2003; Gaillard, et al. 2001; UNESCO 2005). Nevertheless, it is one of the better indicators of quality and international relevance that is available for the purposes of this study. The second category is local journals. Vietnamese scientists publish in such journals in many different countries, but in this case this category is primarily populated by Vietnamese journals.

In general, scientific publication productivity is on the rise in Vietnam. One of the few measures of scientific publication productivity available for Vietnam is from the ISI databases. Fig 3 shows the 5238 international journal articles as they appeared in the ISI database per year 1986-2006, authored or co-authored by a Vietnamese scientist (i.e. the author had an address in Vietnam and did not have a European name). As one can see, during this 21-year period, the number of publications has risen nearly sevenfold from 79 in 1986 to 550 in 2006.

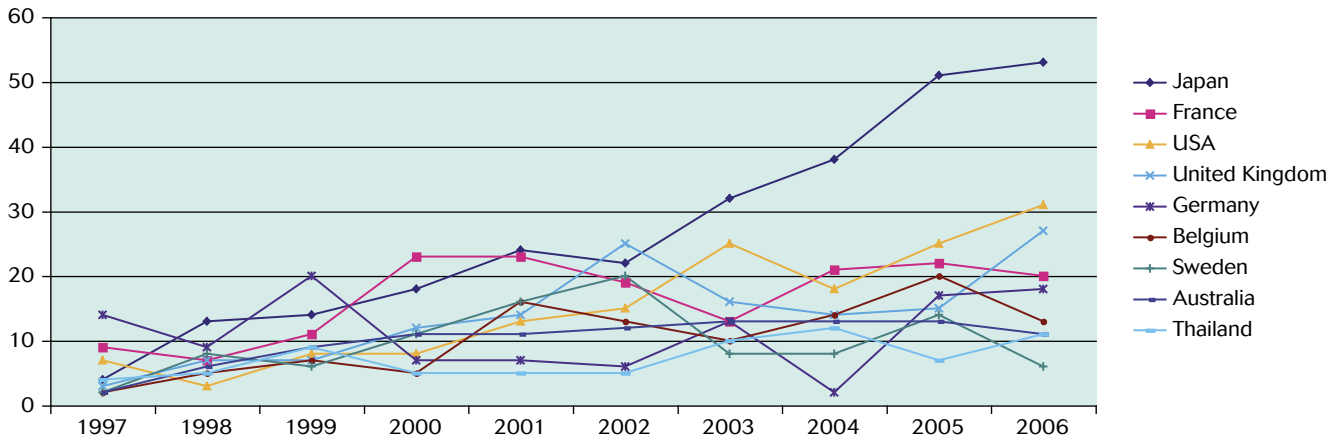


Figure 4. Changing international collaboration patterns of Vietnamese scientists in the production of ISI journal articles (1997 - 2006)

Using keywords, these publications were sorted according to whether or not they would fit in the IFS granting programme as it was constituted in 2007. Of 5238 articles, 1660 were found to be in fields relevant to the IFS granting programme. Over the past two decades, the fields that IFS support are the source of a growing number of international ISI publications, both in absolute terms and as a proportion of total publication productivity. Whereas in the mid- to late-1980s, publications that would fit within the current IFS programme represented between 16-27% of all publications in ISI journals by Vietnamese authors, since the year 2000, this range has been between 32-40% of all ISI publications. At the very least, this indicates that the areas of science supported by IFS are of increasing importance in Vietnam.

The ISI database also allows one to chart the patterns of international collaboration in scientific research. This is done by using journal article publication as an indicator of research partnership. In doing so, we find that during the past 20 years (1987 – 2006), Vietnamese scientists were most likely to co-author ISI journal articles with other scientists from Japan, France, the USA, the United Kingdom, or Germany (Table 17 and Figure 4). However, if we consider only the five-year period 2002-2006, we see that the importance of France (95 co-authored articles) begins to slip in comparison to that of the USA and the United Kingdom (114 and 97 co-authored articles, respectively). Swedish collaborations peaked in 2002 and have since been in decline.

Table 17 Home country of persons that co-authored ISI journal articles with Vietnamese scientists (1986-2006)

Country	Total
Japan	288
France	198
USA	170
United Kingdom	152
Germany	148
Belgium	110
Sweden	107
Australia	106
Netherlands	104
Thailand	85
Russia	69
South Korea	64
Philippines	59

IFS Grantee publication productivity

During their scientific careers, IFS Grantees have published scientifically on average approximately 27 times (women 21 times, men 29 times). These publications include journal articles, conference proceedings, reports, books, etc. Recent IFS Grantees have published less often (19 times), but this is not unexpected given that they are at an early stage of their career. In total, 69 grantees report having published 1849 times, based upon their scientific work.

Publication lists were received from 51 grantees, or 57% of the 89 grantees contacted. For the purposes of this analysis, data were culled from the publication lists regarding the number of publications each grantee had authored or co-authored in a scientific journal during the period 1997–2006.

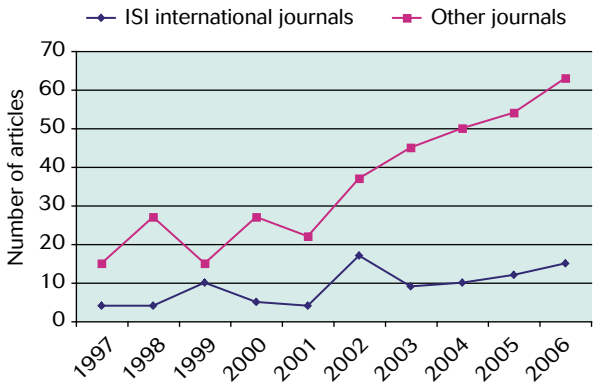


Figure 5. Number of journal articles resulting from IFS supported research projects (1997 - 2006)

A small number of grantees did not report publication before 2000, and it is suspected that some grantees under-reported the number of journal publications in Vietnamese journals. This may have led to a slight under-representation of the number of publications during the period 1997-1999 and the number of Vietnamese journal publications.

Nevertheless, out of 51 grantees, 47 had published at least one journal article, and one half of them (n=25) had published in an international journal listed in the ISI database at least one time during the period 1997-2006. In total, 90 publications appeared in ISI journals during this ten-year period (see Figure 5). By way of comparison, this population of IFS Grantees published in ISI international journals more than three times as often as the average Vietnamese professor or associate professor (Nguyen 2008).

Meanwhile, these same 51 grantees published 355 times in Vietnamese or other journals that are not listed in the ISI databases. Taking into consideration that this may be an underestimation (see above), grantee article production in local journals is at least four times that of publication in international ISI journals.

Data are not available on the nationality of co-authors to papers written by IFS Grantees. Nevertheless, in the following section we find other information that indicates that Japan and the USA are among the most important sources of international collaboration for IFS Grantees in Vietnam, followed by a number of European countries such as Germany, Belgium, the Netherlands and Sweden.

Scientific training abroad

One strategy of the Vietnamese government for maintaining and strengthening national scientific capacity is the training of young Vietnamese scientists at foreign universities (Vietnam 2003a; VNS 2008). Young researchers are supported by domestic or foreign funds to obtain a Masters or PhD degree at a foreign university, often using the sandwich programme model. Newly-trained scientists are then expected to return to a Vietnamese institution to make a scientific contribution to Vietnamese development. In the case that a young scientist has been trained abroad with domestic funding, he or she is generally contracted to work at a Vietnamese institution for a stipulated number of years (Huong 2007). The information obtained during this study indicates that currently the limiting factor to the number of Vietnamese that go abroad for research training is not funding, but rather English language skills.

The opportunity to train abroad holds many attractions for young scientists. Predominant among these is that foreign studies allow a young researcher to gain experience using the latest scientific equipment or techniques, as well as to learn new approaches to generating new scientific knowledge. Doing a PhD abroad also has the advantage that one can concentrate on research without the many distractions, and even obstacles, that can accompany doing a PhD in Vietnam. In addition, the stipends for training abroad provide a personal income that exceeds what young scientists can expect to obtain in Vietnam.

For Vietnamese universities and research institutions, the ability to offer promising young scientists a chance to study and do research abroad is one of the strongest incentives that they have to entice young researchers to stay in science. If they cannot offer such a position during the first year or two following the completion of their Bachelors or Masters degree, young scientists are likely to leave for private employment. Despite this incentive, many senior university and research institute personnel express upon being interviewed their worries about how hard it is to keep the best young brains in the publicly-funded science sector.

IFS Grantees have generally been quite successful at finding opportunities to study abroad, and it is a key source of international contacts for them. The questionnaire survey shows that Vietnamese grantees spend

significant amounts of their scientific careers abroad (Table 18). On average, they report spending 4.6 years outside Vietnam for higher education, training, and post-doc positions. If we also include other reasons for time spent abroad, this average rises to 5.1 years.

Table 18 Number of IFS Grantees spending time abroad for scientific training and research *

Period of time	Number of Grantees
None	3
2 years or less	19
2 - 5 years	22
6 - 10 years	18
11- 20 years	5

* Relates to Question 28 in the Questionnaire (see Appendix 1)

Gender-disaggregated statistics show that women spend an average of 3.7 years abroad for science (4.5 years in total), and men an average of 5 years (5.4 years in total). For women, it is generally important to study abroad before starting a family, and in particular having children. Interviewees of both sexes, on the other hand, agreed that Vietnamese men are more flexible and can more easily study abroad while their wife and children remain in Vietnam.

The average time recent grantees report spending abroad is roughly equal to the general average. However, since recent grantees are younger and have had a shorter scientific career, we can tentatively conclude that there is a tendency for young scientists today to spend more time abroad than did their colleagues from earlier generations. This is supported by interview evidence where scientists from a range of generations agree that there are currently many more opportunities for scientists to go abroad than there were some 15 or 30 years ago.

If we consider scientific training, we see that two out of three IFS Grantees with a PhD received their training outside Vietnam. The trend is even stronger among IFS Grantees during recent years (2003-2007), when only 21% of these grantees have been awarded a PhD in Vietnam. This is not an unexpected trend given the tremendous increase in opportunities for study in foreign countries during recent years. While opportunities are increasing, countries that have been important sources of degrees for IFS Grantees in the past, like the Netherlands and Sweden, seem to be of less importance today (Table 19).

Table 19 Countries from which IFS Grantees have obtained a PhD degree

Country of PhD	All grantees		Recent grantees	
	No.	%	No.	%
Vietnam	18	33%	4	21%
Netherlands	5	9%		
Russia	4	7%	2	11%
Sweden	4	7%		
Australia	3.5	6%	2.5	13%
Germany	3	6%	2	11%
Japan	3	6%	2	11%
Philippines	2	4%	1	5%
United Kingdom	2	4%	1	5%
France	2	4%	2	11%
Denmark	1.5	3%	1.5	8%
USA	1	2%	1	5%
Belgium	1	2%		
Hungary	1	2%		
Norway	1	2%		
Ukraine	1	2%		

Table 20 Countries identified by IFS Grantees as the location of their most important academic visit *

Country	% of grantees identifying the country
Australia	19%
Germany	19%
Japan	18%
Netherlands	18%
Belgium	11%
Korea	11%
Sweden	11%
Thailand	11%
USA	9%
France	5%
India	5%
Malaysia	5%
Norway	5%
Philippines	5%
Austria	4%
China	4%
Denmark	4%
Russia	4%
Taiwan	4%
Argentina	2%
Cambodia	2%
Czech Republic	2%
Indonesia	2%
Italy	2%
Laos	2%
United Kingdom	2%

* Relates to Question 27 in the Questionnaire (see Appendix 1)

Grantees were also asked what their most important academic visits abroad had been. These visits were to have been of at least two months duration, and could have taken place at any time during their scientific career. In general, grantees named visits abroad in pursuit of a higher degree or for short-term training courses. Hence, there is some overlap with the visits listed in Table 19. Table 20 shows that visits to countries that have had the greatest importance for IFS Grantees are Australia, Germany, Japan and the Netherlands. This is followed by another group of countries of secondary importance that included Belgium, Korea, Sweden, Thailand, and the USA.

However, if we only survey grantees that have received their first IFS grant during the period 2003-2007 (Table 21), then we see that the pattern of grantees' international linkages is changing. For recent grantees, Japan is by far the most important country, with 30% of grantees mentioning visits to Japan as being of greatest importance. Meanwhile, Germany (20%), Korea (15%), and the USA (15%) remain important. As was the case for PhD training, the Netherlands and Sweden have become less important countries for IFS Grantees during recent years.

International Partnership

When IFS Grantees are asked about the nationalities of their research partners during the previous five years, we see a slightly different pattern (Table 22). After Vietnamese, the most frequently mentioned research partners are from the USA. One-third of IFS Grantees have been part of a research team that includes American scientists during the previous five years. Following the USA, Australia, Japan, Germany, and Sweden remain strong research partners. It is notable that the USA is a top research partner, even though it is not a top destination for PhD training or other academic visits abroad.

If we consider IFS Grantees during the period 2002-2007, the only notable difference in research partners is that Vietnam and the USA trade places. Among recent grantees, 29% work with Vietnamese research partners while 48% work with American research partners. This surprising finding is not something that was directly discussed during the interviews. Nevertheless, it was common for researchers to express frustration that they were not better connected with Vietnamese researchers in other institutions and in other parts of the country.

Table 21 Countries identified by recently supported IFS Grantees as the location of their most important academic visit*

Country	% of grantees identifying the country
Japan	30%
Germany	20%
Korea	15%
USA	15%
Australia	10%
Belgium	10%
Denmark	10%
France	10%
Netherlands	10%
Norway	10%
Philippines	10%
Taiwan	10%
Thailand	10%
Argentina	5%
China	5%
Indonesia	5%
Italy	5%

* Relates to Question 27 in the Questionnaire (see Appendix 1)

Table 22 Nationality of research partners to IFS Grantees during the previous five years (2007) *

Nationality	% of grantees having such a research partner
Vietnam	49%
USA	33%
Australia	27%
Japan	25%
Germany	24%
Sweden	22%
Netherlands	16%
Thailand	16%
United Kingdom	15%
Switzerland	13%
France	13%
Cambodia	9%
Denmark	9%
Korea	9%
Belgium	7%
Canada	7%
Laos	7%
Malaysia	7%
Indonesia	5%

* Relates to Question 45 in the Questionnaire (see Appendix 1)

Table 23 Frequency of communication between IFS Grantees and other researchers and organisations *

Communication with:	Never	Rarely	Annually	Monthly	More than once a month
Own institution	0%	0%	7%	8%	85%
Other Vietnamese Institutions	0%	8%	17%	37%	37%
Researchers in other SE Asian countries	11%	24%	46%	11%	7%
Researchers in other Asian countries	15%	30%	37%	9%	9%
Researchers in Europe	7%	21%	34%	20%	18%
Researchers in USA or Canada	29%	36%	20%	11%	4%
Researchers in Africa	64%	28%	8%	0%	0%
Researchers in Central or South America	69%	25%	4%	2%	0%
Staff of IFS	16%	38%	41%	5%	0%
International science organisations	21%	38%	26%	11%	4%
International NGOs	31%	33%	25%	4%	6%
International development agencies	31%	39%	20%	6%	4%
Companies and businesses	28%	30%	23%	9%	9%

* Relates to Question 47 in the Questionnaire (see Appendix 1)

Although Japan is mentioned as being of the greatest importance to IFS Grantees in terms of their scientific visits abroad, this does not seem to directly translate into scientific research partnerships. Here, Japan is third in importance behind the USA and Australia for all grantees, and behind the USA and Germany for recent grantees. The lesser importance of Japan among IFS Grantees is surprising given the high rate of ISI journal article collaboration with Japan identified in a previous section.

A possible explanation for this might be related to the fact that IFS is much better known in Europe and North America than it is in Japan. Furthermore, most IFS advisers are from Europe or North America, while only very few Japanese scientists are IFS advisers. This may result in promising young Vietnamese researchers who engage in collaborations with Europeans and North Americans, or pursue scientific training in those regions, being much more likely to learn about IFS than their colleagues who are more oriented towards Japanese scientific networks.

IFS Grantees' scientific communication

The image of close cooperation with the USA is tempered by grantee responses to the question about how often they communicate with various partners (Table 23). Here, 35% of grantees indicate that they communicate with researchers in the USA and Canada at least annually. Meanwhile, 72% of grantees communicate with researchers in Europe at least annually, and 64% do so with researchers in other Southeast Asian countries. Over half (55%) of grantees communicate with researchers in other Asian countries, including Japan, at least once yearly. Meanwhile, there is negligible communication between IFS Grantees in Vietnam and researchers in Africa and Latin America.

Most IFS Grantees have little or no contact with international organisations, and less than one half of grantees communicate with IFS regarding their research on an annual basis. As was also discussed in a previous section, communication with private enterprise is also relatively rare.

Promotion and career goals

Promotion

Researchers are promoted in Vietnam through two parallel structures. One avenue of promotion is through the chain of increasing administrative authority within scientific institutions. In a university, this hierarchy leads from the position of lecturer to Dean of the faculty and Rector of the university. In research institutions, the pinnacle of the hierarchy is the position of Director of the institute. Another avenue of promotion is the honorary promotion to the position of Associate Professor and Professor.

In the questionnaire survey, grantees were asked what they perceived to be the most important criteria for promotion of scientists. Unfortunately, the survey question did not distinguish between the two types of promotion. Despite this, there was

Table 24 Career goals of IFS Grantees *

Goal	All grantees	Male grantees	Female grantees	Grantees under 40
Scientific career in Vietnam	81%	86%	70%	87%
Career within foreign or international organisations	40%	37%	48%	52%
Career within national development programmes	33%	33%	35%	35%
Scientific career outside Vietnam	21%	18%	26%	39%
Consultancy or medical practice	21%	14%	35%	26%
Career in administration	19%	22%	13%	9%
Private business	14%	18%	4%	9%
Career in national politics	3%	4%	0%	4%

* Relates to Question 42 in the Questionnaire (see Appendix 1)

general agreement that academic degrees are of the greatest importance for achieving promotion. Sixty percent of respondents rated it "very important." It was especially important to women given that 77% of women grantees rated it of highest importance compared to only 52% of men.

Vietnamese scientists speak of increasing their "score," or points towards promotion. Journal articles contribute to score, but they score the same whether they are published in a local journal or in an international journal. Furthermore, the score might be less if one is a co-author rather than being the single author. Hence, the incentive structure for publishing in Vietnam does not emphasise collaboration or writing for an international audience.

According to the results of the questionnaire survey, of least importance were strategic social relations and seniority. Meanwhile, interviews with scientists at universities and research institutions indicate the contrary. For example, to achieve senior administrative positions, a candidate must have a number of qualities. In addition to the merits of scientific ability and esteem among one's peers, political affiliation with the Vietnamese Communist Party is a strong asset, if not a requirement, for obtaining higher positions such as Dean of a faculty or Rector in the university structure. Furthermore, a wide range of interviewees, both IFS Grantees and persons not affiliated to IFS, explain that even for much lower-ranking positions, social and kinship connections can play a determining role.

Meanwhile, achievement of the position of Associate Professor or Professor is based upon a set of formal criteria that includes number of students supervised, publications, etc. Party membership, social and kin connections seem to have less influence on possibilities to attain these honorary statuses. In the words of one grantee,"it is difficult to become a Professor, but it is straightforward."

Career goals

Most IFS Grantees (81%) are interested in a scientific career inside Vietnam. Among grantees under 40 years of age, nearly 9 of 10 share this goal. Meanwhile, for women the figure is 70%. The second most likely career goal is a career within a foreign or international organisation. Forty percent of grantees have this goal, with women and grantees under 40 years of age even more likely to share it (Table 24).

In fact, it is a general trend that women grantees and young grantees are more likely to have goals outside Vietnam, than are male grantees. Few grantees are looking for careers in politics, business, or administration.

5. Assessing IFS support in Vietnam

One is often overwhelmed by the energy and enthusiasm that grantees in Vietnam have for IFS. As one IFS Grantee proclaimed, "IFS was the start, after that everything just opened up."

In this survey, grantees and other scientists in Vietnam clearly stated that the IFS programme was of continuing importance and relevance in Vietnam, both at the level of the individual young scientist and for Vietnamese science in general. In their enthusiasm for IFS, they also see almost boundless opportunities for IFS to do more, and they bring important constructive criticism to areas where IFS can improve. In the following pages, I attempt to capture and synthesise some of their collective energy and wisdom.

Relevance of the IFS Mission

The IFS programme of support is very relevant to the needs of scientists in Vietnam today. This conclusion is strongly confirmed by both the questionnaire survey and interviews with IFS Grantees. Furthermore, in interviews and focus group meetings, scientists repeatedly expressed the need for, and the uniqueness of the IFS programme in Vietnam.

Photo: Eren Zink

Vietnam is a biodiversity hotspot, and IFS supports researchers to better understand the needs of biodiversity and the trade-offs between conservation and development

Grantees indicated overwhelming support for the IFS programme in terms of its focus on strengthening the capacity to conduct relevant and high-quality research on the sustainable management of biological and water resources. Of 72 grantees questioned, 67 (87%) judged IFS to be very relevant in this respect (Table 25).

Grantees indicate a similar level of support for IFS in its priority to support social science and natural science research related to the conservation, pro-

Table 25 Relevance of IFS mission to strengthen the capacity of developing countries to conduct relevant and high quality research on the sustainable management of biological and water resources *

Grantee response	% responding (n=72)
Not relevant	0%
Somewhat relevant	7%
Very relevant	93%

* Relates to Question 1 in the Questionnaire (see Appendix 1)

Table 26 Relevance of IFS mission to support social science and natural science research related to the conservation, production, and renewable utilisation of the biological and water resource base *

Grantee response	% responding (n=72)
Not relevant	0%
Somewhat relevant	6%
Very relevant	94%

* Relates to Question 2 in the Questionnaire (see Appendix 1)

Table 27 Relevance of IFS strategy to support individual researchers rather than teams or institutions *

Grantee response	% responding (n=72)
Not relevant	3%
Somewhat relevant	16%
Very relevant	81%

* Relates to Question 3 in the Questionnaire (see Appendix 1)

Photo: Brian Porter

Golden snails pose a challenge for rice farmers, and for scientists (snail eggs on rice shown here)

duction, and renewable utilisation of the biological and water resources base (Table 26). A total of 94% indicates that this strategy is very relevant.

When asked if the IFS priority to support individual researchers rather than making team or institutional grants was relevant to Vietnam, there was also broad agreement. Among grantees, 81% indicate that a strategy of individual support is very relevant to the situation in Vietnam (Table 27).

Meanwhile, interviews and focus group discussions reveal that the problem of whether or not to support team research is often being solved by IFS Grantees locally. Vietnamese grantees usually related how their IFS grant also lent some small financial support for Masters and Bachelor level students at their departments to carry out scientific work relevant to the overall project. In fact, the IFS grant, though awarded to a single individual, often mobilises a research team of junior scientists, led by the IFS Grantee.

Age and eligibility

The IFS programme eligibility rules indicate that an applicant should be less than 40 years of age upon applying for a first grant. In the questionnaire survey, grantees were asked what age limit is most appropriate for a programme seeking to support researchers at the beginning of their career. Of all respondents, 46% supported the current age eligibility rule. The age most commonly mentioned was 40 (n=33), followed by 35 (n=18) and 45 years of age (n=9).

The question of who counts as a *young* scientist in Vietnam also arose during interviews and other discussions with scientists in Vietnam. While in the past it was common for scientists not to achieve a PhD degree until well into their 40s or 50s, today there are many more opportunities for young scientists to obtain advanced training. Furthermore, young scientists are faced with the decision of whether or not to make a career in science versus in private enterprise at an early age (as discussed in a previous section). Either this decision is made when they are in their early to mid-20s, and weighing the opportunities of business versus pursuing a Masters or PhD degree, or they make the decision in their early to mid-30s when they have completed a PhD.

Because of the changing timelines for scientific training, I found few strong reasons for IFS to award first grants to researchers older than 40 years of age. Rather, one would expect that most promising young male researchers will have or be nearing completion of a PhD by the time they are 36 years of age. For women, an upper limit of 40 might be more reasonable, given the additional challenges that women face[12].

Currently, promising young scientists that have a Masters degree and are working in a research position at a university or research institute are encouraged to apply to IFS for grants. However, IFS should be aware that the first priority for these young scientists is usually to find and enrol in a PhD programme abroad. When the young scientist goes abroad, the IFS supported project will be interrupted. Hence, an IFS grant, if awarded to such a person, is likely to be delayed or even cancelled if it is not possible to incorporate the project into a PhD programme.

[12] There are of course exceptions. And some very talented scientists do not complete their PhDs before the age of 40. However, given the mission of IFS to support young researchers and the fact that some scientists in Vietnam become well established long before they complete a PhD, it seems safe to conclude that the age of 40 should be a maximum age limit for IFS in Vietnam.

A more effective strategy for IFS would be to support young scientists that have already been enrolled in a PhD programme. These persons are able to propose a research project that is integrated into, or at least aligned with, their PhD programme. This is true of both PhD students at Vietnamese universities and PhD students engaged in a so-called sandwich programme at a foreign university. The simplest way to ensure that an IFS grant is actually used by the designated grantee to carry out a research project personally, is in fact to award the grant to a PhD student.

An additional strategy is to support young scientists immediately upon their return to Vietnam after they have completed PhD studies abroad. In interviews with both young and senior Vietnamese researchers, it is common for them to mention a one to two year adjustment period that most new PhDs experience upon their return home. During this period they try to reestablish their scientific networks in Vietnam and demonstrate their reliability to their peers. It is also a moment in their career when they have few opportunities, and an IFS research grant in hand could be a significant incentive for them to stay in science.

This study concludes that IFS support is particularly important for grantees in their late 20s through to their early to mid-30s. At these ages, scientists are weighing their options and trying to decide whether they should stay in publicly funded science, or move into the private sector. For many of the most promising candidates, there are strong incentives to choose the second option. This is also the age span when many young scientists are at the middle or end of PhD training, and when they would greatly benefit from IFS support to carry out their research project in Vietnam.

An appropriate grant size

If an IFS grant is to be an incentive for scientists to stay in science, become experienced researchers, and contribute to the production of new scientific knowledge and national development, then the IFS grant must be of a sufficient size to help achieve these goals. During this study, scientists regularly expressed concerns that the value of the IFS grant was in dangerous decline. They frequently argued that inflation and the weakening of the US dollar means that USD 12,000 is often no longer sufficient to carry out a project of an internationally acceptable quality.

Table 28 The appropriate size for an IFS research grant, according to IFS Grantees *

Value of grant (USD)	No. of responding grantees
15,000	24
20,000	13
30,000	10
12,000	8
10,000	4
18,000	3
25,000	3
Other amounts	5

* Relates to Question 5 in the Questionnaire (see Appendix 1)

In the words of one grantee,"12,000 USD is a very small amount. In 1986, I had USD10,000 and it was a very big grant. Now it would not be enough." Another grantee who had been supported by IFS during his PhD put it much more bluntly, "When people like me finish a PhD, 12,000 dollars is not enough to care about research." These grantees, like many others, suggested that IFS should make the grant size more open-ended and flexible in order to meet the needs of the scientists that it is mandated to support.

The grantee survey contained an open question about how big an IFS research grant should be. Respondents were then instructed to reflect upon the mission of IFS to support young researchers at the beginning of their scientific career. The average expected grant size based upon 70 responses was just above USD 18,000. Only 20% of grantees indicated that USD 12,000 or less was an appropriate amount, with the most common responses being USD 15,000 and USD 20,000 (Table 28).

Importance of the IFS support

Of course, the monetary value of an IFS grant is only one aspect of IFS support. Notably, despite the gradual erosion in the purchasing power of a grant, IFS Grantees were unanimous in their claim that IFS support had been an important boost to their scientific careers. For example, a grantee from Can Tho University explained:

IFS was very important for me. It gave me more confidence, especially because my work was reviewed by an international committee. Since becoming an IFS Grantee, I am more confident in applying for international support. It widened my contacts internationally in the field because I could go to conferences, and it was easier to get assistance from my institution. I was also able to share with my PhD and MA students, thereby allowing them the chance to do research (IFS Grantee, Can Tho, November, 2007).

Numerous interviews and the results of the questionnaire survey showed that the experience of this grantee was by no means unique.

The survey shows that IFS support is "very important" for the career of 70% of grantees. The remainder claimed that it was "somewhat important." This number is even more pronounced when looking at grantees from the period 2003-2007, among which 84% indicate that IFS support is very important for their career.

While IFS support was very important, both the survey and the discussions with grantees revealed that even without it, they would probably have carried out research on the same topic. However, the availability of funding would have been so curtailed that only the most rudimentary project would have been possible. Women were even more vulnerable in this regard than men.

The IFS grant allowed grantees to carry out research of a standard that can merit one or more publications, and it is a springboard to gaining other sources of funding or scientific support, and to work with new scientific partners. The following sections contain more detailed discussion of these aspects of the grant.

Indirect advantages of IFS support

In the questionnaire survey, we specifically asked if the respondent – after having become an IFS Grantee - had found it easier to access additional funding from their home institution, from national funding sources, and from international funding sources, in addition to scientific and technical assistance from the home institution. Of those surveyed, 94% experienced that their access to at least one kind of support had increased, and 71% had easier access to two or more kinds of support.

Four out of five IFS Grantees report that, since becoming grantees, they have had easier access to at least one other source of research funding. If we look at grantee responses to each question separately (Table 29), we see that about one half of grantees have had improved access to funding from home institutions, with a similar number for national sources and international sources. Three out of four grantees report easier access to scientific and technical support from their home institutions, following an IFS grant.

If we consider the most recent IFS Grantees that were awarded a first grant between 2003 and 2007, we see that the IFS grant has less impact for them in accessing funds from their home institutions (32% report improvement), but greater impact in receiving scientific and technical assistance (84% report improvement), than when compared to the general population of IFS Grantees.

There are also differences between the experiences of male and female grantees, respectively (Table 30). Men find that the IFS grant improves their access to national sources of funds 54% of the time, compared to 35% for women. Meanwhile, the opposite trend is noted with respect to funding from

Table 29 Impact of IFS grant on other opportunities to access scientific support (all and recent IFS Grantees) *

Type of support	% of all grantees responding that access has become easier	% of grantees from 2003-2007 responding that access has become easier
Additional funding from home institution	45%	32%
Additional funding from a national funding institution	48%	52%
Additional funding from an international institution	56%	60%
Scientific and technical assistance from your institution	76%	84%

* Relates to Question 20 in the Questionnaire (see Appendix 1)

Table 30 Impact of IFS grant on other opportunities to access scientific support (female and male IFS Grantees) *

Type of support	% of female grantees responding that access has become easier	% of male grantees responding that access has become easier
Additional funding from home institution	43%	46%
Additional funding from a national funding institution	35%	54%
Additional funding from an international institution	65%	52%
Scientific and technical assistance from your institution	78%	75%

* Relates to Question 20 in the Questionnaire (see Appendix 1)

international sources. Women report improved access to international funds 65% of the time, compared to 52% for men. There is little difference between men and women with respect to funds and scientific and technical assistance from the home institution.

Building networks and experience

The IFS support also permits grantees to strengthen their scientific networks. Almost all grantees report that IFS support has stimulated them to work with new scientific partners (93%). Meanwhile, the IFS grant allows them to support a node of researchers at their home institutions, with themselves at the centre. For example, without the IFS grant many grantees reported that their Masters students would have worked on a diversity of small projects with little in common between them. An IFS grant, however, allows the grantee to give some support, albeit small, to her/his Masters students to carry out interrelated projects that support the grantee's own work. According to the grantees interviewed, this is a more satisfactory way of working

Another reason why the IFS grant is important is that it affords a young researcher experience as a project leader from start to finish. There are very few other opportunities in Vietnam for a young researcher to get scientific management experience by writing a proposal, carrying out and managing a project (both scientifically and administratively), and reporting on the project results. The norm is rather that a young researcher may be entrusted with a small segment of a project while the main responsibility for the project rests on a very senior researcher. Grantees identified this experience as one of the main benefits of an IFS grant. It was an experience that they felt greatly strengthened both their confidence and their competence as a scientist.

Grantee evaluations of IFS

Grantees in Vietnam are generally very satisfied with the performance of IFS (Table 31). On a five-point scale where 4 is equal to "good" and 5 is equal to "excellent", the grantees award the IFS programme in general an average score of 4.5. None expressed any level of dissatisfaction with the programme in general.

The highest average score (4.6) was awarded to the IFS grant administration, including the transfer of funds. Other items which received high ratings (an average score greater than 4) were IFS contact with grantees, IFS feedback and advice on research proposals, the IFS peer review process, IFS support for the purchase of research equipment, and IFS efforts to monitor and follow up on projects.

Table 31 Grantee evaluation of the level of IFS performance on a five point scale (1 = poor, 5 = excellent) *

Area of IFS performance	Average score
The IFS programme in general	4.5
Grant administration (including transfer of funds)	4.6
Contacts with IFS staff	4.4
Feedback and advice on your grant application	4.4
Selection process	4.3
Purchase of research equipment	4.2
Monitoring and follow-up of projects	4.1
Maintenance of research equipment	3.7
Scientific counseling	3.6
IFS-organised workshops	3.3
Networking activities, including with other IFS Grantees	3.3
Follow-up activities once the supported project is terminated	3.3
Research training	3.1

* Relates to Question 14 in the Questionnaire (see Appendix 1)

The average score did not fall below 3 (i.e. less than satisfactory) for any item. IFS performance was regarded as slightly better than satisfactory in providing support for the maintenance of research equipment, scientific counselling, IFS-organised workshops, networking activities, follow-up support following the completion of the IFS project, and research training. Since maintenance of equipment and follow-up support have not been priorities for IFS, it is not surprising that these services are rated lower.

It may concern IFS that IFS-organised workshops, networking activities, and research training receive mediocre ratings, as these are areas where IFS is currently seeking to become more active. It is not clear from the information at hand, whether the dissatisfaction of some grantees with these services is based upon what they see as too little investment by IFS in these areas, or on an evaluation of their experiences as participants in these activities. However, it is noteworthy that a number of IFS Grantees interviewed were unaware that IFS indeed does provide supporting activities like training workshops, and even conference support.

In interviews and focus group discussions, researchers often expressed dismay at the timeline for applying and reapplying for a research grant. Scientists tended to appreciate the IFS practice of providing scientific feedback and encouragement to unsuccessful applicants. However, since feedback and comments on unsuccessful applications often arrive after the next deadline for applications, applicants must usually wait an entire year before the next possibility to be awarded an IFS grant. According to interviewees, one effect of this long delay is that many applicants do not submit a revised application. Researchers would like IFS to streamline the application deadline and review process so that it is possible to revise, resubmit and receive a decision on their application during the next review session. This could be achieved by shortening the time IFS uses to review and make decisions upon applications from six months to five months.

IFS-supported publications and scientific outputs

IFS has been successful at identifying promising young scientists who are productive throughout their careers, and who remain in science. At the end of 2007, 68 out of 72 surveyed grantees were still working as researchers. Out of the four individuals who no longer regard themselves as researchers, two work in government ministries, one as a development consultant, and one in the human resources office of a university.

Among the grantees surveyed, 63 indicated that they had published scientifically, based upon their IFS-supported work. Out of the nine individuals who had not published scientifically, five received their IFS grants only very recently. The total volume of scientific productivity resulting from IFS support in Vietnam measured as scientific publications is 441 articles, or an average of more than six publications per grantee. Taken as a whole, IFS support has contributed to 24% of the entire volume of scientific productivity of IFS Grantees during their careers so far.

From the total number of publications resulting from IFS support, 243 (55%) were published in Vietnamese journals and 119 (27%) in journals based in other countries. The remainder are books, conference proceedings, reports and other scientific communications.

Table 32 shows the average rate at which grantees published by research area. The natural products research area stands out as one in which grantees publish at a much higher frequency, both in general and in international journals, than do researchers

Photo: Brian Porter

Science is a key input for ecologically sound aquaculture production

Table 32 Rate at which grantees publish the results of their IFS supported research, by research area and publication type *

IFS Research Area	Average total number of publications	Average number of publications in Vietnamese journals	Average number of publications in international journals	Number of respondents
Aquatic Resources	3.6	2.1	1.1	7
Animal Production	5.0	1.5	1.9	23
Crop Science	2.8	1.6	1.0	10
Forestry/Agroforestry	3.8	2.8	1.0	4
Food Science	3.5	1.7	1.0	6
Natural Products	19.0	13.1	4.1	11
Social Sciences	2.7	1.0	1.0	6
Water Resources	1.8	0.5	0.8	4

* Relates to Questions 15, 16 & 17 in the Questionnaire (see Appendix 1)

Table 33 Publications resulting from IFS supported research projects as a percentage of total career publication productivity of IFS Grantees *

IFS Research Area	% of total publication productivity that was supported by IFS	No. of respondents
Aquatic Resources	17%	7
Animal Production	17%	23
Crop Science	15%	10
Forestry/Agroforestry	15%	4
Food Science	20%	6
Natural Products	35%	11
Social Sciences	17%	6
Water Resources	16%	4

* Relates to Questions 15 & 32 in the Questionnaire (see Appendix 1)

from other research areas. This is nothing unique to IFS Grantees but rather reflects the normal publishing practice in the field of natural products chemistry. In interpreting the number of publications by researchers in the areas of social sciences and water resources, respectively, one should keep in mind that these fields have only been supported by IFS since 2003. Hence, the grantees in these areas are "younger" than in other areas.

The evidence provided in Table 32 indicates that an IFS grant "produces" the largest number of publications in the natural products research area. Meanwhile, the evidence in Table 33 shows that an IFS grant is also of the greatest importance for natural products grantees in terms of their overall publication career. Whereas in other research areas, the IFS grant contributes to 15-20% of a grantee's total publication productivity, in the natural products area, the grant contributes to 35% of all their career publications.

In addition to producing publications, 71% of grantees mention other outcomes of their IFS-supported research. These outcomes were commonly new technologies used in agricultural production, new commercial applications, or influence on Vietnamese natural resource management policy making.

IFS Grantee scientific production also includes the training of new generations of scientists. During their careers, 65 responding grantees indicated that they have supervised 1,800 Bachelor degree students, 246 Masters students, and 42 PhD students.

Career advancement

Information on the highest academic degree was available for 64 of the participants in the questionnaire survey (Table 34). Of these, 54 had a PhD and one had an MD, meaning that 86% of the population has achieved the most advanced degree available in their field.

Table 34 Highest academic degree obtained by survey participants

Degree	Number of grantees
PhD	54
MD	1
MSc	7
MBA	1

When asked if they have been promoted in their work since being awarded an IFS grant, 68% of grantees indicated that they had. However, if we compare men with women, we see that men were more likely to have received a promotion than were women (Table 35).

Of the 43 researchers that were awarded IFS grants during the first 20 years of IFS activity in Vietnam (1981–2000), 12 (28%) report having achieved the position of Associate Professor. Meanwhile as of 2007, IFS Grantees include 10 Heads of departments, 3 Deans of faculties, 1 University Rector, 8 Vice Director/Deputy Directors, and 1 Director. A selection of the positions held by grantees can be found in Table 36.

Table 35 Rate of promotion of different groups of IFS Grantees *

% of grantees promoted since the award of an IFS grant	68%
% of female grantees promoted since the award of an IFS grant	61%
% of male grantees promoted since the award of an IFS grant	71%
% of grantees from 2002 or earlier that have been promoted	81%
% of grantees from 2003 until 2007 that have been promoted	44%

* Relates to Question 30 in the Questionnaire (see Appendix 1)

Table 36 Positions held by IFS Grantees in 2007 *

Rector of Can Tho University
Vice Director of the Center for Monitoring Aquacultural Environment and Diseases
Vice Director of the Biotechnology Research and Development Institute (BiRDI), Can Tho University
Deputy Director General of the Department of Forestry, Ministry of Agriculture and Rural Development
Deputy Director General of the Forestry Science Institute of Vietnam
Deputy Director of the Center for Nuclear Techniques
Vice Director of the Institute of Agricultural Sciences of South Vietnam
Vice Director of the Institute of Chemistry, Vietnamese Academy of Science and Technology
Deputy Director for Animal Husbandry and Technology Transfer, National Institute of Animal Husbandry (NIAH)
Director of the Center of Veterinary Research
Head of the Forest Protection Research Division, Forest Science Institute of Vietnam
Head of the Livestock Production Division, Ministry of Agriculture and Rural Development
Head of the Department of Animal Nutrition and Biochemistry, Hue Agriculture and Forestry University
Dean of the Faculty of Animal Sciences, Hue Agriculture and Forestry University
Dean of the Faculty of Animal and Aquacultural Sciences, Hanoi Agricultural University
Dean of the Faculty of Animal Husbandry and Veterinary Medicine, Nong Lam University, HCMC
Head of the Virology Department, National Veterinary Bioproduct Control Centre
Head of the Enzyme Biotech Lab, Vietnamese Academy of Science and Technology (VAST)
Head of the Department of Economics, Hanoi Agricultural University
Head of the Department of Pathology & Parasitology, Nong Lam University, HCMC
Head of the Department of Animal Physiology and Biochemistry
Head of the Department of Starch and Sugar, Food Industries Research Institute

* Relates to Question 36 in the Questionnaire (see Appendix 1)

6. Encouraging the next generation of Vietnamese Scientists

Vietnam is the site of important investments in scientific capacity, both in terms of infrastructure and in terms of the training of a new young generation of scientists. Meanwhile, resources are lacking that would allow young scientists to put their capacity to work in creating new knowledge for national development. In this context, the IFS programme is of great relevance.

In previous sections we have reviewed the history of science in Vietnam, current conditions for doing science, and assessed the performance of IFS Grantees and the IFS programme. In the following pages, I highlight areas where the subjects of this study have indicated that IFS, or another organisation supporting scientific research capacity building, could make further contributions. In some cases these are areas where IFS is already active to some extent; in others it would entail developing new components of the IFS programme.

Photo: Eren Zink

Scientists in Ho Chi Minh City work towards developing a better breed of buffalo

Supporting the right kind of science

In interviews and discussions, scientists were interested to discuss the types of research that IFS funds. Given that the Vietnamese government is perceived to be investing in science that is applied, low risk and relevant to short-term commercial or economic challenges, scientists felt that IFS should prioritise research with other qualities that do not currently receive research support. For example, IFS was often encouraged to support research that had one of the following qualities:

1) it is high risk but could lead to innovative new results;
2) it is intended to address the needs and the problems of Vietnam's poor and small-scale farmers; or
3) it is baseline research providing the foundation for better understanding of basic biological and chemical processes, as well as social, cultural and economic characteristics.

In each case, the research should be relevant to the development challenges currently faced by Vietnam. However, it is not necessary that the research results in immediate applications to today's problems. It is also important to support research that has a medium or long term perspective towards arriving at solutions appropriate for Vietnam.

Some grantees describe the government's investments in science as being the equivalent to first aid

Table 37 IFS Grantee opinions regarding the most important kinds of support to be provided as a complement to the IFS research grant *

Type of support	Percent of IFS Grantees identifying the type of support as being one of the five most important
Support to attend scientific conferences	65%
Provision of access to up-to-date scientific journal articles	63%
Support to visit a foreign research institution	58%
Support to publish scientific articles	53%
Support to attend scientific workshops	49%
Support to organise regional networks of scientists	29%
Special programme of support for women scientists	28%
Support to attend research proposal writing workshops	28%
Support to attend scientific writing/publishing workshops	26%
Extra salary/honorarium	26%
Assistance to repair scientific equipment	25%
Laptop computer	21%
Provision of an Internet connection	17%
Patenting and intellectual property support	17%
Other	4%

* Relates to Question 6 in the Questionnaire (see Appendix 1)

and emergency room science. While these kinds of science are obviously of great importance, many grantees see an advantage in investing in science that is preventative medicine for medium and long-range challenges. Such research might be higher risk and/or not promise applicable results in the short term, but these are areas where private or NGO organisations, such as IFS, are better able to provide support than are governments (Sommer 2005).

Most-needed additional support activities

In the questionnaire survey, grantees were presented with 14 possible ways that IFS could provide support in addition to research grants. From this list, they were asked to identify the five activities that they felt were most important.

A cluster of five activities was identified by approximately one half or more of the grantees as being of the greatest importance (Table 37). First on the list was that IFS should provide support for grantees to attend scientific conferences (65%), closely followed by providing access to up-to-date scientific journal articles (63%). Other types of support that were prioritised included support to visit foreign research institutions, support to publish scientific articles, and support to attend scientific workshops. While IFS does provide many of these supports already, albeit on a modest scale, interviews reveal that many grantees are unaware of the opportunities.

Scientists who were not IFS Grantees often point out that Vietnamese scientists require additional support to write research proposals in English. One young scientist I met in Ho Chi Minh City speaks for many others I met across the country: "The quality of our proposals is not good enough. Sometimes we understand a topic very well, but we can't express ourselves in English."

If one divides the sample according to gender, a number of interesting differences between men and women become visible (Table 38). Among women, there is a strong desire for a special support programme to women scientists (61%), whereas only 12% of men rated this as one of the top five priorities. Meanwhile, men rated support to visit a foreign research institution as one of the top five priorities (67%), whereas for women this was ranked sixth (39%).

In the questionnaire survey, support for a regional network of scientists was not among the top five prioritised areas. While 39% of women respondents supported such an initiative, only 24% of men did so. Nevertheless, this support emerged in the interviews as an important issue for both men and

Table 38 Opinions of male and female IFS Grantees regarding the most important kinds of support to be provided as a complement to the IFS research grant*

Type of support	Percent of female IFS Grantees identifying the type of support as being one of the five most important	Percent of male IFS Grantees identifying the type of support as being one of the five most important
Support to publish scientific articles	65%	47%
Special programme of support for women scientists	61%	12%
Support to attend scientific conferences	57%	69%
Provision of access to up-to-date scientific journal articles	52%	67%
Support to attend scientific workshops	43%	51%
Support to visit a foreign research institution	39%	67%
Support to organise regional networks of scientists	39%	24%
Assistance to repair scientific equipment	35%	20%
Support to attend research proposal writing workshops	26%	29%
Support to attend scientific writing/publishing workshops	22%	29%
Extra salary/honorarium	22%	29%
Laptop computer	17%	22%
Provision of an Internet connection	17%	16%
Patenting and intellectual property support	13%	18%
Other	4%	4%

* Relates to Question 6 in the Questionnaire (see Appendix 1)

women. Grantees repeatedly asked that IFS initiate a network of grantees in Vietnam or Southeast Asia that would meet with some regularity.

One popular suggestion was that regular meetings be held where grantees who had recently finished their IFS work would be required to present their results to an audience of grantees and other scientists. Many respondents also urged that a publication series be started to document such meetings and other work of grantees. Grantees felt that such a network would have many benefits, e.g. strengthening the national scientific community by allowing greater communication and collaboration between different universities and research institutions. For IFS, it was foreseen that such an activity would lead to an increase in high-quality proposals, through greater visibility and a more organised and active network of grantees.

Internationalising Vietnamese science

One concern of IFS Grantees, arising from both the questionnaire and the interview surveys, is that IFS should assist Vietnamese researchers to become better connected with their peers in the international science community. Typical comments about internationalisation in the questionnaire survey included:

Young Vietnamese researchers are full of talent and enthusiasm, but they lack facilities to enable them to integrate in international scientific communities, and financial support. If the IFS strategy can focus on these two issues, young scientists in Vietnam can make the best of the opportunity (IFS Grantee).

What young researchers in Vietnam need is advice on research orientation, opportunities to improve their skills in project development and writing up projects, and more importantly opportunities to establish and maintain good connections or networking with peers around the world. I suggest that IFS consider a number of supporting activities in addition to the grants it has kindly provided to researchers in Vietnam. These can be in the form of a discussion forum between relevant industries and researchers, organising workshops on needs assessment, project development, proposal writing, data analysis, and publishing scientific papers. IFS can also help link researchers with potential end-users (of research outcomes) or request grant applicants to establish partnerships with industry (IFS Grantee).

I would think that IFS should provide a larger amount of grant for doing research, and open up more opportunities for young scientists to go

> *overseas for a short course or training session. This will be more relevant and will equip young researchers with solid skills in problem solving. (IFS Grantee)*

In general, strategies identified for achieving greater internationalisation include providing opportunities for scientific exchange outside Vietnam, training courses to help scientists reach an international audience (e.g. support to publish scientific articles internationally), and an increase in grant size. With respect to the latter, a common observation of grantees in interviews was that the IFS grant is currently too small to cover the costs of a scientific project that will merit publication in an internationally recognised journal.

Localising IFS

Vietnamese scientists would like IFS to be more integrated with the national scientific environment. This report is a preliminary step in that direction, and building a network of IFS Grantees and/or initiating a regularly occurring conference series for Southeast Asia, as discussed in a previous section, would go some distance towards this goal. Nevertheless, a wide range of scientists and grantees indicated a desire that IFS go further during the coming years in engaging with the Vietnamese scientific community. Such a step would also benefit IFS by improving communication between IFS and the Vietnamese scientific community.

While the questionnaire survey indicated a high rate of satisfaction with the communication between IFS and grantees (see Chapter 5), interviews and meetings with small groups show that the quality of communication varies from situation to situation. During visits to various institutions and in meetings with a wide range of scientists, it became apparent that many rumours are circulating regarding what kind of science IFS prioritises, and even what kind of contacts might be necessary to be awarded an IFS grant. Some scientists understood special calls on the IFS website for a particular research topic to mean that only projects in that field would be supported during the current year. Other scientists thought that an IFS application had to be co-authored and supported by an IFS adviser in order to be successful in the IFS peer review process. Others believed that IFS does not support biotechnology research, and rather has a philosophical bias towards low-tech approaches to improving agriculture.

In other respects, IFS lacks some crucial information about its programme in Vietnam. There are indications that some grantees' research proposals have been authored by senior, foreign scientists that were close to IFS. In addition, a small but worrying number of IFS Grantees were much older than they claimed at the time of their first research grant. The two-way lack of information and misinformation described here is a threat to the credibility of the IFS programme, and a closer integration of the IFS programme within the Vietnamese context could go far to alleviating this problem.

A related concern raised by a wide range of Vietnamese scientists is that IFS does not sufficiently include Vietnamese scientists as Advisers in the peer-review process. Although information about the number of Advisers from Southeast Asian countries is not available from the IFS website or brochure, Vietnamese scientists were keenly aware that peer reviews of their applications were rarely carried out by Vietnamese. One grantee expressed his concern as follows:

> *I think that the IFS may establish an IFS Grant Adviser Board in Vietnam or an IFS Grant Evaluation Committee in Vietnam. So the IFS proposal of a Vietnamese researcher will be evaluated by a Vietnamese scientist who has a better understanding of the relevant situation of Vietnam (IFS Grantee).*

The concern of this grantee and others is based on an accurate understanding of the IFS peer review system. While IFS does benefit from the advice of a wide range of Southeast Asian specialists, most of them are not actually located in Southeast Asia. Furthermore, in 2007, of the more than 1,000 Advisers that regularly participated in the peer review process, only three lived in Vietnam. This is few in comparison to other Southeast Asian countries such as Thailand (23 Advisers), Malaysia (21 Advisers), The Philippines (17 Advisers). However, it is comparable to Indonesia (4 Advisers), Cambodia (1 Adviser), Burma and Lao PDR (none).

In addition to increasing its presence in Vietnam by inviting experienced Vietnamese scientists to

become IFS Advisers, several grantees suggest that IFS nominate an organisational representative in Vietnam, or even open a branch office. Their suggestions included the following:

> *There should be more meetings to disseminate IFS support to different areas in large (or long) countries. The best way is to organise an office (or one responsible person for each country) specialised in seeking, encouraging and supporting grantees to write and submit the application. Normally, the leaders of institutions do not pay much attention (because of time limitations) in guiding their young staff to start their own research (IFS Grantee).*

> *The main duty of the office is to (i) assist the IFS headquarters in monitoring and managing the IFS research activity in Vietnam (ii) organise networking in terms of holding the workshop, issuing publications both in English and Vietnamese and linking the other activities between the headquarters and Vietnamese institutions (iii) report the current need for research as a means of enhancing the research capacity of grantees to contribute to their local, regional development and meet the requirements of the new Government policy (IFS Grantee).*

Suggestions to open an office in Vietnam were less frequent than those to increase the influence of Vietnamese scientists on the peer review process and to establish networks of grantees. Nevertheless, both suggestions surfaced with sufficient frequency to indicate that in the eyes of Vietnamese scientists, the localisation of IFS in Vietnam, whether physically or through association, would benefit both IFS and the researchers that it aims to support.

This said, the author of the report received a good deal of cautionary advice from Vietnamese scientists and science administrators regarding the localisation issue. Many Vietnamese scientists experience that it can be difficult to maintain transparency and avoid the influence of kinship and social networks in science administration. They warn that the localization of IFS should be done with great care so as not to jeopardise the ability of IFS to primarily select grantees based on the scientific merit of their ideas.

Women in science

Throughout the previous chapters, I have highlighted what I found to be important differences between male and female scientists in the population of IFS Grantees, and in the general population of researchers in Vietnam. It is hoped that this will serve as some small contribution towards improving the empirical foundations for understanding the role of women in science in developing countries (UNESCO 2008). In this section, I will bring together these various strands and argue that women are systematically disadvantaged in science in Vietnam, due to the structure of science, and due to the structure of Vietnamese society and culture. I will also indicate where the women scientists that I met saw possibilities for IFS to help them change their situation.

For almost all of the more than 1400 years of organised scholarship in Vietnam, first education, and later science, has been the domain of men. Some 60 years of communist ideology has opened up more opportunities for women in higher education and science, but it has not overcome a history and culture that is both strongly patriarchal and hierarchical.

To become trained and established as a scientist requires sacrifice and significant investment in time during the early stages of one's adult life. To reach the elite, international level achieved by most IFS Grantees, one should preferably obtain a PhD and spend time abroad. As mentioned previously, this requires investing at least 10 years of one's life after secondary school in training and the pursuit of the qualifications that permit entry into the profession. If everything goes smoothly, these 10 years would generally begin during one's early to mid-20s and be completed sometime in one's early to mid-30s.

This investment in time and energy is at odds with some fundamental social and cultural expectations of both men and women. One of the most significant ones is the expectation that one will marry and start a family. Another expectation, especially in the case of men, is that they will contribute to the financial well-being of that family. This pressure originates from the general cultural expectations of Vietnamese society, and is particularly forceful as expressed by parents and grandparents.

In discussions with Vietnamese scientists, it became apparent that the pressure felt by women to marry and start a family is particularly strong. This is further complicated by the tendency for men to marry younger women whose educational level is lower or equal to their own. As a result, as a woman ages, it becomes harder for her to marry and have children.

If a woman does choose to marry and start a family during the time of her apprenticeship as a scientist, she can rely on her extended family to assist with childcare during the day. However, she still has the primary responsibility for maintaining the health and well-being of her extended family. This entails many time-consuming and tiring tasks, among them cooking, laundering, and assisting with children's school homework. The latter is a heavy task, much more time-consuming than in most European or North American families. In addition, the woman bears the responsibility for taking care of elderly parents in need of help.

None of the women scientists I met felt that they were discriminated at work based on their gender. In fact, they often mentioned that their male colleagues were very supportive and provided encouragement and assistance. However, they were convinced that the weight of their responsibilities both before and after normal work hours was a sig-

Photos: Brian Porter

Reducing pesticide use and improving the safety of fruit and vegetables for consumers are important issues for scientists

nificant challenge to them being able to reach the same level of scientific achievements as their male colleagues.

In this study, almost all indicators of scientific success and productivity support this conclusion. We have seen that IFS Grantees are a high-achieving, elite group of researchers. We also see that women are underrepresented among grantees compared to what one would expect, given the general demographics of the scientific community in Vietnam. IFS Grantees are 28% female, while the general population of researchers are 43% female (UNESCO 2008). Furthermore, women who have become IFS Grantees earn less income from their scientific work, have less research funding, spend less time abroad in training, publish less, and are not promoted as often as men. This is not a reflection of women's talent but rather of a scientific and socio-cultural system that does not fully take advantage of the capacity of women scientists. Unfortunately, this pattern is not unique to Vietnam. On the contrary, it tends to occur in many, if not most, countries. (UNESCO 2008).

In the questionnaire survey and in interviews, women grantees strongly supported the idea that IFS should create a special programme of support for women scientists. It was obvious to the women with whom I spoke, that IFS could do little to change Vietnamese culture and the structure of the scientific profession. However, IFS can stand behind and support women who have through their choice of profession decided to challenge these same structures. An IFS programme of support for women scientists need not be radically different from what IFS already does in developing countries, but it should rather place emphasis on providing more opportunities for women to receive further training and take part in professional networking.

One suggestion with many variations was that IFS should initiate a network of women scientists (grantees) in Southeast Asia that would meet regularly. Such a network would be a forum where women could discuss strategies and learn from each other about how to survive and excel in a social and cultural environment that favours their male colleagues. This network could be linked to a general IFS alumni network, and have its meetings in connection with those meetings.

Another suggestion was that IFS should earmark training/research opportunities for women to make short-term visits to centres of excellence. Such a programme would build upon the trend already highlighted in the analysis of the questionnaire survey for women grantees to have a greater degree of orientation towards international collaboration and networks. This kind of support would, however, need to be flexible and take into account women's obligations to their families at home.

Finally, IFS might consider making more funds, or more research grants (i.e. multiple renewal grants) available to women scientists. As the questionnaire survey demonstrated, women scientists generally have fewer research funds available to them than do men, and they are less likely to be able to participate in the national research grant programmes. Hence, if IFS would like to improve the conditions for women to excel in science in Vietnam, it might consider ways to increase women's access to research funding. Of course, one spin-off effect of organised networks and additional opportunities to visit research centres abroad would also be an increase in their international scientific profile and awareness of other sources of research support.

Stimulating private-public partnerships

Historically, there have been very few direct links between the scientific community and industrial and agricultural actors in Vietnam. Communication between the sectors has been mediated by government ministries. Even in the 1990s, an evaluation of Vietnamese science concluded that

> *"research institutions in Viet Nam tend to follow their own logic, mostly inherited from a Soviet (mission-oriented) approach to conducting research, in which the end user (the scientific community, educational institutions, a public agency) does not operate in the market and is identified in advance" (Bezanson et. al 1999:34).*

In recent years, however, the government has come to believe that continued economic growth and national development are at least partially dependent upon the fostering of more links between science

and the productive sectors of the economy, including industry, forestry, agriculture, aquaculture, etc (World Bank 2006; Vietnam 2003a; Vietnam 2006).

IFS Grantees generally believe that the purpose of science is to create new technologies and contribute to economic development. Despite this, this study finds that companies have a very marginal role in the scientific work of IFS Grantees, and especially of women grantees. The contacts that grantees do have with companies generally occur outside the institutional framework of their research institution or university, and are primarily a supplement to their livelihood rather than a source of research collaboration.

This situation is similar to what has been documented in other studies of science in Vietnam. For example, Ngoc Tran Ca writes:

> *Many transactions between productive units and universities are based on informal and personal relationships, as the institutional mechanisms to facilitate this process are rarely in place. A further problem is that the overall structure and dynamism of markets do not sufficiently encourage firms to innovate. There is not enough pull for university staff to pay more attention to innovation and serve the firms (2006).*

A frequent suggestion put forward is that additional mechanisms are needed in Vietnam to broker between science and industry (Annerstedt and Liyanage 2008; World Bank 2006; Bezanson, et al. 1999; Tran 2006a).

In interviews, many grantees expressed a keen interest to better explore ways in which science can contribute to business and production, and vice versa. In particular, they expressed concern that they are not aware of what kind of research needs Vietnamese companies might have, and therefore have some difficulty in tailoring their research to practical applications that could more easily contribute to economic development. They also saw business and industry as potential contributors of research money to institutions and universities and would like to develop this potential.

Grantees suggest that IFS could serve as a stimulus for contact between research institutions and private enterprise. In their view, this could be achieved rather simply. They suggest that IFS, in conjunction with an effort to build a grantee network in Vietnam or Southeast Asia, invite businesses to participate in and sponsor IFS scientific workshops in the region. Their participation should also include dialogue sessions where scientists and business leaders can meet, exchange ideas, and develop collaborative projects of mutual interest.

7. Summary and conclusions

For nearly 30 years IFS has supported young researchers in Vietnam to carry out high-quality scientific projects, and to become experienced and established scientists in their home country. The results of this programme include some 140 scientific projects and 113 grantees in fields ranging from natural products chemistry to anthropology. In the preceding chapters, we have traced the origins of science and higher education in Vietnam, and how they have contributed to the present-day scientific landscape in which IFS works. This chapter recounts some of the key conclusions from previous chapters as they specifically relate to the IFS programme of support for developing country scientists, and draws some general conclusions regarding science in Vietnam today.

The environment for pursuing scientific research

The history of science and higher education in Vietnam is both rich and complex. Over the course of some 1400 years, both have contributed to the rise and fall of empires, and have been central to Vietnamese visions of a better future. The many layers of history continue to influence the content and structure of science and higher education in Vietnam today. The heritage of the past includes Chinese, Soviet, Japanese, French and other Western influences, to name only a few. This heritage is expressed in terms of the way science is organised, and also in the culture of science among different generations of Vietnamese scientists. This rich heritage, combined with contemporary factors that influence science both globally and locally, creates both opportunities and challenges for achieving the economic and development ambitions of contemporary Vietnam.

Photo: Eren Zink

An area of growing concern for scientists is how Vietnam will adapt to the impacts of climate change

This study has shown that contemporary Vietnamese scientists believe that science both can and should contribute to the achievement of development goals. These scientists are often motivated by personal experience of hardship and the will to contribute to a more prosperous future. In addition to the scientist herself, funding agencies and a researcher's home institution have a strong influence on choices of research topics.

Opportunities for aspiring scientists in Vietnam to enrol and complete a PhD training programme, whether in Vietnam or abroad, have never been greater than they are today. In view of the substantial amounts that have been invested in scientific infrastructure (e.g. equipment) nationally, and a critical lack of research funding for young researchers, this means that the IFS programme is currently of great relevance to science in Vietnam. In fact, the simplest way to ensure that an IFS grant is actually used by the designated grantee to personally carry out a research project is to award the grant to a scientist already enrolled in a traditional or sandwich PhD programme.

In contrast to the scientific landscape of two decades ago, contemporary Vietnamese science is dynamic, experimenting with new forms of organisation, as well as domestic and international partnerships. The new freedom with which individuals, teams and institutions in science can communicate and collaborate with foreign programmes and institutions creates many opportunities for initiatives in the field of scientific capacity building.

In the international scientific community, the USA and Japan are the most important partners for IFS Grantees, and for scientists in Vietnam in general. Australia and Germany are also of significant importance.

Low salaries are the key and perhaps most debilitating problem for science in Vietnam. The fact that a scientific career does not guarantee a livelihood puts scientific research at odds with personal ambitions to marry, raise a family, and enjoy a reasonable standard of living. This is the single greatest problem for science in Vietnam today, and it constitutes a threat to any investment in strengthening scientific research capacity.

There are further problems for young scientists, especially for the women. In Vietnam, the structure of science (and society in general) is both paternalistic and hierarchical. Strategic social networks and kinship also shape the range of opportunities for young scientists. While this does not necessarily affect opportunities for obtaining advanced training in a scientific field, it does influence possibilities for putting that training to use for the production of new scientific knowledge after completing one's PhD.

Evaluating IFS and its grantees

The IFS Grantees surveyed for this report are a productive and internationally well-connected group of scientists in fields related to the sustainable management, conservation and utilisation of biological and water resources.

In many cases, the IFS grant has enabled a young researcher to establish a small team of researchers consisting of Master's and Bachelor's degree students that work together to carry out the IFS project. In these cases, the grant enables a group, that would otherwise have worked in an uncoordinated and fragmented way, to work together towards common research goals.

The IFS programme has successfully identified and supported individuals who later become established and productive members of Vietnam's scientific community. The community of IFS Grantees is one that remains active in science, publishing both locally and internationally, and contributing to national development.

Nearly all IFS Grantees have been promoted following the IFS grant, and many have reached positions of leadership at their universities and institutions, or become Associate Professors, or both.

IFS Grantees are more successful in accessing research funds internationally and in publishing their research results than the general population of Vietnamese scientists.

Almost all IFS Grantees report that the IFS grant led to more scientific support from their institution, national research funds, and/or international research funds.

IFS Grantees are unanimous in rating the performance of the IFS programme as good or excellent.

As currently organised, the IFS programme of support is still of great relevance to the needs of Vietnamese scientists. This said, grantees saw a number of improvements that they felt are critical for ensuring that IFS continues to provide support adapted to the challenges of carrying out science in Vietnam. These include:

- Increasing the size of research grants to a level that enables scientists to do work that is internationally recognizable as being of high quality.
- Providing additional support that enables grantees to continue to participate in important science communities. This support includes travel to conferences, access to journals, scientific training opportunities, and national and regional scientific networking.
- Initiating a network of IFS Grantees in Vietnam or Southeast Asia that meets regularly to present scientific results and participate in capacity-enhancing activities.

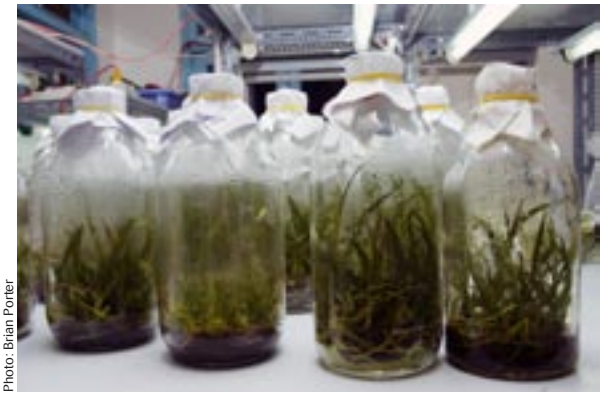


Photo: Brian Porter

IFS grantees work with orchid tissue culture for conservation, and commercial production

- Special support for women scientists that strive to succeed in an environment that favours male scientists.
- Events and networks that encourage new links between public sector researchers and private sector actors.
- Shorten the application review process from six months to five months, and thereby improve the possibility for applicants to submit two applications during one year. This is particularly important for promising applicants that were unsuccessful in applying for IFS funds on their first attempt.

IFS support could be of particular value in niches not currently prioritised by national sources of research funding. These include innovative, high-risk research that can lead to new knowledge, research that specifically addresses the needs and problems of Vietnam's poor and small-scale farmers, and baseline research that can provide the foundation for a better understanding of basic biological and chemical processes, as well as social, cultural and economic systems.

IFS Grantees believe that IFS must engage with the Vietnamese scientific community in a more active way, as there currently exist some communication problems between them. Vietnamese scientists should be invited to become IFS Advisers, and some grantees felt that a representative of IFS should be located in Vietnam. In these initiatives, they advise that IFS should proceed with care in order to maintain high levels of transparency.

Final words

The findings of this report indicate that IFS is as relevant to the challenges and opportunities for pursuing science in Vietnam as ever. It is clear that the activities of a relatively small organisation such as IFS cannot be expected to create great changes in a science community the size of that in Vietnam. Nevertheless, a well-functioning peer-review system that selects the most promising young scientists and supports them to carry out innovative and important scientific work can both stimulate and catalyse positive change. It is this hope that inspires the many IFS Grantees and other scientists to offer advice and guidance to IFS on how it should continue to develop its programme of support in Vietnam.

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Appendix 1

Questionnaire for IFS Grantees in Vietnam

Is the IFS programme relevant to the needs of researchers in Vietnam?

1) The mission of IFS is to contribute towards strengthening the capacity of developing countries to conduct relevant and high quality research on the sustainable management of biological and water resources. In your opinion, how relevant is this mission to Vietnam today? Place an "X" next to your answer below.

Not relevant
Somewhat relevant
Very relevant

2) The IFS programme supports research that investigates issues related to the conservation, production, and renewable utilization of the natural resources base. Research can be carried out in social science or natural science fields. In your opinion, how relevant are these research areas to Vietnam today? Place an "X" next to your answer below.

Not relevant
Somewhat relevant
Very relevant

3) The main strategy of IFS is to support scientists by providing research grants to individuals rather than teams or institutions. Is this strategy relevant to the needs of researchers in Vietnam?

Not relevant
Somewhat relevant
Very relevant

4) The IFS programme supports young researchers at the beginning of their research career. In your opinion, what should be the maximum age for Vietnamese researchers that apply for a first grant from IFS?

years of age.

5) Given the goals of the IFS programme and the conditions for doing research in Vietnam, what do you think the maximum value of an IFS research grant should be (in US Dollars)?

US Dollars.

6) In your opinion, in addition to research grants, what kind of support do you think is most important for IFS to provide to grantees in Vietnam? Below is a list of possible kinds of support, please indicate with an "X" which you consider to be the five (5) most important.

Most important

Provision of access to up-to-date scientific journal articles
Provision of an Internet connection
Patenting and intellectual property support
Support to visit a foreign research institution
Support to publish scientific articles
Support to attend scientific conferences
Special programme of support for women scientists
Support to attend scientific workshops
Support to attend research proposal writing workshops
Support to attend scientific writing/publishing workshops
Support to organise regional networks of scientists
Extra salary/honorarium
Laptop computer
Assistance to repair scientific equipment
Other:

7) In the previous questions you were asked to give your opinion of the IFS mission and strategy. If you feel that IFS should change its mission or strategy in order to be more relevant for researchers in Vietnam, please provide your suggestions on how IFS could do this in the space provided below:

Science in Vietnam

8) In your opinion, what are the most important fields of science in Vietnam today? Please explain.

9) In your opinion, what most influences a researcher in Vietnam when he/she chooses a research problem to be investigated? Please rank the following possible influences in order of importance, with number "1" being the most important, "2" the second most important, etc. If you feel one or more factors are of little or no importance, please leave the space blank.

Companies and businesses
International development agencies
International science organisations
Non-governmental organisations (NGOs)
Science funding agency
Scientists and research teams from other countries
The researcher himself/herself
The researcher's home university or research institution
Vietnamese government ministries
Other, please explain:_____

10) Indicate whether you agree with the following statements by writing a number between 1 and 5 in the space provided. 1 = "disagree completely", 3 = "neutral", 5 = "agree completely".

In Vietnam, scientific research should mainly lead to economic development.
In Vietnam, scientific research should mainly lead to new scientific knowledge.
In Vietnam, scientific research should mainly lead to useful technologies.
Vietnamese researchers strongly participate in the international scientific community.
Researchers in Vietnam form a strong national scientific community.

11) How important is Vietnamese science for economic development in Vietnam?

Not important
Somewhat important
Very important

12) Which criteria are the most important for the promotion of scientists in Vietnam? Write a number between 1 and 5. 1 = no importance, 3= some importance, 5 = very important.

Academic degree
Award of research grants
Consultancy projects
Contribution to development
Contribution to teaching
Contribution to the institution
Publications in international journals
Publications in local journals
Strategic social relations
Seniority/Age
Others (specify): _____

Your experience of IFS

13) Would you have carried out the same research project if IFS funding had not been available?

Yes
No

14) Based upon your own experience, how would you evaluate the performance of IFS? Please write the appropriate number next to each mode of support (1 = unacceptable, 2 = poor, 3 = satisfactory, 4 = good and 5 = excellent). If you have no experience of one or more of the aspects, then please indicate a "0".

The IFS programme in general
Selection process
Feedback and advice on your grant application
Grant administration (including transfer of funds)
Monitoring and follow-up of projects
Contacts with IFS staff
Purchase of research equipment
Maintenance of research equipment
Research training
Scientific counseling
IFS-organised workshops
Networking activities, including with other IFS Grantees
Follow-up activities once the supported project is terminated
Other (specify) _____

15) How many publications (including journal articles, conference proceedings, reports, books, etc) resulted partly or wholly from your IFS-supported research? If none, please enter "0"

Publications

16) How many of the publications that resulted partly or wholly from your IFS-supported research were published in Vietnamese journals? If none, please enter "0"

Publications

17) How many of the publications that resulted partly or wholly from your IFS-supported research were published in international journals? If none, please enter "0"

Publications

18) Please explain any other important outcomes of your IFS-supported research (patents, commercial applications, policy implications, new technologies, etc.).

19) How important was your IFS research grant for your career as a scientist?

No importance
Some importance
Much importance

20) Since becoming an IFS Grantee, has it become easier for you to obtain:

	Yes	No
Additional funding from your institution?		
Additional funding from a national funding institution?		
Additional funding from an international institution?		
Scientific and technical assistance from your institution?		

21) Has the IFS support provided opportunities to collaborate with new partners?

Yes
No

Research conditions

If you have not been active in research or research administration during the past five years, please skip to Question 26.

22) What are, according to you, the three main factors holding back your research work in order of importance?

1.
2.
3.

23) Listed below you will find several possible difficulties for carrying out research. Please indicate if they are a problem in your own work by writing the relevant number (1, 2, 3, 4) in the space provided.
1 = not a problem, 2 = small problem, 3 = serious problem, or 4 = obstructive problem.

Access to research equipment in your institution
Difficulties to import scientific equipment
Broken equipment/equipment repairs
Access to expendable supplies
Lack of time
Lack of technician(s)
Difficulties in doing fieldwork
Access to vehicle
Access to scientific publications
Lack of sufficient salary
Others (specify):_____

24) During 2006, please approximate the amount of research funds you have received from each source, in US Dollars. Please do not include salaries.

Sources	total, in USD
Home institution	
National public funds	
Industry or private foundation (national)	
Industry or private foundation (foreign)	
International organisation	
Other (please specify):	

25) List the different funding institutions from which you have received financial support for your research activities during the last five years, including your own institution.

Year(s)	Name of funding organisations	Country	Amount in USD

Your career

26) Have you been awarded any additional academic degrees since your first IFS grant? If yes, please identify the degree and the country of the institution that awarded it.

27) List your most important academic visits abroad (of at least two months' duration) during your career.

Year(s)	Institution visited	Country	Purpose of visit

28) How many years have you spent outside your country for higher education and training, including postdoctoral studies and academic visits outside Vietnam?

years.

29) How many years in total have you spent outside Vietnam?

years.

30) Have you been promoted in your employment since the award of your IFS grant?

Yes
No

31) How many students have you supervised during your career? Please provide the number below:

Bachelors degree (or equivalent)
Masters degree (or equivalent)
PhD degree (or equivalent)

32) How many publications have you authored or co-authored during your scientific career (journal articles, conference proceedings, reports, books etc)?

Publications

33) What other important achievements/awards/honors have you had during your career?

34) Are you still working as a researcher?

Yes
No

35) If you answered "no" to question 34, why did you stop working in research?

36) What is/are your current employment(s)? Please also include non-scientific jobs.

Position/job title	Institution/company	Country

If you are not currently working in research, teaching or research administration, please skip to Question 41.

37) In which kind of organisation do you work as a scientist today?

Public university
Public research institute
Private company
Private university
Private research institute
National NGO
International organisation

38) Given the institutional framework in which you work as a scientist, would you consider the following elements as relative advantages or disadvantages? Please mark your choice with an "X"

	Advantage	Disadvantage
Salary		
Research opportunities		
Job security		
Social benefits		
Retirement benefits		
Others (specify) _____		

39) Do you consider that the salary you receive as a scientist is adequate to support you and, if applicable, your family?

- Adequate
- Inadequate

40) What was your income from your work as a scientist during 2006?

Dong

41) What was the total income of your household during 2006?

Dong.

42) What is your future career goal (you may select more than one)?

- Scientific career inside Vietnam
- Scientific career outside Vietnam
- Career in administration
- Career in national politics
- Private business
- Consultancy or medical practice
- Career within national development programmes
- Career within foreign or international organisations
- Other: _____

Partnership and communication

If you have not been active in research or research administration during the last five years, please skip to Question 50.

43) To carry out your research activities, do you usually work alone or with other scientists?

- Alone
- With other scientists

44) If you work with other scientists, how often do you work in multidisciplinary research teams?

- Never
- Sometimes
- Usually

45) If during the last five years you have worked with other scientists in a research team, what nationalities did the other scientists have?

46) If you work in multidisciplinary research teams, how often do you work together with economists, geographers, sociologists, or other social scientists?

- Never
- Sometimes
- Usually

47) During the past five years, how often have you communicated (by email, telephone, or face to face) with the following people regarding your research? Please enter a number between 1 and 5 (1 = never, 2 = rarely, 3 = annually, 4 = monthly, 5 = more than once a month.)

Researchers in your own institution
Researchers from other institutions in Vietnam
Researchers in other Southeast Asian countries
Researchers in other parts of Asia
Researchers in Europe
Researchers in USA or Canada
Researchers in Africa
Researchers in Central or South America
Staff of the International Foundation for Science (IFS)
International science organizations
International NGOs
International development agencies
Companies and businesses
Others (specify): _____

48) Do you have sufficient access to up-to-date scientific literature?

- Yes
- No

49) Do you have access to bibliographic databases of recent scientific literature via the Internet?

- Yes
- No

50) In the space below, please explain how many scientific conferences you have attended since the beginning of your research career? Please indicate their location and the source of your funding to attend the conference.

Conferences	With national support	With IFS support	With foreign support**	Without support
Within Vietnam				
In Asia				
In Europe including USSR				
In USA or Canada				
In Latin America & Caribbean				
In Africa				

Other information

51) Please find below your contact information and personal details according to our records. We ask that you make corrections to your contact information in the space provided.

Name:
Title:

Mailing address:

Email address:

Corrections that you would like to make:

52) Please use the space below to make any additional comments or suggestions to IFS:

Appendix 2

List of Figures, Tables and Text boxes

IFS MESIA Impact Studies

Report No. 1 *Monitoring and Evaluation System for Impact Assessment (MESIA), Conceptual Framework and Guidelines*
Gaillard J.
Stockholm: IFS, 2000. 38 pages.

Report No. 2 *Questionnaire Survey of African Scientists*
Gaillard J. and A. Furó Tullberg
Stockholm: IFS, 2001. 92 pages.

Report No. 3 *IFS Impact in Mexico: 25 years of support to scientists*
Gaillard J., J.M. Russell, A. Furó Tullberg, N. Narvaez-Berthelemot and E. Zink
Stockholm: IFS, 2001. 152 pages.

Report No. 4 *Strengthening Science Capacity in Tanzania: An Impact Analysis of IFS Support*
Gaillard J., E. Zink and A. Furó Tullberg
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Report No. 5 *Science Research Capacity in Cameroon: An Assessment of IFS Support*
Gaillard J. and E. Zink
Stockholm: IFS, 2003. 72 pages.

Report No. 6 *Summary of IFS Impact Studies Nos. 1-5*
Zink E. and Gaillard J (ed.) S. Major
Stockholm: IFS, 2006. 28 pages.

Report No. 7 *Evaluation of IFS Food Science Area*
J R N Taylor
Stockholm: IFS, 2006. 64 pages.

Report No. 8 *IFS and OPCW Joint Support to African Scientists*
Malin Åkerblom
Stockholm: IFS, 2008. 80 pages.

Report No. 9 *Science in Vietnam: An assessment of IFS grants, young scientists and the research environment*
Zink E.
Stockholm: IFS, 2009. 80 pages
(this document)

These reports are available in pdf format on the IFS website: www.ifs.se

Supporting Scientists to solve Environmental and Development Challenges

Leaving the ranks of the world's poorest countries, Vietnam has recently experienced rapid economic growth. However, growth has been accompanied by mounting environmental and development challenges. Climate change, agro-industrial pollution, biodiversity conservation, avian-influenza and changes in land-use patterns are just a few of the phenomena that Vietnamese scientists are asked to address. Success in these endeavors demands increased funding for science as well as the encouragement of promising young researchers, creative research environments, and strong national and international science networks.

The International Foundation for Science (IFS) strengthens scientific capacity in developing countries. It gives research grants, capacity enhancing activities and other supporting services to young scientists whose work is relevant for the conservation, management and sustainable utilisation of biological and water resources. IFS was established as a non-governmental organisation in 1972, and has provided over 6,500 grants to researchers in 100 countries.

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