



Summary of IFS Impact Studies Nos. 1-5

Eren Zink
Jacques Gaillard

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 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 4,000 researchers in Africa, Asia and the Pacific, and Latin America and the Caribbean have been awarded research grants by IFS.

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Nos. 1-5

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Preface

The International Foundation for Science (IFS) provides support to young scientists in developing countries. We operate a competitive research grant scheme, arrange thematic and methodology workshops, and facilitate networking and mentoring for grantees. Since the mid 1970's IFS has awarded 5,800 research grants to 4,000 young scientists in their early career in countries throughout Africa, Asia and Latin America.

IFS keeps track of the scientific careers of grantees through the Monitoring and Evaluation System for Impact Assessment (MESIA) which produces and analyses data on grantees and undertakes surveys of the condition of young scientists in developing countries.

Since 2000 five reports have been published in the MESIA series. Dr Jacques Gaillard developed the conceptual framework and guidelines of the evaluation system. He was the principal researcher and author of the first five MESIA reports. Other authors include Eren Zink, Anna Furó Tullberg, Jane M Russell, and Nora Narvaez-Berthelemot. The Impact Assessments have also benefited from the contributions of Brian Porter (network, information and publications) and Henrik Hovmöller (database and statistics).

The main findings of the five MESIA studies are summarized in this report. It has been written by Eren Zink and edited by Sharon Major.

We would like to especially thank the IFS Scientific Advisers and staff who have provided useful and critical comments. We are particularly grateful to the many current and former IFS grantees, and other scientists, who have contributed to our questionnaires, interviews and informal discussions.

Stockholm, May 2006



Michael Ståhl
IFS Director

Key points from the Impact Studies

The International Foundation for Science (IFS) supports scientific capacity building in developing countries. It does this at a basic yet strategically important level, by providing competitive research grants and support services to young scientists at the start of their research careers.

Four impact studies, the Monitoring and Evaluation System for Impact Assessment (MESIA) Studies Numbers 2 to 5, have investigated the impact of IFS in Mexico, in Tanzania and in Cameroon, and surveyed results in Africa. These studies have shown that IFS grants do make a difference.

Key points from the MESIA studies:

1. Young researchers provided with a grant at the start of their research career tend to stay and work and contribute within their own country. Even if initial research activity provides opportunities for further research elsewhere, these grantees tend to return, even better equipped, to their home base.
2. These relatively small research grants have often been an important factor in enabling a young scientist to pursue a research career under sometimes adverse conditions. IFS grants have helped to keep research careers alive.
3. The support services IFS provides along with the grant can help to achieve more than just basic support to the grantee. Purchasing or enabling the purchase of vital, and often very basic, research equipment, can help in establishing a research laboratory which will benefit far more people in the scientific community - researchers, students, and technicians - than just the initial grantee.
4. The competitive nature of the granting process has been successful in identifying scientists with potential to become scientific leaders

in their community. See the list (p. 17) of positions filled by African former grantees.

5. Success in gaining an IFS grant tends to be perceived as prestigious, and grantees often have access to larger funding sources after the IFS grant.
6. Gaining an IFS grant acts as a stimulus to an upsurge in scientific productivity.

Introduction

The first IFS grant was awarded in May, 1974 to a young researcher in Cote d'Ivoire, and since then thousands of researchers have benefited from IFS support. During 1974-2002, the period covered by the Impact Studies summarized here, IFS supported close to 3,400 young researchers in 99 developing countries. More than a third of the researchers (1,231) were in Africa. More than 10,000 young scientists benefited from scientific counselling by IFS Advisers, and more than 50,000 researchers and students used equipment purchased by IFS .

The following pages summarize what has been learned by IFS from its own impact assessments of IFS support to developing country researchers, in the MESIA reports. The reports assess the impact of IFS activities in selected countries from 1974 to 2002. Much has changed and is changing: but the reports provide useful indicators of both what IFS has achieved and where it might best concentrate its efforts today.

IFS Impact Assessments (MESIA)

IFS Impact Studies measure the impact of IFS activities in developing countries and indicate opportunities for future initiatives and investment. The method of analysis, the "Monitoring and Evaluation System for Impact Assessment" (MESIA) has been specifically developed for the evaluation of the capacity strengthening efforts of IFS: to assess the impact of IFS activities on the achievements and career development of IFS grantees.

The IFS Impact Studies also investigate the research environment and working conditions of IFS grantees, and provide an overview of national science and technology systems.

The analysis is based on data available in the IFS database, analyses of the scientific output of IFS Grantees, questionnaire surveys, and interviews with scientists and policy makers.

Published Impact Studies (MESIA Reports)

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

This report provides the conceptual framework and guidelines for the following MESIA studies. Indicators for evaluating the impact and useful tools (the IFS database, interviews, selected profiles of some IFS grantees, questionnaire surveys) are discussed, as well as the constraints of monitoring systems.

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

This report assessed the state of science in Africa in 1999, and the conditions under which African scientists were carrying out their research activities. The information came from scientists who received research support from IFS, or from the INCO-DEV programme of the European Commission, a population active in biological, agricultural, environmental and medical sciences.

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 pp.

This study covers the period 1974 to 1999, and a total of 138 grantees of whom 69 were still benefiting from IFS support. The grantees were distributed through 36 research institutes and universities within Mexico, but half of them were in the top four recipient institutions: Universidad Autónoma de Yucatán, Universidad Nacional Autónoma de México, Centro de Investigación y de Estudios Avanzados del IPN and Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias. The five main components of the study: an overview of science and technology (S&T) activities in Mexico; a retrospective statistical analysis of IFS applications, applicants and grantees; a questionnaire survey of the 138 grantees; a bibliometric study of their scientific production; and 48 interviews with Mexican grantees.

- Report No. 4 *Strengthening Science Capacity in Tanzania: An Impact Analysis of IFS Support*
Gaillard J., E. Zink and A. Furó Tullberg, Stockholm:
IFS, 2002. 104 pp.

This study comprises an overview of S&T activities in Tanzania; a retrospective analysis of IFS applications, applicants and grantees; a questionnaire survey of IFS grantees in Tanzania (31 responded); a bibliometric study of their scientific production; and 17 interviews with Tanzanian grantees. The study covers the period from 1974 to 2000, and includes the 55 grantees in the IFS programme during that time. They were working in 18 research institutions throughout the country, but more than half were found in the top two recipient institutions in Tanzania: the Sokoine University of Agriculture and the University of Dar es Salaam.

- Report No. 5 *Science Research Capacity in Cameroon: An Assessment of IFS Support*
Gaillard J. and E. Zink, Stockholm: IFS, 2003. 72 pp.

This study covers the period 1974 to 2002, and includes the 84 IFS grantees who were working in eight research institutions throughout the country, but with two-thirds of them found in the top two recipient institutions: the Institut de Recherche Agricole pour le Développement and the University of Yaoundé. As in the earlier studies, there is an overview of S&T in Cameroon; a retrospective analysis of IFS applications, applicants and grantees (for 1974-2002); a questionnaire survey of IFS grantees in Cameroon (49 responded), and a bibliometric study of their scientific production (1974-1999); and 27 interviews with Cameroonian grantees.

Research conditions in developing countries

IFS grantees identified the main limitations to carrying out research in developing countries as a lack of research funding, insufficient access to functioning scientific equipment, poor access to up-to-date scientific literature, isolation from the wider scientific community, and often miserably low salaries for researchers. Nevertheless, research conditions vary widely through time and between developing countries. The IFS impact studies indicate that IFS grants can have more impact now in low income countries with a fragile research infrastructure. These are primarily concentrated in Sub-Saharan Africa, parts of Central and Andean America, and parts of South-East Asia.

The history of science in both Cameroon and Tanzania, as outlined in the IFS impact studies, is characteristic of many developing countries. Relatively large investments in science in Cameroon and Tanzania in the 1970s and early 1980s made a strong impact on the development of the science infrastructure and of S&T human resources. However, in these two countries, as in many others, national investments in science came to a standstill in the 1990s, recruitment of new researchers froze, and the national capacity to generate new scientific knowledge was eroded. In countries such as these where national investment in science is currently marginal, IFS continues to have an important role in supporting the young generation of scientists who may become those countries' future science leaders.

In contrast, countries such as Mexico have invested in science, trained young researchers, and established national science funding mechanisms that contribute significantly to scientific research within their borders. This and similar countries such as Thailand, Malaysia and Brazil, are success stories, where IFS has had an important role at an earlier time, but where the need for IFS support may now be diminishing.

The difference between countries in the South that have a vulnerable scientific infrastructure and those that have a relatively strong scientific

infrastructure is clearly illustrated by comparing Mexico with Tanzania. Current and former grantees surveyed in Mexico reported in 1998 that of their total research budget, only around 14% came from international organizations. Most funding came from national funding programmes or from the researchers' home institutions. In comparison, in Tanzania in 1998, 80% of current and former grantees' research funds came from outside Tanzania. While the average research budget in Mexico was more than USD 22,000, in Tanzania it was only USD 8,400.

In many of the less developed countries, research can not always be considered a livelihood. Scientists do not earn enough to support themselves and their families. As a result, there is another brain drain at work where researchers are spending more and more time on consultancies, private business, and farming. Unlike in Mexico where salaries, at least for senior researchers, are competitive with some countries in the North, in Cameroon and Tanzania scientists must struggle to make ends meet. As a result, the amount of time that researchers are willing and able to allocate to research is limited.

The lack of national sources of funding in many countries in the South, especially in Sub-Saharan Africa, parts of South-East Asia and the Pacific, and Central and parts of Andean America mean that IFS still has an important role to play.

The IFS Granting Programme: Impact and Perceptions

IFS worked hard to identify the next generation of good scientists, and to support them in their early careers to become established in their home country. A primary objective of the IFS Impact Studies was to identify whether or not IFS had succeeded in this.

Getting established

In interviews with former IFS grantees, they emphasized that IFS support entailed much more than just a research grant. The period when a researcher was eligible to apply for an IFS grant was often the time in their career when they were first confronted with the choice between pursuing a career in their home country, or in a developed country. Often it was IFS support that made it possible for a researcher to foresee a productive scientific career in their home country. In addition to the funds to purchase the tools for research, IFS support expanded the horizons of a grantee's scientific community. It brought national and international recognition, introduced grantees to new contacts in their field, provided opportunities for participating in conferences and workshops, and often opened the door to their participation in international research networks.

IFS support also meant that young scientists could begin to establish themselves within their own institutes. They could outfit their laboratory with the basic tools for research, involve students in their work, and begin to carry out their own research agenda on a more equal footing with their older colleagues.

The track of a grantee's career, whether they be in Mexico, Cameroon, or Tanzania, was often found to be rather predictable. The IFS grantees established themselves within a university or research institute in the developing country. They published based upon their IFS work in both international and regional journals. Following the IFS grant they sought larger sources of funding for their work and gradually began to assume

a senior role in their institution. They trained more students and, if they did not have one already, completed their PhD. They were promoted. Their students became a second generation of IFS grantees and a national network of researchers working on their areas of expertise began to take shape.

More productive scientists

Bibliometric studies of IFS grantee productivity in Tanzania, Cameroon and Mexico showed that IFS grantees published their research results both nationally and internationally. Publications from IFS supported work could account for a significant portion of a grantee's entire publication record, and IFS support usually coincided with an increasing level of scientific productivity.

In Mexico 105 IFS grantees produced 441 publications resulting from their IFS work. Furthermore, the period of IFS support coincided with a period of increasing scientific production that peaked approximately eight years after the first grant was awarded. These grantees had published more than 4000 scientific articles, papers in conference proceedings, books, etc.

In Tanzania, the 31 grantees surveyed reported producing 103 publications from their IFS supported work. The same grantees reported publishing a total of over 600 scientific publications thus far. Similarly to Mexico, researchers' publication productivity rose during and after IFS support, and peaked between four and six years after the IFS grant.

In Cameroon, 49 grantees reported producing 210 publications from their IFS supported work. This number was equal to 22% of their total scientific production thus far (972 publications). Publication productivity leveled off about four years after the first grant.

Comparing the impact of IFS support on publication output among the different case studies reveals that in Tanzania and Cameroon, IFS support contributed to a greater percentage of researchers' overall production (17% and 22%, respectively) than it did in Mexico (10%).

One likely explanation for the noted differences is that in countries with a more vulnerable scientific infrastructure, the impact of IFS support has been greater. Where scientific networks were fragile and funding was scarce, IFS support could have a more significant impact on a researcher's scientific production.

An alternative to the brain drain

Despite their strong international contacts, IFS grantees have tended to remain in their home countries or regions, influencing policy there and contributing to the training of the coming generation of researchers. They are also mobile, attending international conferences and workshops. Often they have completed one of their degrees or a post-doc in another country. In Mexico 59% of grantees had taken their highest academic degree outside of Mexico. In Africa the numbers were slightly higher.

However, despite their mobility, IFS grantees have generally been committed to working in their own countries and strengthening local science capacity from the inside. In Mexico, IFS could only document two cases of long term brain drain out of 138 grantees. Among 84 Cameroonian grantees, only three had left Africa. Of 55 Tanzanian grantees, two had left Africa at the time of the survey. Five grantees each from Cameroon and Tanzania had left their country for another African country, contributing through their circulation to regional or continental development in Africa. These numbers indicate that IFS has had an exceptionally strong method of identifying researchers who are committed to working in developing countries and provided timely incentives and means for these scientists to remain active in their countries.

In tracing the life histories of grantees (many are presented in the IFS Impact Studies and in the IFS 30 Year Anniversary booklet, *Developing Science, Science for Development*, published in 2002), it has become clear that grantees who established themselves in developing countries have played an important role in training the next generation of researchers. Many of the more recent IFS grantees have former grantees as mentors.

Doing science at home in Mexico

At the time of his first IFS grant, Dr Luis Manuel Peña Rodríguez had few colleagues working in the area of Natural Products Chemistry in South-east Mexico. This isolation is one reason why he trained and worked in Canada and the USA at various points in his career, but it is also part of the reason why he returned to the Centro de Investigación Científica de Yucatán (CICY) in the city of Mérida. Determined to build a research team and to establish a project for the evaluation of Yucatecan medicinal plants, Dr Rodríguez found the means to do so with IFS research grants.

When Dr Rodríguez applied for IFS funding in 1990, he was awarded a small research grant (USD 6,200). At that time, CICY lacked an infrastructure for organic chemistry research, and for Dr Rodríguez the IFS grant made “the difference.” Despite the relatively small amount of money awarded, the grant launched his project by allowing him to purchase equipment and recruit his first research group (two undergraduate students and himself).

In 1994, after returning from a year-long research position in New Brunswick, Canada, Dr Rodríguez’s dedication to working in the South was reinvigorated by his IFS supported attendance at a scientific meeting in Chile. There he met scientists with similar interests to his own who were working in other Latin American countries. He says that this meeting was a revelation that opened tremendous opportunities for collaboration with colleagues in Argentina, Bolivia and other countries. In 1998 he was invited to the same meeting as a lecturer (also supported by IFS).

A renewal grant from IFS in 1995 for USD 8,330 was one of the foundations for a new research group that Dr Rodríguez continues to co-ordinate today. That team has continued its work to detect, isolate and identify bioactive metabolites produced by Yucatecan medicinal plants. Dr Rodríguez’s relationship with IFS continued with a third grant in 1997 (USD 12,000).

Despite the challenges involved in working at a distance from Mexico’s large scientific centres, Dr Rodríguez and his colleagues feel that they are contributing to the development of the region through their efforts to build and strengthen the scientific capacity of the Yucatán. Dr Rodríguez does not see his role as that of a renowned international scientist, but rather as a builder of future scientific research groups.

Supporting leadership in science

If the primary goal of IFS is to support young researchers in developing countries at an early stage in their careers, one of the competitive advantages of IFS has been that it developed a programme of support that could identify future leaders in science. IFS grantees became leaders in science by assuming senior academic positions within their universities where they supervised graduate students, taught, and published. In addition, many former IFS grantees assumed leadership positions in universities, research institutes, NGOs and governments where they could have broad influence on national and regional science policies (see list p. 17).

The individual and the institution

While the IFS grant is awarded to an individual, IFS support has also had a positive affect on a grantee's institution. More tools for research have become available within the institutions and the grant and the grantee have often become catalysts for the growth of a research team, a laboratory, or even sometimes a department/school/institute.

Scientific equipment purchased with the grant became the property of the host institution and could subsequently be used by a number of researchers. IFS grantees reported that on average 14 other scientists and students used the equipment purchased by an IFS grant, in addition to the grantee. Over 90% of IFS grantees reported that they carried out their research projects in the context of a team of scientists, and that 85% of the teams were multidisciplinary. In Cameroon, more than 80% of the publications that acknowledged IFS support were the result of teamwork, and similar results were found in Mexico and Tanzania.

In Cameroon the Impact Assessment discovered that IFS grants had led to the formation of research nodes which were able to survive in institutions that were otherwise devastated by drastic cuts to national science funding. Here, groups of organic chemists and food scientists had informally organized themselves to peer review colleagues' applications for IFS support with the result that they experienced high success rates with their applications. These informal research networks within and between institutions supported by IFS continued to demonstrate high scientific productivity under persisting difficult circumstances.

Providing quality service

When former grantees were asked to evaluate the service provided by IFS, they generally gave IFS good or excellent marks for the manner in which it administered research grants, its purchasing services, how it monitored and followed-up research projects, organized workshops, and for their experience of the secretariat staff.

Areas where grantees were only satisfied or slightly less were with assistance in the publication of their research results, scientific counseling and networking, and follow-up activities once the grant was completed. IFS Impact Assessments suggested that IFS respond to the mixed reviews of these latter services by making some changes: by adopting a strengthened travel and publication grants programme that will support grantees when they have completed their research, by establishing a mentorship support programme that will draw upon the IFS Advisers to support researchers working in countries with a vulnerable infrastructure, and by supporting country and regional alumni networks.

Leadership in science in Africa

The following are some of the positions held in recent years by former IFS grantees in African countries:

| | |
|--------------|--|
| Burkina Faso | Director, Centre de Recherche en Sciences Biologiques Alimentaires et Nutritionnelles(CRSBAN) President, Conférence des recteurs des universités francophones d’Afrique et de l’Océan indien (CRUFAOCI) President, Université de Ouagadougou |
| Cameroon | Dean, Faculty of Science, University of Buea Deputy Vice-Chancellor, University of Buea Head of Division, Ministry of Scientific and Technological Research Dean, Faculty of Science, University of Yaoundé I Director General, Institut de Recherche pour la Recherche Agronomique pour le Développement (IRAD) Minister of Science and Technology Vice Rector, University of Dschang |
| DR Congo | Director, Centre de Recherches Agronomiques de Lou-dima |

| | |
|-------------|---|
| Ethiopia | President, Chemical Society of Ethiopia Dean, Jimma College of Agriculture |
| Gambia | Dean, Faculty of Science and Agriculture, University of the Gambia |
| Guinée | Scientific Coordinator, Institut de Recherche Agronomique |
| Ivory Coast | Scientific Coordinator, Centre National de Recherche Agronomique (CNRA) |
| Kenya | Deputy Vice-Chancellor, Egerton University Deputy Vice-Chancellor, University of Nairobi Vice Chancellor, Moi University Regional Director (Eastern Africa), IUCN – The World Conservation Union Director, Tropical Soil Biology and Fertility (TSBF) Institute of CIAT Centre Director, Kenya Agricultural Research Institute Director of Strategic Initiatives, World Agroforestry Centre (ICRAF) Coordinator, Kenya Forestry Research Institute (KEFRI) |
| Madagascar | Regional Centre Director, Centre National de Recherche Appliquée au Développement Rural (FOFIFA) Director (Research), Institut Malgache de Recherches Appliquées (IMRA) Director, Centre National de Recherches Pharmaceutiques |
| Malawi | Principal, University of Malawi |
| Mali | Board of Trustees, IFS Director General, Institut d’Economie Rurale Director of Research, L’École inter-états d’Ingénieurs de l’Équipement Rural (E.I.E.R) |
| Mozambique | Dean, Veterinary Faculty, Universidade Eduardo Mondlane Executive Secretary, Conselho Técnico de Investigação Agrária |
| Namibia | Pro Vice Chancellor, University of Namibia |
| Niger | Director General, Centre Regional d’Enseignement Spécialisé en Agriculture (CRESA) Secretary General, Ministère des Enseignements Secondaire et Supérieur et de la Recherche |

| | |
|----------|--|
| Nigeria | <p>Director, Federal Institute of Industrial Research Dean, Faculty of Agriculture, Obafemi Awolowo University Assistant Director, Nigerian Institute of Medical Research (NIMR) Chief Researcher, Nigerian Institute for Oil Palm Research (NIFOR)</p> |
| R Congo | <p>Director, Centre d'études sur les ressources végétales (CERVE)</p> |
| Senegal | <p>Director, Cabinet du Ministre de l'Enseignement Supérieur du Sénégal President, Conseil d'Administration de l'ISRA Executive Secretary, Conseil Ouest et Centre Africain pour la Recherche et le Développement</p> |
| Tanzania | <p>Chief Executive, Tanzania Fisheries Research Institute Dar es Salaam Centre Director General, Ministry of Natural Resources and Tourism Director, Institute of Marine Sciences, University of Dar es Salaam Director, Animal Diseases Research Institute Chief Academic Officer, University of Dar es Salaam Dean, Faculty of Agriculture, Sokoine University of Agriculture Director, Commission for Science and Technology (COSTECH) Minister of Education and Culture</p> |
| Togo | <p>Director General, Office des Forêts (ODEF) Director of the Cabinet, Ministère Environnement</p> |
| Uganda | <p>Dean, Faculty of Veterinary Médecine, Makerere University</p> |
| Zimbabwe | <p>Board of Trustees, IFS Director, Institute of Environmental Studies Dean, College of Agriculture, University of Zimbabwe</p> |

IFS in Cameroon: A grantee's viewpoint

The most acute developmental challenges Cameroon currently faces are in the health and education sectors. Our government recognizes that our development and growth cannot be fully achieved without inputs from higher education and scientific research. When well managed, these tools could bring about improvement of the economic development through better planning of the nation's development process especially as far as industrialization is concerned. They are also indispensable for the betterment of the quality of life through developing means for better crop production, sustainable agriculture and environmental protection.

In the 1980s, when I was a university student, Cameroon enjoyed better scientific research capacity, as evidenced by the availability of well equipped laboratories and research centres. Working conditions were also good. Researchers, university teachers and research personnel, as I can remember, enjoyed meaningful salaries and incentives. This situation led to a better training of graduate students and provided us with a solid background that enabled some of us to compete efficiently for international scholarship offers. Needless to say, this played a major role in my deciding to become a scientist.

Due to the economic crisis experienced by Cameroon in the nineties, public research budgets were cut to such an extent that with a few exceptions, hardly any research can be undertaken now without foreign aid. It is in this area that the impact of the International Foundation for Science (IFS) is most felt. Thanks to its policy to assist individual researchers, most IFS grantees have been able to remain in activity both by working on specific topics and by training graduate students in their various institutions.

In this context, I can serve as an illustration of the impact of IFS support in Cameroon: since my first grant in 1996, I have been able to develop a relatively new discipline, eco-toxicology, within the laboratory of General Biology in the department of Animal Biology and Physiology of the Faculty of Science of the University of Yaoundé 1. Together with my second grant in 2001, I have trained more than a dozen graduate students, published more than 10 journal articles and presented more than 15 communications at national and international conferences in eco-toxicology and related fields. The number of graduate students interested in eco-toxicological studies has been growing steadily. Thanks to this significant scientific production, I was able to successfully secure a post-doc training in soil eco-toxicology and environmental chemistry at the Institute of Environmental Research (INFU) at the University of Dortmund in Germany, with a research fellowship from the Alexander von Humboldt Foundation of Germany.

All this would not have happened without the input from IFS. It is my wish that Cameroonian researchers will continue to receive support from IFS so as to boost the current governmental effort in scientific research recovery.

Dr. Adolphe Monkiedje (March, 2003)
Department of Animal Biology and Physiology
University of Yaoundé I, Cameroon

Looking forward

Today the issues that gave birth to IFS in the 1970s are still real and still important. IFS can pride itself on having contributed to strengthening science in difficult situations during its first 30 years. IFS support has enabled some significant advances in developing countries, and it has been a reliable source of support for scientists during the various economic crises of the late 20th century.

The findings of the Impact Studies have contributed to a better understanding of the strengths and gaps in the IFS Programme, and provide a foundation for the further strengthening of the IFS support to young researchers

This report has dealt with the period 1974 – 2002. A considerable part of IFS support has been provided to talented young scientists in the Middle Income Countries. In the past decade, many of these countries have invested heavily in research infrastructure, provisioning of national research funding mechanisms and development of national post-graduate research training programmes. IFS has played a role, together with many others, in the strengthening of science capacity in what are now the scientifically advanced developing countries. The role of IFS in such countries is thus becoming less important. Consequently it is logical that IFS in the future concentrates its support towards young scientists in poor countries which have yet to commit themselves to such investments.

Science is more than ever recognized to be a key input necessary for the long term improvement of human livelihoods in poor countries. The international community prescribes large investments in science-based development programmes in order to combat environmental degradation and poverty. If these countries are to be meaningful participants in the current scientific and development debates (for example about the potential role of biotechnology and genetically modified organisms to reduce hunger and create employment) they require a strong national science capacity. IFS maintains that there is no substitute for nationally based scientific communities and support to the young generation plays a key role.

IFS as a small organization, has made only a limited number of grants per year in any given developing country. But the impact of these grants has gone far beyond that. The relevance of IFS has been in its high quality of support, the high demand for its grants, and its ability to identify and support the next generation of distinguished scientists. The challenge for IFS now is to focus its support on scientifically vulnerable countries, and to continue to develop its services.

The IFS programme of support is being adapted accordingly. A Five Year Programme Framework (2006 – 2010) has been launched. The established IFS research grant provided on competitive grounds is being supplemented with a package of capacity enhancing activities as an additional support to grantees working under difficult circumstances. The package will add value to the grant, it is flexible and includes modules which are often lacking for these young scientists, such as mentorship, thematic workshops, methodology courses, scientific paper writing workshops, help to access scientific literature, and help to attend scientific meetings.

APPENDIX 1:

Background information

The origin of IFS

IFS arose in response to the perceived threat of the brain drain. In the relatively new science communities of Africa, Asia and Latin America, it was believed that the best young scientists were leaving their home countries to take up well-paid positions in well-equipped research institutions in the North. In essence, this was a case of yet another valuable national resource being appropriated by developed countries.

The scientists who started IFS in the 1970s believed that the brain drain of some of the best researchers from developing countries to developed countries could be reduced if opportunities were provided for promising young researchers to establish themselves in their home countries

During the late 1960s and early 1970s, there was no international organization with the sole purpose of identifying young scientists with the potential for excellence, in order to support them in their early careers. While Sida-SAREC, IDRC and other organizations supporting science recognized the value of such a program, it was difficult and costly for organizations that specialize in funding large programs to efficiently run a small grants programme for individuals.

A new kind of organization was needed to provide individualized support to young researchers to help them to become established in the international scientific community, while still based in a developing country.

The idea of IFS was discussed by scientists at Pugwash conferences in 1965 and 1969. Distinguished physicists Abdus Salam (1979 Nobel Laureate in Physics) and Robert Marshak, oceanographer Roger Revelle and astrophysicist Pierre Auger were among the leading scientists who kept the idea alive. When their ideas were discussed at a meeting of the UN Advisory Committee on Science and Technology, the project gained

momentum and Sven Brohult, President of the Royal Swedish Academy of Engineering Sciences, became its leading promoter. In 1970, a meeting of 50 scientists from 20 countries was held to formally discuss the nature of the organization, and in 1972 the Foundation was established as a non-governmental organization with a secretariat in Stockholm, Sweden. Initial financial support for IFS was provided by Sweden, Canada and France.

One of the first key decisions for IFS was to select the fields of science that would be supported. The chosen research fields focused on food production and forestry products. These fields are closely related to development problems and priorities, and were areas where research results could lead to improvements in food production and in the quality of rural life. These were also areas where small individual grants for young researchers made sense, something that was not true of other fields where research requires support on a larger scale. The initial six research areas agreed upon were aquaculture, animal production, vegetable production, mycorrhiza and afforestation, food fermentation and natural substances.

Today, IFS has extended its scientific areas and supports research projects dealing with the sustainable management of biological and water resources.

An IFS Grant

An IFS Research Grant has a maximum value of USD 12,000. It is awarded to an individual researcher for a specific research project. The IFS Research Grant is intended for the purchase of the basic tools needed to conduct the proposed research project - equipment, expendable supplies, and literature - and to arrange fieldwork activities related to the proposed project. The grant cannot be used to pay for the aspiring Grantee's own salary or for honoraria, or to cover tuition fees or living expenses. It is expected that the IFS Grantees already receive a salary and are employed by or otherwise attached to a developing country research institution.

The timeframe of a research project should normally be 1-3 years. After having completed an IFS supported research project, and submit-

ted a project report, Grantees may apply for renewal grants. In total, a researcher is eligible to receive three research grants from IFS.

IFS also provides other services to its grantees that complement the research grant. These may include scientific advice and counseling, travel grants to attend conferences and present papers, assistance in the procurement of scientific equipment, assistance in access to current scientific literature, etc.

IFS is affiliated with a range of national science councils, universities, and research institutes in both developed and developing countries, as well as development cooperation organisations and United Nations bodies. Among researchers in the North and the South, donors, and partners, IFS has a reputation for identifying promising researchers in developing countries early in their careers, and helping them to establish themselves in productive scientific careers. IFS continues to have a role in countries that have a fragile scientific infrastructure. Most of the countries where IFS is active have relatively young universities and short histories of investment in science. Nevertheless, these countries are often wealthy in the human and natural resources that are a potential foundation for national development.

APPENDIX 2:

The IFS Donors 1972 - 2005

| | |
|--|----------------|
| Consejo Nacional de Investigaciones Cientificas y Técnicas (CONICET) | Argentina |
| Fundación Antorchas | Argentina |
| Australian Centre for International Agricultural Research (ACIAR) | Australia |
| Australian International Development Assistance Bureau(AIDAB - now AusAID) | Australia |
| Ministère des Affaires Etrangères | Belgium |
| Flemish Interuniversity Council (VLIR) | Belgium |
| King Baudouin Foundation (Fondation Roi Baudouin) | Belgium |
| Nutrition Third World | Belgium |
| Secrétaire d'Etat à la Coopération au Développement | Belgium |
| Oswaldo Cruz Foundation | Brazil |
| International Development Research Centre (IDRC) | Canada |
| The Royal Society of Canada | Canada |
| Consejo Nacional para Investigaciones y Tecnológicas (CONICIT) | Costa Rica |
| Royal Danish Ministry of Foreign Affairs (DANIDA) | Denmark |
| European Commission of the European Union | European Union |
| Ministry for Foreign Affairs (FINNIDA) | Finland |
| Centre National de la Reserche Scientifique (CNRS) | France |
| Centre Technique de Coopération Agricole et Rurale | France |
| Institut de Recherche pour le Développement (IRD) | France |
| Institut Francais de Recherche pour l'Exploitation de la Mer (IFREMER) | France |
| Ministère des Affaires Etrangères (MAE) | France |
| Ministère de la Recherche | France |
| Stifterverband für die Deutsche Wissenschaft | Germany |
| Federal Ministry for Co-operation and Development | Germany |
| Deutsche Forschungsgemeinschaft (DFG) | Germany |
| Organisation of Islamic Conference Standing Committee on Scientific and Technological Cooperation (COMSTECH) | International |
| Organisation for the Prohibition of Chemical Weapons (OPCW) | International |
| World Bank | International |
| Islamic Education Scientific and Cultural Organization (ISESCO) | International |
| African Biosciences Network | International |

| | |
|--|----------------|
| Asian Fisheries Society | International |
| Inter-Islamic Network on Water Resources Development and Management (INWRDAM) | International |
| Technical Centre for Agriculture and Rural Cooperation (CTA) | International |
| Ministry of Foreign Affairs | Japan |
| Consejo Nacional de Ciencia y Tecnología (CONACYT) | Mexico |
| MacGillavry, Carolina | Netherlands |
| Ministry of Foreign Affairs (MINBUZA) | Netherlands |
| Royal Netherlands Academy of Arts and Sciences (KNAW) | Netherlands |
| Federal Ministry of Science and Technology | Nigeria |
| Ministry of Foreign Affairs | Norway |
| Norwegian Agency for Development Cooperation (NORAD) | Norway |
| Norwegian Academy of Science and Letters | Norway |
| Foundation for Strategic Environmental Research, (MISTRA) | Sweden |
| Stockholm Environment Institute (SEI) | Sweden |
| Sven och Dagmar Saléns Stiftelse | Sweden |
| Swedish International Development Cooperation Agency (Sida) | Sweden |
| Swiss National Research Council | Switzerland |
| Swiss National Science Foundation (SNSF) | Switzerland |
| Syngenta Foundation for Sustainable Agriculture (SFSA) | Switzerland |
| National Science Council | Taiwan |
| Overseas Development Administration (now DFID) | United Kingdom |
| CAB International | United Kingdom |
| Commonwealth Science Council | United Kingdom |
| Department for International Development (DFID) | United Kingdom |
| Food and Agriculture Organization of the United Nations (FAO) | United Nations |
| UN Development Programme (UNDP) | United Nations |
| UN Educational, Scientific and Cultural Organization (UNESCO) | United Nations |
| UN Environment Programme (UNEP) | United Nations |
| UN Fund for Science and Technology (UNFSTD) | United Nations |
| UN Office for Project Services (UNOPS) | United Nations |
| United Nations University (UNU) | United Nations |
| United States Agency for International Development (USAID) | USA |
| Agency for International Development (AID) | USA |
| National Academy of Sciences (NAS) | USA |
| Winrock International | USA |
| New England Biolabs Foundation | USA |
| The International START Secretariat | USA |

The IFS Mission

The need

Scientific research provides an important input for sustainable management of biological resources. Scientific knowledge is central for rural, urban, industrial, and policy development, which will lead to improvement of people's livelihoods.

The mission

IFS shall contribute towards strengthening the capacity of developing countries to conduct relevant and high quality research on the sustainable management of biological resources. This will 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

IFS shall identify, through a careful selection process, promising young scientists from developing countries with potential to become future lead scientists and science leaders. They will receive support in their early careers to pursue high quality research in developing countries on problems relevant to the mission, which will help them to become established and recognised nationally and internationally. Additional supporting services will be provided to researchers in scientifically weaker institutions and countries.

IFS shall act in collaboration with Affiliated Organisations and other national, regional, and international institutions, utilising the complementary strengths of such partnerships.

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
Stockholm: IFS, 2002. 104 pages.
- 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 J. Gaillard (ed.) S. Major
Stockholm: IFS, 2006. 28 pages.
(this document)



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