

Scientific Research Capacity in Cameroon

An Assessment of IFS Support

Jacques Gaillard
Eren Zink

in collaboration with:
Anna Furó Tullberg

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 3,500 researchers in Africa, Asia and the Pacific, and Latin America and the Caribbean have been awarded research grants by IFS.

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Layout: Eren Zink
Printing: AB Norrmalmstryckeriet, Sweden
Cover photos: Vincent Fondong (cassava leaf) and Tanja Lundén (city of Yaoundé))

ISSN 1651-9493
ISBN 91-85798-52-5

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October, 2003

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Preface

The International Foundation for Science (IFS) is an international NGO offering competitive research grants to promising young scientists in their early career. Developing country researchers are eligible to apply and IFS relies on a wide network of Scientific Advisers who assess the applications. Decisions on funding are made twice yearly and the value of the grant may be up to USD 12,000, the bulk of it being used to purchase scientific equipment and supplies. IFS signs a contract both with the grantee and the research institute or university department where the work is conducted. Thus, the grant benefits not only the individual grantee but also her/his institution.

Over the three decades during which IFS has functioned as an international research council, more than 5,000 grants have been awarded, of which one third have been allocated to researchers in Africa. Cameroonian scientists were among the first IFS grantees in Africa, and altogether 83 researchers have been awarded at least one research grant.

In order to measure the impact of IFS support for developing country scientists, a monitoring programme has been established at the IFS secretariat in Stockholm. This report is the fourth study investigating the research conditions of IFS grantees (previous studies dealt with Mexico, Tanzania and Sub-Saharan Africa in general).

This study was written by Deputy Director Jacques Gaillard and Scientific Programme Coordinator Eren Zink. The bulk of data is derived from a questionnaire to all grantees and information in the IFS' database, supplemented by interviews with a sample of them, as well as field visits to selected research institutions.

The findings of the report show that the scientific research landscape in Cameroon has eroded since the 1990's, but shows signs of recovery in recent years. Despite severe budget cuts over the past decade there exist a number of strong academic "islands" where quality science is produced. However, they are all dependent on funding from international sources.

The study shows that IFS grantees have done well academically and achieved important positions in the scientific community. The brain drain factor among former grantees is extremely low, only three are working in North America, while another four have moved to other African countries. This indicates that the IFS approach to support young scientists in their early career facilitates a scientific career in the home country.

The success rate of Cameroonian grantees is comparatively high, close to 30%, as compared to 20% among African grantees in general. The study analyses the reasons for the high success rate and concludes that there Cameroonian

scientists have intensive contacts with each other and subject their draft research proposals to internal peer review before sending the applications to IFS.

Women scientists are under represented among IFS grantees in Cameroon – they constitute only half the percentage of women scientists in the population of scientists in Cameroon. This indicates that IFS should further explore why women are not better represented. Do they have more fragile networks of support, are they poorly represented in IFS fields or, due to commitments to family and children that delay their research careers, are they too old to qualify for IFS support?

As IFS looks to expand its support to researchers in the least developed countries, women constitute a category whose participation in the IFS small grants programme could be significantly increased. In order to see such an increase, IFS will further investigate why women are poorly represented among applicants from some countries.

The study reports on how IFS is perceived among grantees in Cameroon. IFS received the most positive assessments for its core activity: the manner in which it administers its research grants. A majority of respondents graded the IFS as excellent in this regard and all respondents were at least satisfied. The IFS selection process, the service whereby IFS purchases and ships research equipment, monitoring and follow-up of research projects, and contact with the IFS staff also received high marks from grantees in Cameroon.

Stockholm, October 2003
Michael Ståhl
Director
International Foundation for Science

1. Introduction

The overall mission of the International Foundation for Science (IFS) is to support researchers from the developing world early in their careers to conduct research on the management, use, and conservation of biological resources. The core of IFS support is financial, and comes in the form of twice renewable research grants with maximum values of USD 12,000. The major budget items covered by grants are equipment, literature, fieldwork support and supplies. In some cases, salaries of research assistants and technical personnel can be covered. IFS provides opportunities for grantees to meet and interact with other scientists, and travel grants permit grantees to attend scientific meetings or to visit other research institutes or universities for training or collaboration. IFS organises its own workshops as well: to date close to 100 meetings related to the IFS Granting Programme have been held. IFS is also active in promoting and stimulating scientific networks at a regional and international level. Furthermore, IFS has an award scheme with a cash prize that recognises grantees for noteworthy achievements associated with research projects supported by IFS. All of these efforts are intended to enhance grantees' credibility as scientists and to enable them to become established and recognised in national and international scientific circles.

IFS has been an actively engaged with the Cameroonian science and technology community since 1977. The National Office for Scientific Research and Technology (ONAREST)¹ became an Affiliated Organisation of IFS in that year, and the year after the first two grants were awarded to Cameroonian scientists working at the National Agricultural Research Institute (today IRAD). One of them, Dr. Ayuk-Takem, a maize geneticist, is today director of IRAD after having served as Minister of Science and Technology in the early 1990s. Representatives from Cameroon regularly attend IFS Assemblies and workshops, and IFS staff frequently visit Cameroonian universities and research institutes.

During 1974-2002, IFS supported close to 3400 scientists in 99 developing countries, of which more than a third (1231) were in Africa and 84 in Cameroon. Of 40 recipient countries in Sub-Saharan Africa, Cameroon has the third largest number of IFS grantees and is preceded only by Nigeria and Kenya (Figure 1). Given the relative size of its national scientific community², this third position for Cameroon is to be expected.

Up to December 2002, IFS approved altogether 139 grants to 86 scientists in Cameroon. Two never started their research projects and their grants were consequently withdrawn. The total number of scientists supported by IFS in Cameroon up to the end of 2002 is therefore 84. Of these 84, six are deceased today.

The total value of research grants awarded to scientists in Cameroon (not including travel grants to attend scientific meetings and to visit research institutes abroad) equals approximately 1.4 million USD. In addition, IFS has organised eight workshops in Cameroon. Due to a particular char-

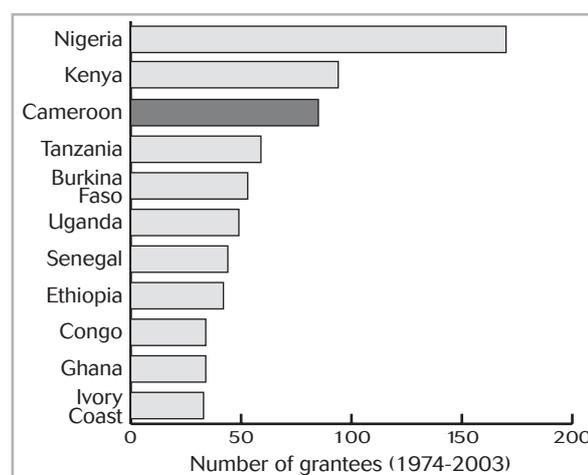


Figure 1
Top recipient countries in Sub-Saharan Africa (1974-2002)

acteristic, namely bilingualism, Cameroon is a very attractive country to organise regional meetings for French speaking and English speaking grantees in this part of the world. The first was held in 1979 in Buea on yams (*Dioscorea* spp.). Many scientists working on Yams in Western and Central Africa met in Buea for the first time thanks to IFS. More recently, IFS organised together with local and international partners the International Workshop on Purchasing, Servicing and Maintenance of Scientific Equipment in Western Africa in Buea in November 2002 and the Food Africa Conference in Yaoundé in May 2003. The list of all meetings organised by IFS in Cameroon is given in Box 1. At the beginning of 2003, 34 Cameroonian scientists continued to receive support from IFS.

1.1 Measuring the impact of IFS activities

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' academic and institutional career. A number of complementary approaches are used to achieve this aim including interviews and questionnaire surveys intended primarily for IFS grantees, bibliometric studies on scientific output of IFS grantees and national impact studies such as the present one for Cameroon. A conceptual framework and a standardised set of guidelines have been elaborated in order to allow international comparisons and to involve IFS staff and as many IFS Affiliated Organisations as possible (Gaillard, 2000).

The first MESIA questionnaire survey was designed for IFS grantees and beneficiaries of the INCO-DEV programme of the European Commission in Africa. The results of this survey, highlighting the conditions and the constraints for scientists in Africa today, have been analysed and published (Gaillard and Furó Tullberg, 2001). In addition, country case studies have also been conducted and completed for Mexico, Tanzania, and Cameroon (this report). The Mexican country case study was published in December, 2001 (Gaillard *et al*, 2001) and the Tanzanian country case study was published in October 2002 (Gaillard *et al*, 2002).

Box 1

Workshops organised by IFS in Cameroon

- 1978. Buea. Yams/Ignames.
- 1985. Douala. Development of Indigenous Fermented Foods and Food Technology in Africa.
- 1989. Bamenda. Small Ruminant Research.
- 1989. Garoua. Cereals of the Semi-arid Tropics.
- 1993. Yaoundé. *Comment rédiger une demande de financement de recherche.*
- 1994. Yaoundé. *Comment rédiger une demande de financement de recherche.*
- 1994. Yaoundé. Use, maintenance and repair of scientific equipment.
- 2002. Buea. International workshop on purchasing, servicing and maintenance of scientific equipments in western Africa.
- 2003. Yaoundé. Food Africa Conference (co-organised)

1.2. The components of the MESIA study in Cameroon

This study was initiated during a visit to Cameroon by IFS (Jacques Gaillard) in November 1999 during which interviews were conducted in Bamenda, Buea, Douala, Dschang, Ekona, Fombot, Limbe, Njombe and Yaoundé in a variety of institutions specialised mainly in the biological and agricultural sciences, and, to a lesser extent, nutrition and health. IFS grantees in Cameroon were also contacted in February-March 2003 to update available information on their whereabouts and careers. A follow-up final visit was also made by Jacques Gaillard in March 2003 to conduct additional interviews and update information on science and technology (S&T) activities in Cameroon. The present study covers the time period from 1974 until 2002, and includes the 84 grantees that participated in the IFS Programme during that time. While these grantees are working in some 8 research institutions throughout the country, two-third of them are found in the top two recipient institutions: the *Institut de Recherche Agricole pour*

Institution	City	No. of Grantees
Institut de Recherche Agricole pour le Développement (IRAD)	Nkolbisson/Yaoundé and 6 other cities	28
University of Yaoundé I	Yaoundé	27
University of Dschang	Dschang	16
University of Ngaoundéré	Ngaoundéré	6
University of Buea	Buea	3
Others		4
Total		84

le Développement (IRAD) and the University of Yaoundé I (see table 1).

The study comprises five main components: an overview of S&T in Cameroon, a retrospective analysis of IFS applications, applicants and grantees, a questionnaire survey addressed to the IFS grantees in Cameroon, a bibliometric study of their scientific production, and finally interviews of Cameroonian grantees. These five components are briefly presented below. The period under review for IFS applications, applicants and grantees is 1974-2002 and the period of reference for the questionnaire survey and the bibliometric study is 1974-1999.

1.2.1 Overview of science and technology activities in Cameroon

The main objective of the overview, presented in Chapter 2, is to describe the Cameroonian S&T environment. The topics covered include science development and policy, the institutional landscape, the conditions under which scientists work, the new initiatives and institutions, and IFS grantees' position in the Cameroonian S&T system. Organisations and individuals interested in working in Cameroon on strengthening science capacity will find it to be an informative and detailed introduction that can be read independently of the rest of the report

1.2.2 Analysis of applications, applicants and IFS grantees

A key component of the study, is the analysis of applicants' and grantees' success rates, and distri-

bution, and grantees' project duration, quality of submitted reports, and academic and institutional promotion.

1.2.3 Questionnaire survey

As part of the "Questionnaire survey of African scientists", questionnaires were sent to 59 Cameroonian scientists in Cameroon in March 2000. A reminder was sent in June 2000 to those who had not responded. 48 questionnaires (or 81% response rate) were completed and returned to IFS.

1.2.4 Bibliometric study on scientific production

A bibliometric study was also carried out to determine the effect of IFS support on the trends in the nature and volume of the scientific output of the IFS grantees. Of 66 grantees at the end of 1999, 49 sent publication lists containing a total of 972 publications (all document types). This 71% rate of response is consid1999.spectivseend IFS lted belontains theoutp1

impact of IFS support on the grantees' working environment and career.

1.3 The content of the report

The report is organized in 11 chapters including this introduction and the conclusion with cross references between the chapters. Although an effort has been made to organize the chapters in a logical order, they can be read separately and/or in a different order. Chapter 11 summarises the main findings of the study and lessons learned.

1.4 Acknowledgements

In the course of the fieldwork for this study, IFS benefited from the support of the *Institut de Recherche pour le Développement* (IRD) that provided a car and a driver that greatly facilitated journeys

within the country. Furthermore, Jacques Gaillard was seconded to the IFS Secretariat by IRD. IRD's support is gratefully acknowledged. Jean Nya-Ngatchou, Research Director Emeritus from Cameroon, assisted in gathering and updating statistics on S&T activities in Cameroon. Hocine Khelifaoui participated in a complementary study on Science in Cameroon at the dawn of the 21st century. The interviews he carried out with scientists in social, medical and basic sciences, although not directly relevant to the IFS grantees' work, were very useful to corroborate or invalidate some of our results. Henrik Hovmöller is the architect of the IFS database and provided some important data for this report. Brian Porter helped with the layout of the report. The backbone of this report comes from the Cameroonian grantees themselves. Without their answers to the questionnaire, and the many enlightening discussions during the interviews, this report could not have been written. Everybody's contribution is gratefully acknowledged.

Chapter Notes

¹ ONAREST has successfully been transformed in different bodies to become today the Ministry of Science and Technology (see Chapter 2).

² In a recent study (Gaillard, Waast and Hassan, 2002), it is estimated that the number of researchers (Full Time Equivalent) in Nigeria, Kenya and Cameroon were respectively 3,000, 1,000 and 800.

2. Science and technology in Cameroon: an overview

This chapter provides an overview of the development and current status of science and technology (S&T) in Cameroon. The topics covered include science policy, the institutional landscape, the conditions under which scientists work, the new initiatives and institutions, and IFS grantees' positions in the Cameroonian S&T system.

2.1. Building the national research system

Like in most African countries south of the Sahara, “modern science” was introduced in Cameroon during western colonisation. In the beginning, scientific research in Cameroon was carried out by explorers, Christian missionaries, colonial administrators, officers of the German and French armies, as well as isolated researchers and academics. These researchers conducted their investigations in areas as diverse as botany, zoology, archaeology, history, sociology, human and physical geography, geology, etc. In 1960, when the Cameroonian State became independent, it inherited an appreciable research infrastructure established during the colonial times, but the number of trained Cameroonian researchers was very small¹.

Collaboration between Cameroon and France prevented the interruption of research activities during the transition from colonial possession to independent state. The running costs of the institutes were taken over by the Cameroonian authorities, but the salaries of the researchers, who were mostly French scientists, were provided by France. This enabled the emerging Cameroonian State, in the beginning, to concentrate its resources on higher education and training. Research remained essentially agricultural, and focused on plant breeding, crop protection and the improvement of agricultural systems. Research interest in subsistence crops was just starting. These had been neglected before, all attention having been turned towards cash crops for export.

2.1.1. From higher education to research

Research was considered a priority in the first years of independence, but the first national investments were actually made in the sector of higher education. Many schools and universities were founded before any new research institute was created. Thus, the first institute created by the new state, in 1960, was the *Ecole Nationale Supérieure d'Agronomie* (ENSA). Created with American aid funds, this institute was later transferred to Dschang in 1977 to become part of the newly founded University Centre. It was also within this University Centre that the National Institute for Rural Development (*Institut National de Développement Rural*, INADER) was created in 1988. The ENSA later became the Faculty of Agronomy and Agricultural Sciences (*Faculté d'Agronomie et des Sciences Agricoles*, FASA). The University of Yaoundé was founded in 1961, followed by the University Centres of Douala, Ngaoundere and Dschang.

In 1962 the Council for Scientific Research was founded and instructed to report directly to the President of the Republic. In spite of the creation of this council, no real change in research policy occurred during the first ten years of independence from 1960 to 1970. Based on Franco-Cameroonian agreements, research remained under French leadership and was conducted within the French institutes established in Cameroon. This leadership was reinforced following the Franco-Cameroonian co-operation agreements of 1963 on scientific research and technology. The 1960s were thus mainly years of expansion of higher education and training. It was not until the 1970s that the first public research institutes were created (see Box 2).

At the national level, the institutionalization process (see Box 3) led to the creation of the National Council for Scientific Research and Technology (ONAREST). This institution, placed under the Ministry for Regional Development, became operational in 1974. The creation of ONAREST was also

Box 2

Creation of the first Cameroonian research institutes

1972: creation of the National Agricultural Research Institute (Centre National de Recherche Agronomique) at Ekona in the South-western province.

1974: creation of the Institute for Medical Research and Medicinal Plants (Institut de Recherches Médicales et d'Etudes des Plantes Médicinales) in Yaoundé.

1974: creation of the National Centre for Agricultural Machinery (Centre National d'Etudes et d'Expérimentation du Machinisme Agricole), by the Ministry of Agriculture.

1983: creation of the National Veterinary Laboratory, by the Ministry for Animal Production.

accompanied by the foundation of nine research institutes.

2.1.2. ONAREST: 1974 - 1978

With the establishment of ONAREST in 1974, Cameroon acquired a research management coordinating body as well as a central instrument for unified management. The latter was required by decree of the newly established Unified Republic of Cameroon, the creation of which put an end to the federal regime in 1972. In view of the federal constitution of Cameroon, which at the time of independence consisted of the French-speaking eastern Cameroon and the English-speaking western Cameroon, it also made sense that research be placed under federal authority.

The mission of the ONAREST was to co-ordinate scientific research throughout the whole territory, and to act as adviser to the government on scientific issues. This unified central management compensated for the nearly autol4Emouswas18(e in Chich a

Box 3

The science policy institutionalisation process and the creation of ONAREST

1965-1974: creation of the National Office for Scientific Research and Technology (Office National de la Recherche Scientifique et Technique, ONAREST). ONAREST became fully operational in 1974.

1969: creation of a Department of Human Resources and of Scientific Research within the Ministry for Planning and Regional Development.

1971: The Department for Human Development and Scientific Research becomes the Permanent Secretariat for Science and Technology.

1974: creation of the Council for Higher Education, Science and Technology. The task of this body was to advise the government on higher education and scientific research policy issues.

challenge was inherent to the organization of research itself within the ONAREST. Running the nine research institutes proved much more costly than anticipated and their administration much more complex.

In order to improve the capacity of ONAREST to respond to these challenges, the government reorganized the ONAREST in March 1976. Among the changes was the reduction of number of research institutions from nine to five, as well as the size of their respective missions (Box 4).

2.1.3. From the DGRST to the Ministry of Science and Technology

In 1979 the ONAREST was transformed into a “General Authority of Science and Technology”, *Délégation Générale à la Recherche Scientifique et Technique* (DGRST), which answered directly to the Prime Minister. This change reflected a considerable gain in political status for scientific research, which was soon after to be given its own Ministry.

The DGRST was responsible for the management of research in Cameroon until 1984, when it was integrated into the higher education sector: the reorganization of the government in February 1984 led to the creation of the Ministry of Higher Education and Scientific Research, which took over the entire responsibilities of the DGRST in matters of research². Two years later, in 1986, this department also integrated the computer technology services and changed its name to Ministry of Higher Education, Computing and Scientific Research³. After being under the same Ministry for a relatively long period of time (from 1984 to 1992), research and higher education were separated again. In 1992, the Ministry of Higher Education, Computing and Scientific Research was split into two: the Ministry of Higher Education, and the Ministry of Science and Technology, the latter entrusted to Dr. Ayuk Takem, at the time Director of the Institute for Agricultural Research, *Institut de Recherche Agricole* (IRA) and also former IFS grantee.

Researchers and academics alike find difficulties in coming to terms with the separation between research and higher education. For the researchers of the research institutes, this separation makes graduate training more difficult to access, as well as the participation in doctoral work and the supervision of PhD students. In more general terms, it makes scientific co-operation with their colleagues

Box 4

The reorganisation of ONAREST in five research institutes

The Institute for Agricultural and Forestry Research, *Institut de Recherche Agricole et Forestière* (IRAF), based in Ekona, took over the activities of the ICP and the ICVT.

The Institute of Zootechnical Research, *Institut de Recherche Zootechnique* (IRZ), which continued to be based in Ngaoundere, replaced the IZPV.

The Institute of Medical Research and Medicinal Plants, *Institut de Recherche Médicale et d'Etudes des Plantes Médicinales* (IMPM).

The Institute for Research in Technology, Industry and the Subsoil, *Institut de Recherches sur les Techniques, l'Industrie et le Sous-sol* (IRTISS), integrated the activities of the IRT and the IHGM.

The Institute of Human Sciences, *Institut des Sciences Humaines* (ISH), replaced the INE.

more complicated. Any collaboration undertaken with the university is nowadays the sole result of informal contacts that researchers and academics form outside of the institutions. Many of the interviewed researchers qualify the relationship between universities and research institutes in terms of “conflicting solidarity”: “solidarity”, because research had no personnel of its own upon decolonization, and the State gave the university the task of training scientists that could later run it, “conflicting”, because the leaders trained at the university continue to be evaluated according to a system that does not take into account the time spent on research activities.

2.2. Human resources and budgets

2.2.1. Rise and fall of State research

Research in Cameroon received considerable State support until the middle of the 1980s. In 1974, the government established a funding system for scientific research and technology when the ONAREST was created. At that time, Cameroon was among the African countries having invested most in research. The early 1980s were prosperous years in research; according to researchers interviewed,

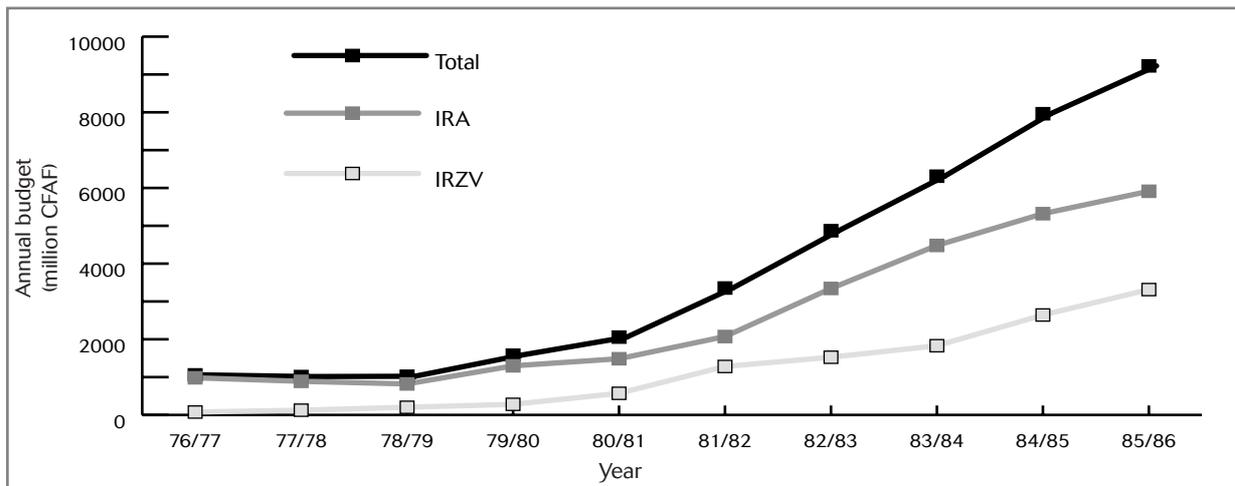


Figure 2
Budget of IRA and IRZV in millions FCFA (1976-1986)

funding available to researchers in Cameroon was comparable to French levels at that time.

The high funding levels were to a large extent due to revenues from petroleum, but there was also a genuine political will to train and have access to a scientific elite. It was during this period that the large majority of the Cameroonian scientific community was formed. Large investments in research were made by the government. These efforts are apparent in the funding levels given before the approaching crisis to institutes such as the IRA and the *Institut de Recherches Zootechniques et Vétérinaires* (IRZV) (Figure 2).

Within a ten year period, the total budget for the two institutes rose from slightly more than one billion CFA franc (CFAf) in 1976/1977 to 9.2 billion in 1985/1986. In addition to government subsidies, income from sales of the institutes' own animal and crop production should be added on, as well as income from laboratory analyses undertaken. During this period, research was carried out within programmes included in the five-year plans for development. Until 1985, each researcher worked within programmes defined beforehand by his or her research institute. The leadership of the institutes decided which research subjects the researchers should deal with. The means provided to carry out the research depended on the objectives set, and it was simply asked of the researcher to ensure that the plan was fulfilled.

Some researchers remember this prosperous period by certain outward signs noticeable by all: "at one time, the vehicles of the DGRST were so numerous in the capital that even children recognized

them". Others remember that some made good use of the advantages offered by the system without necessarily contributing to the advancement of science in return: "many researchers participated in programmes without publishing anything; they just collected their travel claims related to a given programme".

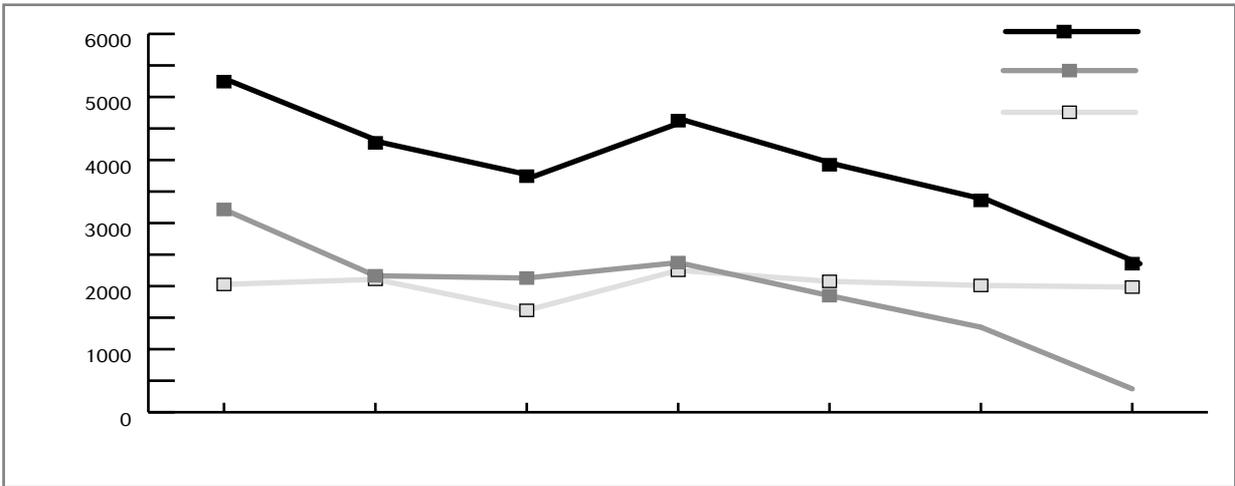
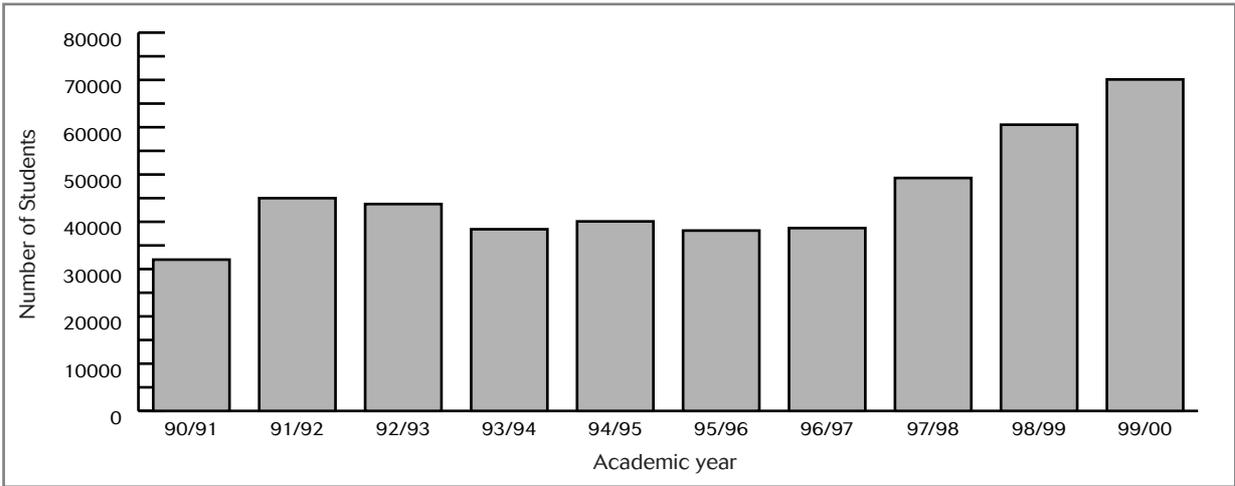
This period was also that of the development and subsequent establishment of the status of researcher⁴. The decree on the status of researchers, signed in July 1980, marked a significant step in the evolution of research in Cameroon. The new status of researcher proved extremely popular with the active researchers as well as with young graduates aspiring to a research career. Thanks to this status, research attracted a large number of candidates. In 1980-1981, 54 researchers were recruited, and 44 in 1981-1982. During those two years, around 30 researchers benefited from grants for specialization abroad. In 1982, Cameroon had 196 national researchers.

The remarkable increase in the number of national researchers during the 1980s (see Box 5) is partly explained by the establishment of the special status of researcher, which attracted even PhDs active in different ministerial departments to research. The status of researcher, decreed in a national context characterized by a small number of researchers and a poor understanding of the mission of researcher by the general public (for example his or her place in the civil service), had the advantage of clearly defining that a researcher is a professional devoting all his time to activities of scientific research. Furthermore, the status developed a sense of community spirit among the researchers above and across

Box 5

The changing research community in Cameroon,
1965-1987

The changes within the research community in



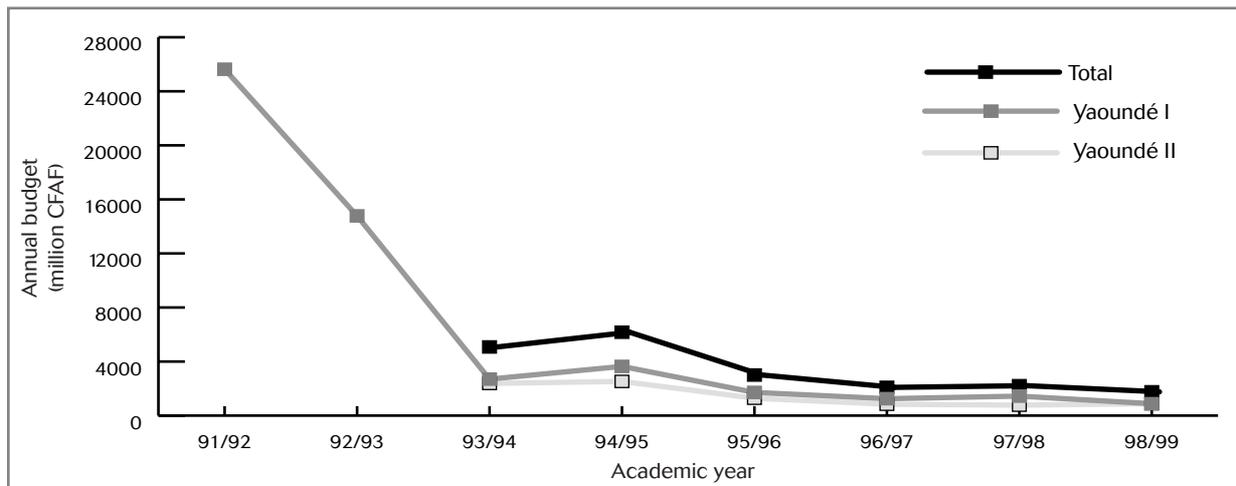


Figure 5
Budgets of the universities of Yaoundé I and II (1991 to 1999)

financial constraints of the institutes also meant that many researchers resigned from their positions. For example, the researchers within the IRAD numbered 248 in 1992, but only 198 in 2003. The result is that the researchers of the institutes have become progressively older, and very few of the research officers at the IRAD are today below 40 years of age (see Box 6 for a more detailed look at IRAD and the Faculty of Science at the University of Yaoundé I).

During the economic crisis, political tensions also appeared in Cameroon that imposed further challenges and risks for researchers. A significant outcome of the political situation was the dissolution of the institute of Human Sciences with its four research centres: the centre for anthropological research, the centre for geographical research, the centre for research in demographics and the centre

for research in economics and social sciences. Only cartography survived to become the future National Institute of Cartography.

Despite the 5% GDP growth of the last few years, this upswing has not had repercussions for research budgets. While this may indicate that research is no longer considered an important priority by the authorities when it comes to budget allocation, it may also be explained by the fact that the accumulated national debt continues to handicap public finances greatly, limiting investment capacities to a large extent.

In short, the financial crisis has resulted in a continual shrinkage of the State subsidies to the research institutes, causing:

- The indefinite postponement of most research projects funded nationally.
- The progressive depletion of the plant and animal gene pool.
- The lack of work for researchers and technicians, whose salaries have, furthermore, not been paid for several months.
- The many unpaid bills for equipment and consumables.
- The worsening of scientific and technical potential, in particular of the infrastructure, which can no longer be adequately maintained.
- The lack of running water and electricity in certain centres and research stations.

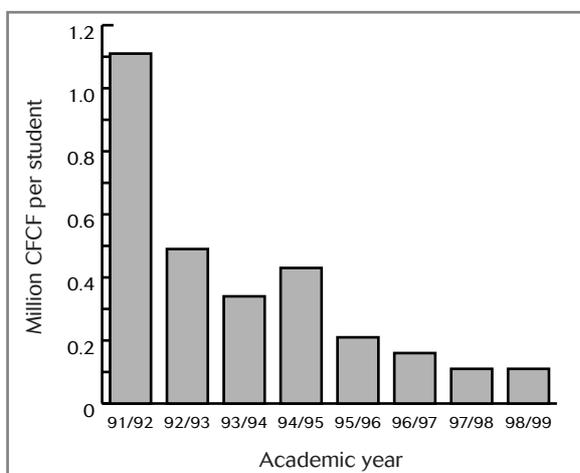


Figure 6
Mean budget per student in the public universities in Cameroon in millions CFAF

Box 6

The shrinking of a highly qualified research community: examples

As would be the case for most African countries, it proved to be problematic to access accurate and up-to-date statistics on the number, age and qualifications of the overall scientific community in Cameroon. However, through the active collaboration of former IFS grantees, we were able to get information on the age and highest degree of scientists at the Faculty of Sciences of the University of Yaoundé I and at the Agricultural Research Institute for Development (IRAD). Altogether, they amount to some 400 scientists and are representative of the two main institutional populations of scientists in Cameroon: higher education system and research institutes.

Information gathered indicates clearly that the scientists in Cameroon (particularly at the university) are highly trained. Nearly all researchers (96%) at the Faculty of Sciences of the University of Yaoundé have a PhD (or equivalent) or a Doctorat d'Etat¹ (see Table A). It should however be noted here that the University of Yaoundé is the oldest university in Cameroon and it is likely that the scientific staff of the more recently established universities may be slightly younger and have slightly less academic training. Meanwhile, about one-third of the scientists at IRAD have a PhD (or equivalent).

Highest degree	University of Yaoundé I		IRAD		% of all researchers
	No. of researchers	Percentage of researchers	No. of researchers	Percentage of researchers	
BSc/Engineer	0	0 %	38	18.5%	9%
MSc	2	1%	77	38%	18%
DEA/DESS	8	3%	18	9%	6%
PhD	178	76%	69	34%	56%
Doctorat d'Etat	48	20%	1	0.5%	11%
Total	232		198		

Table A

Highest degrees held by researchers at IRAD and University of Yaoundé I (Faculty of Sciences only)

The scientists at IRAD obtained their highest degrees in 14 different countries: Cameroon, France, United States and United Kingdom being the most common (see Table B). Except for the neighbouring Nigeria where 16 scientists from IRAD got their highest degrees, very few such degrees were awarded in other African countries.

¹ The Doctorat d'Etat is an inheritance from the French system. Although it has been abolished in France, it is still currently in force in Cameroon and in many French speaking African countries. It is the highest university degree delivered often 10-15 years after the Doctorat in recognition of an outstanding academic work and career.

The crisis and tensions outlined above have both eroded the importance of the profession of researcher in Cameroon and created a extremely challenging environment in which Cameroonian researchers have demonstrated an extraordinary capacity for survival and innovation of new initiatives.

2.2.3 Turning towards external funding

Prior to 1987, the state financed between 85% and 95% of research activities (including salaries). However, during the period 1987-1993, the percentage of foreign funding rose to as much as 39%. The largest funding contributions came from the World Bank (mainly in the form of loans), the *Fonds d'Aide à la Coopération* (FAC), the *Caisse*

Centrale de Coopération Economique (CCCE), the British Overseas Development Administration (ODA, today DFID), the European Union and the German GTZ.

The crisis began to establish itself in 1987, then, as shown by the above curves, worsen and widen in the beginning of the 1990s. This period was described by the researchers interviewed as a "descent into Hell". The crisis put a violent brake on research. In most research sectors, shortages became the rule, and not a single programme could be carried out without external funds. These funds were targeted to national programmes (this is the case of the *Coopération Française*, the World Bank, the Overseas Development Administration, the German Agency for Technical Co-operation, and the USAID⁷), the strengthening of research teams

Box 6
(continued)

Country	Number of degrees	Country	Number of degrees
Cameroon	46	South Africa	2
France	35	Ghana	2
United States	29	Former Soviet Union	2
United Kingdom	27	Canada	1
Nigeria	16	Ivory Coast	1
The Netherlands	9	Denmark	1
Belgium	9	Unknown	18

Table B
Countries in which IRAD scientists obtained their highest degrees

Given the scarcity of recruitment (particularly at IRAD) during the last 10 years, few of them are 40 years or below 40 years (see Table C). The youngest scientists were respectively 31 and 33 at the Faculty of Sciences and at IRAD at the beginning of 2003. The most important age group is between 40 and 49: respectively 50% and 74% at the Faculty of Sciences and at IRAD. It is high time for the conditions for their renewal to be created. We will come back to this issue in the last section of this chapter.

Age	University of Yaoundé I		IRAD		Total
	No. of Researchers	Percentage of researchers	No. of researchers	Percentage of researchers	
Less than 30	0	0 %	0	0%	0%
30-39	46	20%	16	8%	14%
40-49	116	50%	146	74%	61%
50-59	57	25%	36	18%	22%
60-65	13	5%	0	0%	3%
Total	232		198		

Table C
Age of scientists at IRAD and University of Yaoundé I (Faculty of sciences only)

(this is the case for *AIRE-Développement* and the INCO-DEV programme of the European Union), or to support individual researchers (this is the case of French *Institut de Recherche pour le Développement* and the International Foundation for Science). The programmes supporting research teams and individuals have enabled many Cameroonian researchers to continue pursuing their research activities.

Furthermore, given the importance of the agricultural sector to the national economy and the leading role that research should play in the development of this sector, in the early 1990s the government decided, with the support of several donors including the World Bank, to draw up a proposal for reforming agricultural research in depth. The conclusions of this proposal led to the fusion of the Institute of Agricultural Research (*Institut de Recherche Agricole*, IRA) and of the Institute of Zootechnical and Veterinary Research (*Institut de Recherches Zootechniques et Vétérinaires*, IRZV). The fusion of

the institutes aimed to simplify administrative procedures and reduce the number of administrators and operational structures, as well as to decentralize the research programme in order to better take into account the needs of the users in the different agro-ecological zones of the country. It is expected that decentralisation will ultimately lead to a wider implementation of research results.

2.3. Tensions, initiatives and changes in the profession

The economic crisis not only caused a considerable drop in public spending on research institutes and universities, it also meant that the salaries of the researchers became so low that they had to come up with strategies for survival depending, to a large extent, on consultancies for international organisations, non-governmental organizations (NGOs) and private businesses.

2.3.1. Devaluation of the salaries and strategies for survival

Prior to 1993, researchers and University lecturers in Cameroon were paid competitive salaries as compared to those in other African countries, enabling them to enjoy a relatively high standard of living. However, in 1993 the economic crisis caught-up with researchers' salaries resulting in a 66% reduction. This drop in salaries was followed a few months later by a devaluation of 50% of the CFAf compared to the French currency.

Within a year, the purchasing power of Cameroonian researchers had fallen catastrophically. A research officer earning 250 000 CFAf, about 380 Euros per month, in the beginning of the 1990s saw his purchasing power drop to around 125 Euros per month. On the upper side of the salary scale, a research director earning 500 000 CFAf in 1990, around 760 Euros per month, got the equivalent of 250 Euros per month in 1993. While by 2000 salaries have risen by 10 to 15%, they are not sufficient for the researchers and their families to live on. Table 2 presents the official salaries of the researchers⁸ during three successive periods: in 1992, before the drop in the salaries of civil servants occurring in 1993; in 1993, after the drop; and in July 2000, after the decree of the Head of State, signed on the 27th of July 2000, increasing the salaries of civil servants⁹.

The drastic drop in salaries was a key event in the narrative of each interviewed IFS grantee (sometimes referred to as the "descent into Hell"). A common complaint was that "to be able to

conduct his profession in a proper fashion, the researcher needs a salary that enables him to provide for his family; we get a salary, but it does not cover elementary needs any more". The references to the pitiful salaries can be found pinned to office walls: "and the Lord saw our work, and it pleased him well. He asked to see our salaries, and he turned back and started to cry".

One result of the low salaries is that many have left research, and the ones that have stayed are often not very motivated. Those who have left generally remain in Cameroon. However, they prefer to look for employment in other sectors of national activity that offer better pay, as witnessed by a geographer of the National Institute of Cartography: "three of our geographers trained at the Institute have left it for the land registry, the mission for rural and urban network development (*Mission d'Aménagement et d'Équipement des Réseaux Urbains et Ruraux*) or the private sector as topographer, expert geometrician, in geodesy". Many keep their position, ensuring a minimum service: "the teachers keep their position at the University, but they are only keeping up appearances. They provide for their families by taking on any better paid job elsewhere". The University can do nothing about this; the only thing it can do is to draw the attention of the authorities to the salary conditions of the academics and to ask for their improvement so that they can concentrate on their work.

The strategies for survival vary with the generations, the family situation and the disciplines. Many young researchers, newly married and with children, cannot afford the rent of a town flat and

Grade	Echelon	Indice	Monthly salary before taxes		
			1992	1993	July 2000
Attaché de Recherche	1	465	240 667	123 798	138 975
	2	530	269 936	132 362	149 050
Chargé de Recherche	1	605	302 723	142 243	160 675
	2	665	322 010	150 148	169 975
	3	715	341 296	156 736	177 725
Maître de Recherche	1	715	341 296	156 736	177 725
	2	785	368 296	165 959	188 575
	3	870	401 084	177 157	201 750
	4	940	428 085	186 380	212 600
	5	1 005	453 156	194 943	222 875
	6	1 050	470 514	200 872	229 650
Directeur de Recherche	1	1 050	470 514	200 872	229 650
	2	1 115	495 587	209 436	239 725
	3	1 140	505 230	212 730	243 600

Table 2
Researcher salaries (in CFA francs)

The absence of national funds to support research for the public good is further complicated by the rise of consultancy work at the bequest of foreign institutions and organisations. According to some, researchers have become mercenaries at the mercy of donors. As a result, the Ministry of Scientific Research and Technology speaks of the necessity for the Cameroonians to repossess research. The following quote adequately summarizes the feeling of having had one's own free will taken away, a feeling shared by many researchers and people in charge of research in Cameroon: "We have become workers on our own building site, the workers of the donors, of the French, but also of others, that are becoming more and more numerous. We hand over data to them, and they do with it as they please. The countries in Africa have become objects of research, not subjects; on top of all that, we do not even profit from it. They fund the research projects according to their own interests. We want a partnership which will enable us to draw something from it for our own needs".

Another researcher of English descent living in Cameroon since 1970 confirms the above of JT*8(eo2yuh confi)]of

Box 7

The University Research Grant Scheme, *Le Fonds Universitaire d'Appui à la Recherche (FUAR)*

For the first time in the history of the University in Cameroon, a competitive national research fund was launched during the academic year 1998/99 at the University of Yaoundé I. This fund, named *Le Fonds Universitaire d'Appui à la Recherche (FUAR)*, has several objectives:

- The re-structuring of the existing endogenous academic expertise.
- The development of synergistic forces between different research teams, with an emphasis on multidisciplinary.
- The strengthening of the science laboratories at the University around concerted research issues.

After close consultation with the Ministry of Scientific Research and Technology, the FUAR focused on five branches:

- Promotion of the cultural heritage, languages and development.
- Education and training.
- Bioscience and biotechnology.
- Low-cost technologies for water supply
- The environment and forests.

The research projects have been selected taking into account the following criteria:

- Scientific quality of the laboratory or the research team as judged by their previous publications in the concerned field (30%).
- Scientific quality of the research project – methodology, novelty, information (documentation) (30%).
- Relevance and impact of the project on national development (30%).
- Feasibility of the project taking into account the available resources (personnel, equipment, funding) and of its duration, two years (10%).

Of a total amount of 90 million CFAf, the budget of the FUAR was to be provided by the Ministry of Higher Education (30 million CFAf), the Ministry of Scientific Research and Technology (30 million CFAf) and the rectorate of the University of Yaoundé I (30 million CFAf).

On the 18th of June 2000, Professor Jean Tabi Manga, the new Rector, signed the agreement to allocate the subsidies to 29 category A projects (of high priority) and 22 category B projects (of average priority). However, high hopes for this new programme are tempered by reports that as of early 2003 only the first half of the granted amount had been disbursed. Furthermore, some scientists in Cameroon worry that the selection process has not achieved a satisfactory level of transparency.

2.4.2. *The creation of new autonomous research centres in partnership*

In the institutional landscape of Cameroon of the end of the 1990s, the *Centre Régional Bananiers et Plantains (CRBP)* in Njombe hosting several IFS grantees stands out as a privileged structure. With its well equipped laboratories housed in newly constructed and well maintained buildings in front of which new cars are parked, it contrasts with the centres of the IRAD. It is also provided with a scientific library of good quality, adequate budgets for field work, and good quality lodging for its researchers.

Founded in 1989 in the context of the economic crisis, the CRBP was conceived as a centre of excellence in research and training on the subject of the plantain and other banana varieties. It was also meant to be an adequate host to agricultural research in partnership. According to its foundation agreements, this centre is to be administratively and financially autonomous and headed by a directorate composed of a head of administration, an executive of the French Ministry of Cooperation, of a science co-ordinator, a CIRAD researcher, and of a centre director, a researcher from the IRAD. The Cameroonian State finances the centre with the participation of several donors such as the

European Union, the World Bank and the French Ministry of Cooperation. The CRBP has until now (2003) worked in a satisfactory way for all parties.

The IRAD station at Garoua, also supported by France, was created on the same model. Later, in 1995/96, the research programmes in different branches of agro-industrial production (coffee, cocoa, rubber, oil palm) as well as fruits and vegetables were re-organized and benefited from funding by the French Ministry of Cooperation (today merged into the Ministry of Foreign Affairs), as well as the financial support of the producers. The continuous cuts in State subsidies, in particular from 1986 to 1995, led to the establishment of these projects whose institutional organization is built on the model of the CRBP and the Garoua project.

2.5 Encouraging steps

In February of 2003 the newly appointed Minister of Higher Education, Professor Maurice Tchente, oversaw the “*Journées Universitaires pour la Science et la Technologie*” (JUST). The initial goal of JUST, to map the state of affairs of S&T activities in the universities, became more ambitious when the Ministry of Science & Technology and the private sector became engaged and contributed to a needed dialogue on science, society and development in Cameroon. The event was deemed a success and the high level of participation of Cameroonian entrepreneurs may lead to stronger partnerships between universities and enterprises in Cameroon. JUST was also partly responsible for the creation of

specific funds to support research at each university in Cameroon. At the same time, the research fund of the Ministry of Higher Education was increased from 150 million CFAf in 2002 to 300 million CFAf in 2003.

Whereas through the process of deprofessionalisation described in the preceding pages the pool of active people in science at universities and research institutes has significantly decreased over the course of a decade, there are now promising signs emerging from Cameroon. Late in 2002 and in early 2003 the Ministry of Science and Technology launched an unprecedented recruitment campaign. Altogether, 278 young researchers being, all less than 35 years old, were recruited. Most of the new recruits are between 25 and 30 years old and have a MSc or a DEA. Only a few have a PhD. The lion share of them went to IRAD which is by far the biggest research institute and to a lesser extent to the Institut de Recherches Médicales et d'Etudes des Plantes Médicinales (IMPM). The situation of these new recruits is still fragile however, and some six months after their recruitment they were still waiting to get their salaries.

The situation in Cameroon within the S&T community in 2003 was one of hope, with young researchers beginning to enter the system, and a strong nodes of highly qualified senior researchers in key centres and departments. However, the rejuvenation of the Cameroonian S&T infrastructure during the coming years will clearly depend on the continued attentions of the both the government of Cameroon and cooperation with national and international partners and donors.

Chapter Notes

- ¹ For a more detailed account of the birth of science and research institutions in Cameroon, refer to Gaillard and Khelifaoui (2001).
- ² Dr G. BOL ALIMA was appointed head of this ministerial department and was replaced in 1985 by M.D. ABOUEM A TCHOYI.
- ³ Abdoulaye BABALE was appointed head of this Ministry.
- ⁴ Decree no. 80/275 of the 18th of July, on the status of researcher.
- ⁵ It should be mentioned that a new researcher status is being discussed. Elements aiming at a closer resemblance with the existing status of university teacher (like for example the age of retirement) are reported to be part of it.
- ⁶ Or 400 for 100 000 people, around one-third ratio the countries of Northern Africa (Morocco: 1 132; Algeria: 1 236; and Tunisia: 1 253), one-sixth the European average and one-tenth that of France. This rate however puts Cameroon in a slightly above average position compared to the countries in Sub-Saharan Africa, in front of Senegal (237) and behind Côte d'Ivoire (413), Botswana (546), Namibia (738) and South Africa (1 524) (World Bank, 2000).
- ⁷

3. Applicants and grantees in Cameroon

Researchers in Cameroon have submitted applications to IFS and been awarded research grants since 1976. In this chapter the process of applying for IFS funding is briefly reviewed, followed by a description of the applicants and grantees in Cameroon and a brief review of their distribution among institutions and research areas. Also described are the success rates of applicants.

3.1 The application process

Applications for IFS support are accepted year-round, and funding decisions are made twice annually. The primary type of support provided by IFS is a research grant – in the maximum amount of USD 12,000 – which can be awarded to a researcher up to three times. After an initial pre-screening at the Secretariat, applications for IFS support are submitted to a group of Scientific Advisers who have an expertise in the applicant's field. The Scientific Advisers send their evaluation of the application to a Scientific Advisory Committee consisting of between four and eight senior researchers, where a recommendation is made to IFS regarding the application. Regardless of the decision, the comments and constructive criticisms of the Scientific Advisers are compiled and forwarded to the applicant. Unsuccessful applicants are encouraged to review the comments of the Scientific Advisers and to submit an improved application.

3.2 Applications and success rates

During the period 1993-2002, IFS received 120 applications¹ for a first grant from scientists in Cameroon. Of these, 44 research proposals were approved, giving a 36.6% success rate. This is a high rate of success. In comparison, the success rate of researchers in Cameroon during the 1990s was more than two times higher than that for Africa (15%) and Asia (17%), and higher than that for Latin America (30%).

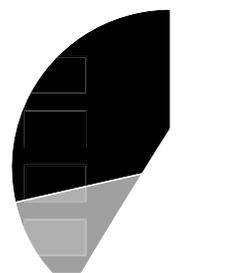
The high success rate is to be related to the quality of training of Cameroonian researchers. Many of the Cameroonian scientists did their graduate and postgraduate studies at the University of Yaoundé (cf. Chapter 4), the quality of which is praised both in Cameroon and outside Cameroon. Furthermore, a research grant application submitted by a scientist in Cameroon is rarely sent to IFS directly. It is first peer-reviewed in Cameroon by colleagues who are most often former IFS grantees. This practise was explained during interviews and seems to be the rule among organic chemists and food scientists, groups that have been particularly successful. Fifty percent and 47% of the applications submitted by Cameroonian scientists and reviewed within the IFS research area of Food Science and Natural Product Chemistry have been approved (see below).

On average, IFS receives some 10 applications from researchers in Cameroon each year, and awards between 3 to 6 grants (see Table 3). The lowest number of applications received during the period under review in Table 3 (1993-2002) was seven, and 2000 stands out as a year with many applications. Years with many applications can often be linked to particular recruitment efforts in Cameroon. The 19 applications received in 2000, for

Year	1st Applications	1st Grants awarded
1993	7	3
1994	10	6
1995	13	4
1996	14	6
1997	13	4
1998	9	3
1999	14	3
2000	19	4
2001	7	6
2002	14	5
Total	120	44

Table 3

Number of applications and first grants by year (1993-2002)²



Research Area	Applications	Grants	Success rate (%)
Food Science	6	3	50
Natural Products	17	8	47
Animal Production	6	2	33
Crop Science	10	3	30
Forestry/ Agroforestry	5	1	20
Aquatic Resources	5	0	0
Total	49	17	35

Institution	Applications	Grants	Success rate (%)
Univ. of Dschang	6	3	50
IRAD	6	3	50
Univ. of Ngaoundéré	11	5	45
Univ. of Yaoundé I	14	6	43
Univ. of Buea	3	0	0
Others	9	0	0
Total	49	17	35

the population of scientists in Cameroon, indicating that IFS should further explore why women are not better represented. For example: do women researchers in Cameroon have more fragile networks of support; are they poorly represented in IFS fields or; due commitments to family and children that delay their research careers, are they too old to qualify for IFS support?

Success rates in Cameroon are comparatively very high. They are even higher in the universities and research institutes having a critical mass of scientists, several decades of tradition of research and dynamic and structured research teams, the leader of which being often a former IFS grantee. Conversely, success rates are poor or very poor when applications are submitted from very isolated institutions having a limited number of scientists

and no research tradition. The particularly high success rate in Cameroon can in part be explained by the peer-review of applications organised by colleagues who are most often former IFS grantees. This practise should advantageously be promoted and transferred to other countries in Africa.

IFS received a fairly constant number of applications per year from scientists in Cameroon during the 1990s, and there has been rather little fluctuation in the annual number of grants awarded to scientists in Cameroon. Increased numbers of applications, such as during the year 2000, can be attributed to increased IFS activity and visibility in Cameroon. A further increase in applications from Cameroon may be obtained if IFS can target the newly recruited cadre of researchers described in Chapter 2.

Chapter Notes

¹ This figure does not include applications for renewal grants by researchers that had completed their first or second IFS research period.

² Please note that there is a time delay between an application is submitted and a decision is taken. Applications submitted during the last six months of a given year are normally processed during the following year. Thus, success rate is not calculated for each year but for the all period.

³ As of May 2001, IFS is deemphasizing its individual Research Areas and instead describes its Small Grants Programme in terms of supporting research relevant to the sustainable management of biological resources. This change in emphasis also opens the door to researchers from social science disciplines and researchers working on topics such as biodiversity, water resources, and climate change, given that their research is justified in terms of sustainably managing the biological resource base and is relevant to local social, economic, and environmental conditions.

⁴ IFS organises two sessions a year referred to as Summer (S) and Winter (W) sessions.

⁵ The choice of this period was dictated by data available in the IFS database.

4. Characteristics of the surveyed IFS grantee population

In this chapter some general characteristics of the IFS grantee population in Cameroon and the population of grantees participating in the questionnaire survey are described. Information about respondents to the questionnaires, all IFS grantees in Cameroon, and general characteristics of the science community in Cameroon are briefly compared.

Looking at the entire pool of grantees in Cameroon (and at Cameroonian respondents to the questionnaire survey), their average age at the time of their first grant from IFS is approximately 35 years old. During the past five years (1998-2002), this figure rose slightly to 36.2 years of age. One difference is that during the 1970s and 1980s, scientists in their late 20s and early 30s applied for and were awarded grants. In recent years, however, the youngest grantees have been in their mid-30s. This trend towards older grantees can be expected to continue unless the aging of the Cameroonian science community can be halted through sustainable initiatives to recruit young researchers. The initiative described in Chapter 2 is a hopeful first step in this direction.

Only five of 86 scientists that were awarded grants between 1974 and 2002 were women (6%). If we consider the percentages of academic staff that are female at the University of Yaoundé (13,5%) and at IRAD (9%), we see that women are clearly underrepresented in the IFS population compared to the general population of women researchers working in Cameroon. Discussions with women scientists in Cameroon also suggest that the 40 year age limit for IFS applicants that was in effect until 2002¹ may be more of an obstacle for women than it is for men. Womens' choice to have children after completing their studies, as well as institutional impediments to women becoming scientists, means that they may turn 40 before they reach the stage of their career where they are prepared to apply for IFS funding. However, there is only anecdotal

evidence to support this hypothesis. The five women to receive grants from IFS were respectively 28, 31, 32, 36 and 38 years of age when IFS funding was made available to them. The small numbers of women grantees make it difficult to draw convincing conclusions regarding the IFS age limit using only IFS data.

The questionnaire survey was sent to 59 current and former Cameroonian grantees working in Cameroon. A total of 48 grantees responded, among them 45 men and three women. Twenty-two of the respondents used English as their preferred scientific language, and 26 preferred to use French.

All 48 respondents reported that they were married. At the time that they answered the questionnaire, the respondents ranged in age from 38 years old to 58 years old, with an average of slightly more than 46 years old. Responding grantees had between zero and 11 children, but on average 3.7.

Forty-three grantees reported the occupation of their spouses. The majority of spouses held intermediate-level positions such as teachers, nurses, civil servants, technicians, librarians, etc. Eight spouses worked in the home, two were academics and one was a medical doctor.

A small majority of the grantees in Cameroon (52%) had a PhD when they applied for their first grant at IFS (Table 8). This is a considerable difference from Tanzania, where instead only 35% of the grantees applying for their first grant held a PhD (Gaillard et al, 2002).

Degree	No. of Grantees	% of Total
BSc	7	8
MSc	33	40
PhD	43	52

Table 8
Degree held at the time of the first grant

5. Research conditions

To effectively direct support to the regions and countries where there is the greatest need and potential impact, it is important for IFS to understand the context in which its grantees work. In the following chapter, results from the questionnaire survey are presented and analysed that illustrate researchers' work environment, both their resources and their rewards, and their connection to the global science community. The results and analysis provided in the following pages lead to a discussion of the role of IFS in the Cameroonian research community.

5.1 Grantee livelihoods

IFS grantees pursued their scientific careers primarily within public research institutes and public universities (Table 10). One reported working in both a public university and public research institute, and one reported splitting his time between a public university and an NGO.

Of the 48 grantees that responded to the questionnaire, only two believed that their salaries as scientists were adequate to support their families.

Meanwhile 24 grantees reported that they work extra jobs to support themselves, nine of those having multiple extra jobs (see Table 11). Farming was the most commonly cited extra job (15) with over 31% of all grantees that participated in the survey working in farming.

Grantees were asked to consider several aspects of their employment as scientists, and indicate whether they considered these elements to be advantages or disadvantages to working as a scientist. The results indicate a mixed pessimism among Cameroonian grantees regarding their employment as scientists (Table 12). Salary scale and social benefits were identified as disadvantages by most grantees, while job security was the one aspect that most grantees felt to be an advantage.

Opinions were varied with respect to retirement benefits and opportunities for promotion.

Grantees were asked to indicate the amount of work time that they devote to five activities: teaching, research, administration, extension, and consultancy, as well as to other unspecified activities. Grantees were also asked to indicate the ideal division of their labour among these activities. In

Type of institution	No. of grantees
Public university	26
Public research institute	19
NGO	2
Private university	0
Private research institute	0

Table 10
Institutions that host grantees' scientific careers

Type of extra job	No. of Grantees
Teaching	8
Own Consultancy or medical private practice	4
Own private business	1
Farming	15
Somebody else's consultancy or medical practice	2
Somebody else's business	5
Other	5

Table 11
Types of extra jobs held by grantees

Elements	Advantage	Disadvantage
Salary scale	9	37
Career development	19	26
Job security	38	7
Social benefits	7	33
Retirement	20	18

Table 12
Grantees' evaluations of the advantages and disadvantages to working as a scientist in Cameroon

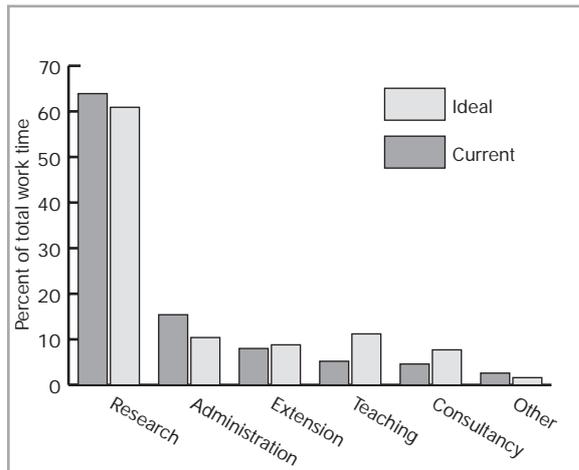


Figure 8
Time allocation of work activities in research institutes

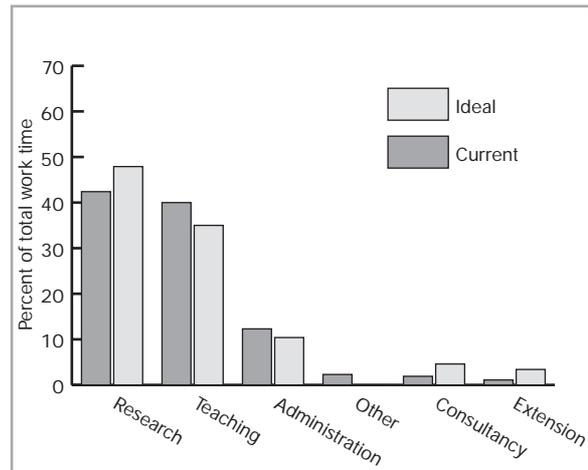


Figure 9
Time allocations of work activities in public universities

Figure 8 the mean present and ideal allocation of time to activities is provided for current and former grantees working in research institutes. Figure 9 provides the same information for grantees working in public universities. Notice that the primary activity of grantees in research institutes is conducting research, and that this is near an ideal level as indicated by the respondents. Meanwhile, as would be expected, grantees in public universities split the majority of their time between teaching and research. Though they in general would like to slightly decrease teaching time and slightly increase research time, current time allocations do not deviate greatly from the ideal allocations.

city system, and as a result have little opportunity to engage with students who will become the next generation of researchers. Figure 8 shows that among IFS grantees at research institutes there is a desire to be involved in more teaching; on average grantees would like to double the amount of time that they devote to teaching.

In Chapter 2 it was discussed that interviews with researchers at research institutes revealed complaints that they are disconnected from the univer-

Of 45 responding grantees, 21 indicated that they devote some percentage of their time, ranging from 1% to 20%, to working as a consultant (mean = 6.5% of work time). This indicates that the rate of grantee participation in consultancies is actually higher than was indicated in Table 11 above. Of those 21, only two indicated that they would like to reduce the amount of time that they spend on consultancy, and many indicated that they would like to increase the amount of time (mean ideal

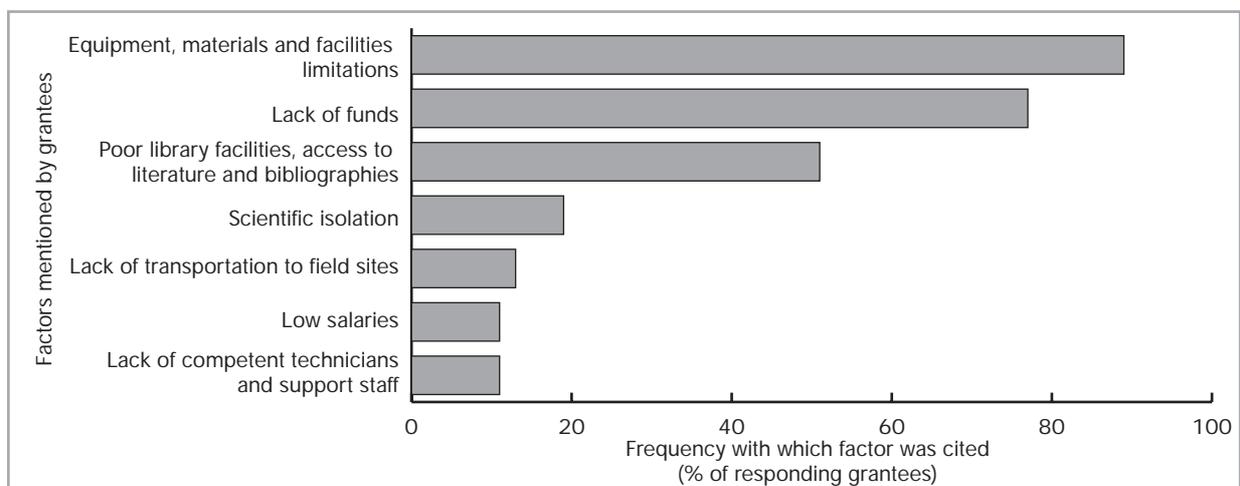


Figure 10
Factors most limiting grantees' research in Cameroon

allocation for all 21 = 9.1% of work time). Furthermore, 10 additional grantees that are not involved in consultancies indicated that they would ideally like to devote between 5% and 10% of their time to consultancies. Interviews conducted for this impact assessment suggest that the interest of researchers to carry out more consultancy work is related to the low salaries that researchers earn from their institutions. In a context where over 90% of grantees find their salaries to be inadequate to support their families, consultancy fees are important means for offsetting the inadequacy of their institutional salaries.

5.2 Funding sources

Grantees were asked to indicate the size of their research budget, excluding salaries, during 1998. Of the 48 respondents, 27 reported budgets that ranged widely from USD 30 to USD 100,000. The mean value of reported budgets was USD 16,000. Twenty-one respondents did not report the size of their research budgets.

Forty-one grantees reported the sources of their research budgets for the year 1998. Of these, nearly one-half (19) depend entirely upon foreign sources for research funding: primarily international organisations but also foreign businesses and foreign private foundations. Thirty-one of 41 depended upon foreign sources for 50% or more of their entire research budget, only ten researchers benefited from more domestic research funding than international. These figures indicated that current and former grantees in Cameroon, like most Cameroonian researchers (see Chapter 2) are heavily dependent upon foreign sources of research funding to carry out their work. Future research might explore the extent to which researchers are free to determine their own research agenda.

5.3 Main factors limiting grantees' research

Grantees were asked, in an open question, to identify three factors that most limited their research (see Figure 10). Their responses were grouped in sixteen categories and one miscellaneous group. Almost all grantees (89%) cited limitations in the equipment, materials and facilities for research as a leading factor that limited their research. Lack of funds, a closely related factor, was cited as a leading constraint by 77% of respondents and slightly

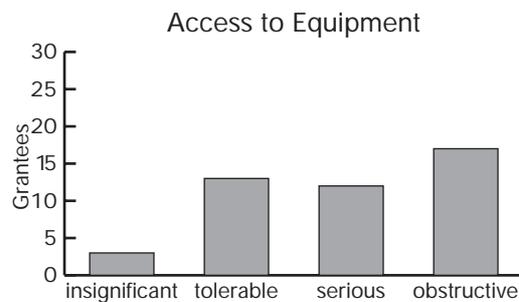
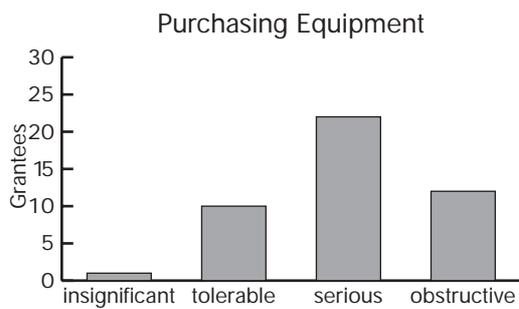
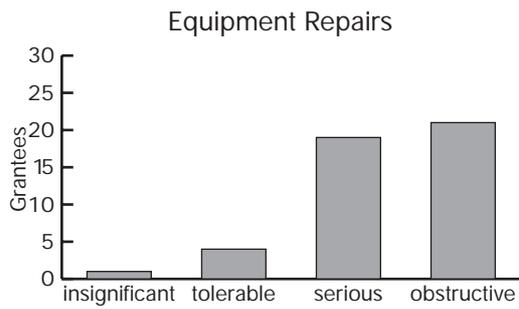
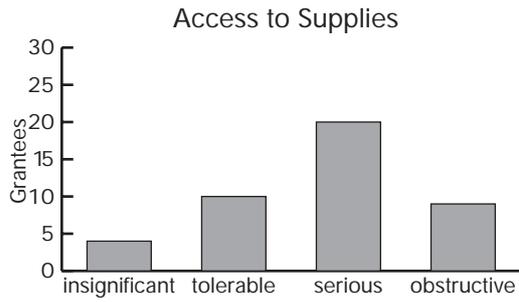
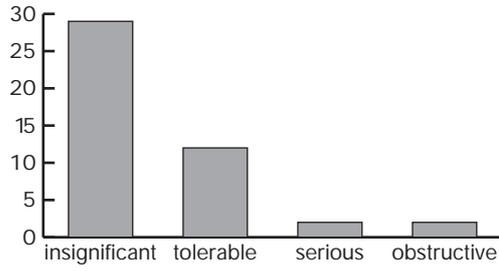
more than half indicated that lack of access to libraries and bibliographic material were limiting (in a related question only 30% of grantees indicated that they had access to bibliographic databases). These three factors are the same three leading factors that were found to limit research in Tanzania (see Gaillard, Zink and F Tullberg, 2001). However, in the case of Cameroon, these factors are cited with much higher frequency and, in contrast, lack of funding is second to lack of equipment, etc. In addition, scientific isolation was an important limitation in Cameroon, whereas it was of less importance in Tanzania.

Next, grantees were presented with ten different recurring difficulties that are encountered while conducting research. They were asked to rate their magnitude as insignificant, tolerable, serious, or obstructive. Figures 11 and 12 chart the results. Most obstructive were factors related to the access to, purchase, and service and maintenance of equipment, as well as access to bibliographic resources. Time was the least restrictive factor.

5.4 Communication and scientific contacts

Although IFS support is targeted to individual researchers, IFS grantees in Cameroon generally work in research teams (45 of 47 respondents). These teams are usually multidisciplinary (39 of 43 respondents). Since IFS grants are primarily used to purchase research equipment that becomes the property of the grantees' home institution, these findings support the IFS claim that targeted support to individuals does not only benefit individuals, but also has positive implications for larger groups of researchers. Information gathered in the interviews also indicates that IFS support contributed to the formation and survival of research teams (see also Chapter 2).

Scientists in grantees' home department are the colleagues that grantees most often communicate with regarding their research (Table 13). However, 34 of 48 researchers communicate with other scientists outside their home department more than once per year. Meanwhile, grantees' responses indicate that it is slightly more common for them to communicate with other scientists in Europe, than it is for them to communicate with other researchers in Cameroon. Communication with other scientists in Africa is limited, usually once per year or less.



Groups	Never	Rarely	Annually	Monthly	More often	Mean score	Mean score in Tanzania
	1	2	3	4	5		
Scientists in grantee's department	0	0	5	10	32	4.6	4.6
Scientists in Europe	3	13	13	6	10	3.2	2.7
Scientists in Cameroon	0	12	23	7	5	3.1	3.3
Scientists in other African countries	7	17	15	4	2	2.5	2.5
Scientists in the US and Canada	12	27	4	3	0	2.0	2.1
Scientists in Asia or Latin America	22	17	3	0	1	1.6	1.7
Funding agencies	8	10	13	6	5	2.8	3.4
Extension staff	8	12	13	6	5	2.7	3.7
NGOs	15	10	11	1	4	2.2	2.7
Private clients	17	12	9	1	4	2.1	2.5



During the five year period between 1995 and 1999, grantees in Cameroon generally attended between one and five conferences (Table 15) outside of their country, with the average for the entire group being five conferences.

5.5 Conclusion

Grantee personal livelihoods and professional opportunities are clearly affected by the broader economic difficulties affecting Cameroon. Low salaries for researchers mean that grantees find themselves working extra jobs as farmers and consultants in order to support their families. Most grantees are willing to take on additional consultancies to further improve their situation. At the same time, we see that most IFS grantees are dependent upon foreign sources of funding to carry out research. Recalling the contemporary state of the Cameroonian research environment as outlined in Chapter 2, where consultancy work and the demands of foreign funding agencies threaten to further erode the self sufficiency and self-determination of Cameroonian science, we see that IFS grantees are not unaffected.

In this context one can argue that IFS research grants increase the opportunities for Cameroonian researchers to determine and act upon the research priorities for their own country. Researchers that apply for IFS grants determine themselves what issue or problem they will address and what their research approach will be. The advantage to such openness is that it allows researchers the freedom to carry out projects that they deem to be most relevant to their own country. The funding agency does not determine the priorities.

Meanwhile, something that IFS does not do, that may have negative effects for grantees' research projects, is provide researchers with an honorarium or stipend. We see in Chapter 5 that lack of personal income is resulting in the diversion of grantees work from scientific activities to income generating activities.

No. of conferences	No. of grantees
0	5
1-5	31
6-10	10
11-15	1
> 15	1

Table 15
Number of conferences outside Cameroon attended by respondents during a five year period (1995-1999)

The difficulties affecting grantees research opportunities are both financial and infra-structural. The national and international funds that are currently available to researchers in Cameroon do not provide the means to adequately overcome their challenges in purchasing, maintaining and repairing research equipment. Furthermore, the work of Cameroonian researchers is often obstructed by scientific isolation in the form of limited opportunities to forge new contacts with the international and national science communities. Opportunities to access their international colleagues' current research results in libraries, bibliographic databases and via the internet are limited, and often non-existent. In the next chapter, the related issue of grantees' own publication productivity will be analysed.

While Cameroonian scientists were able to attend a large number of national conferences using their own resources or national funding, they are almost entirely dependent upon foreign sources of support to take part in the international science community. Notably, IFS is responsible for sending more Cameroonian grantees to international conferences than are Cameroonian sources of research support.

The findings of this chapter indicate that current and former IFS grantees face many of the same challenges that are encountered by the general population of Cameroonian researchers. Funding, infrastructure and scientific isolation are key limiting factors in the Cameroonian research environment. These are the same obstacles that IFS support intends to ameliorate, and in Chapter 9 the performance of IFS in helping grantees to meet these challenges is evaluated.

6. Publication Outputs

The ultimate value of scientific research depends on its availability to the public, and the most common way of making research public is through publication. Publishing is at the heart of the scientific enterprise. In addition to its obvious importance for the distribution of information, publication is often used to measure a researcher's productivity and in many countries it is an important means for advancing a researcher's career. Likewise, publication is an important criterion for the promotion of scientists in Cameroon (See Chapter 8).

This chapter provides an overview of scientific publication in Cameroon, as well as a bibliometric analysis of a group of 49 IFS grantees in Cameroon.

6.1 Local science and international mainstream science

A distinction is often made between local science and mainstream science. Local science is scientific research that is primarily important within the context of a country or region, and consequently does not have great international visibility. Local science has implications for the solution of local problems. As a result, research findings are often made available through local journals and published in the language of the countries concerned. International, or mainstream, science has high visibility, and, because the findings are relevant for researchers across geographic boundaries, results are published mainly in international journals. The most common language for publication of international science is English. Despite the importance of local science, there is generally greater academic prestige associated with carrying out international science.

An often used measure of a scientist's performance is the quantity of their publications that are

indexed in international scientific publication databases. In particular, evaluators use the databases produced by the Institute for Scientific Information (ISI) in the United States. The ISI databases of scientific publications cover some 5,700 journals from diverse fields of natural science, including approximately 3,500 contained in the Science Citation Index (SCI). Nevertheless, ISI is highly selective and screens only the world's most prestigious scientific journals (i.e. the ones whose articles are most frequently cited). SCI focuses on what has become known as "mainstream science," the most internationally visible science carried in the most highly cited journals, most of which are published in the North.

African mainstream scientific production is marginal compared to the rest of the world, and highly concentrated in two countries. The Republic of South Africa and Egypt together represent nearly half of the continent's production. Another group of five countries including Morocco, Tunisia, Kenya, Nigeria and Algeria account for a quarter (26%) of Africa's publication output. These countries are followed by a group of eight countries (Cameroon, Ivory Coast, Ethiopia, Ghana, Senegal, Tanzania, Uganda, Zimbabwe) that produce regularly between 70 and 180 papers a year (see Figure 13).

During the 1990s, Cameroon scientists authored or co-authored approximately 80-160 articles per year that were published in international journals. Over the last 15 years (1987-2001) 1632 such articles were published with Cameroonian authors or co-authors (on average 108 per year). In Africa, Cameroon ranks 11th with approximately 1,5% of the total African production of articles in mainstream journals. Despite constraints to research and publication described in chapter 2, Cameroon has tripled its scientific production during the last 15 years (see Figure 13).

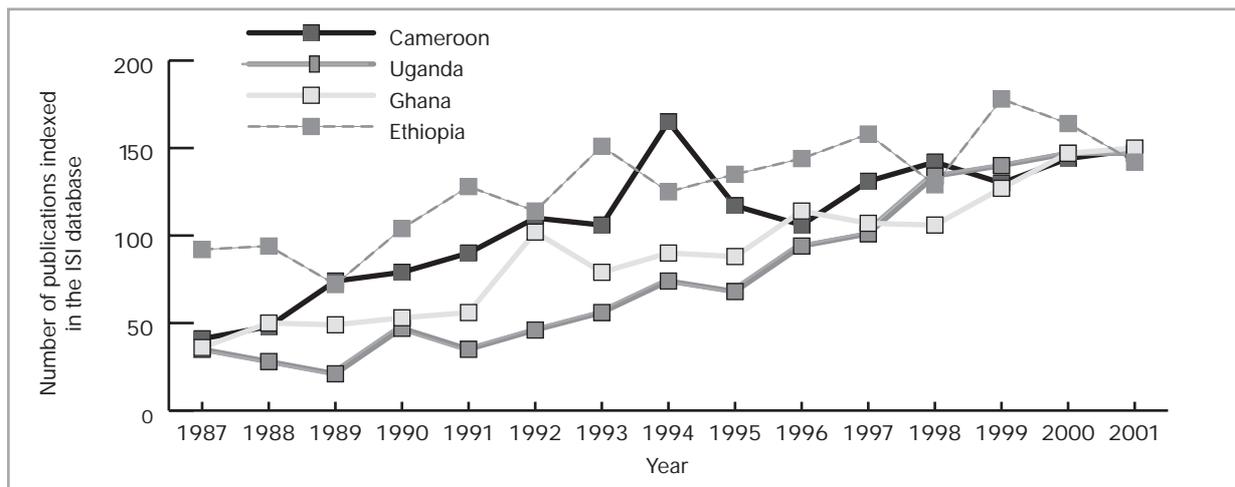


Figure 13

Annual production of ISI indexed publications by four African countries (1987-2001)

According to the ISI database, which does not track social science journals, a large share of the Cameroonian scientific production is within clinical medicine (39%), followed by biology (25%), biomedicine (11%), chemistry (10%) and physics (8%). Engineering accounts for 4% and earth sciences (mainly soil and environmental sciences) for 3%. This production originates from some 75 institutions in Cameroon, many of them being responsible for just one publication.

The University of Yaoundé (today University of Yaoundé I hosting the Faculty of Sciences) is by far the top producing institution and the top five institutions account for more than half of the total scientific outputs. In addition to the University of Yaoundé they include the French *Institut de Recherche pour le Développement* (IRD), the Pasteur Institute, the Ministry of Public Health and the Universities of Dschang and Ngaoundéré. The very low visibility of IRAD can be partly explained by the fact that the ISI database tends to underestimate agricultural sciences. IRAD scientists tend to be more applied oriented than scientists from e.g. universities, and publish relatively less and in less visible journals than scientists in other disciplines.

While this study uses ISI databases to measure mainstream science, the authors do recognise the limitations of this measuring stick. Already in 1985, the question of adequately representing science produced in the developing world in international databases was the main point of discussion at a conference organized at ISI in Philadelphia. The final conference report, *Strengthening the Coverage of Third World Science*, pointed to a glaring

gap by stating that “the workshop participants estimated that about only half of the scientific output of the third world which meets international standards of excellence is included in the SCI” (Moravcsik 1985:3).

6.2 Bibliometric study of grantees in Cameroon

In 1999, requests for publications lists were sent to all present and former IFS grantees who were working, or had been working in Cameroon (69 grantees). Grantees who sent incomplete lists were encouraged to resubmit a complete list. Additional lists were also collected during interviews of grantees.

Most bibliometric studies concentrate on publication output in mainstream science. However, in order to measure the total publication output of grantees in Cameroon, this bibliometric study was not limited to only those publications found in the ISI databases. Instead, all scientific work produced by grantees in Cameroon, based upon data from grantees' complete publication lists, was included.

The complete bibliographical information (title, date, pages, publisher, etc.) of each reference in the publication list was recorded in a database. Entries were classified by publication type: journal article, full paper in conference/seminar proceedings, book chapter, grantee authored or edited book, abstract, report, and other research publications and communications. The latter is a broad category that includes material such as: posters, theses, bulletins,



Publication type	Total No.	Total No. IFS supported	Percent of Total that was IFS supported
Journal Articles	537	117	22%
Paper in Conference Proceedings	133	37	28%
Other Publications	205	38	19%
Abstracts	43	5	12%
Report	37	5	14%
Book Chapters	13	7	54%
Books	4	1	25%
Total	972	210	22%

Table 17
IFS supported publications and total publications by type

was awarded. This peak coincides with a peak in IFS supported publications. Following the peak, grantee publication declines slightly but remains near peak levels for the following six years.

Table 17 shows the break-down of all publications by type. The most common type of publication was a journal article, followed by a full paper in a conference or seminar proceedings.

6.2.2 Journal article productivity

After segregating the publications by type, it was found that the publication lists contained 537 journal articles (55% of all publications) published in 181 different journals. A total of 23 journals had five or more articles by IFS grantees (Table 18), and these accounted for over one-half of all journal articles published by IFS grantees. Grantees credited 117 journal articles directly to IFS support (this represents slightly more than one half of all IFS supported publications).

Of the 537 journal articles authored or co-authored by IFS grantees, 253 (47%) appeared in journals that appear on the ISI master list. In fact, the ISI listed journals *Phytochemistry* and the *Journal of Natural Products* were the two journals that have contained the greatest numbers of IFS grantee publications. As discussed above, journals indexed in the information services provided by ISI such as *Science Citation Index* and *Current Contents*, are considered to represent the mainstream of international scientific publication.

IFS supported research resulted in 67 articles by grantees that were published in ISI listed journals. This represents 26% of all grantee publication in international mainstream journals, and 57% of all

journal articles that resulted from IFS supported research.

Meanwhile, IFS grantees also continue to publish results in local journals. While publications in local journals are less important for the career advancement

of scientists in Cameroon (see Chapter 8), they are important outlets for disseminating research results that are relevant to a limited, local audience. The *Revue Sciences et Techniques, Série Sciences Agronomiques*, the *Revue Science et Technique, Série Sciences Santé*, the *Cameroon Bulletin of Animal Production*, and the *Cameroon Journal of Biological and Biochemical Sciences* are each local journals in Cameroon that have been important outlets for grantees' research results (see Table 18 for others).

6.2.3 Co-authorship and collaboration

IFS provides incentives in the form of research grants to individual scientists while recognising that through collaboration scientists generally achieve their best results. Grantees' patterns of collaboration suggest that the individual nature of the IFS grant does not hinder scientists from working in teams. Of the 117 journal articles that grantees gave credit to IFS for supporting, 97 (83%) were co-authored. Co-authorship was the norm for all articles produced by IFS grantees, only 16% had single authors.

It is a general characteristic of scientific production in Cameroon that it is highly dependent on international collaboration. Two-thirds of the articles appearing in mainstream journals are published in collaboration with foreign authors. Foreign co-authors are predominantly from France where the scientists from Cameroon have been often been trained and to a lesser extent from the US, the UK and Germany (see Figure 15). A limited number of the co-authored articles are published in collaboration with scientists from other African countries (mostly Nigeria, Burkina Faso and Niger). Overall, collaborations with European scientists account for 67%, while Africa represents 11% and Asia 2% only.

Periodical title	No of grantee publications	ISI Journal?	Place of publication
Phytochemistry	60	Yes	United Kingdom
Journal of Natural Products	34	Yes	USA
Fruits	24		France
Revue Sciences et Techniques, Série Sciences Agronomiques	24		Cameroon
Revue Science et Technique, Série Sciences Santé	16		Cameroon
Cameroon Bulletin of Animal Production	10		Cameroon
Planta Medica	9	Yes	Germany
Cameroon Journal of Biological and Biochemical Sciences	9		Cameroon
Cahiers Agricultures	9		France
Tropicultura	8		Belgium
Biosciences Proceedings	8		Cameroon
World Review of Animal Production	7		Italy
Fitoterapia	6	Yes	Italy
Journal of Ethnopharmacology	6	Yes	Ireland
Tetrahedron Letters	6	Yes	United Kingdom
Tropical Medicine and Parasitology (Tropenmedizin und Parasitologie)	6		Germany
Journal of the Chemical Society - Perkin Transactions 1	6		United Kingdom
Ann Fac Sc Chim	6		Cameroon
Animal Feed Science and Technology	5	Yes	The Netherlands
Biochimica et Biophysica Acta	5	Yes	USA
Journal of the Science of Food and Agriculture	5	Yes	United Kingdom
Phytomedicine	5	Yes	Germany
Sciences Agronomiques et Développement	5		Cameroon

Table 18
Journals in which there have appeared five or more articles by IFS grantees in Cameroon

The bibliometric survey did not have data available regarding the nationality of grantee collaborators. However, information obtained during the interviews of grantees indicates that when collabora-

tors were not Cameroonian, the publications were often derived from a PhD thesis produced outside Cameroon and the collaborators were former PhD supervisors or colleagues.

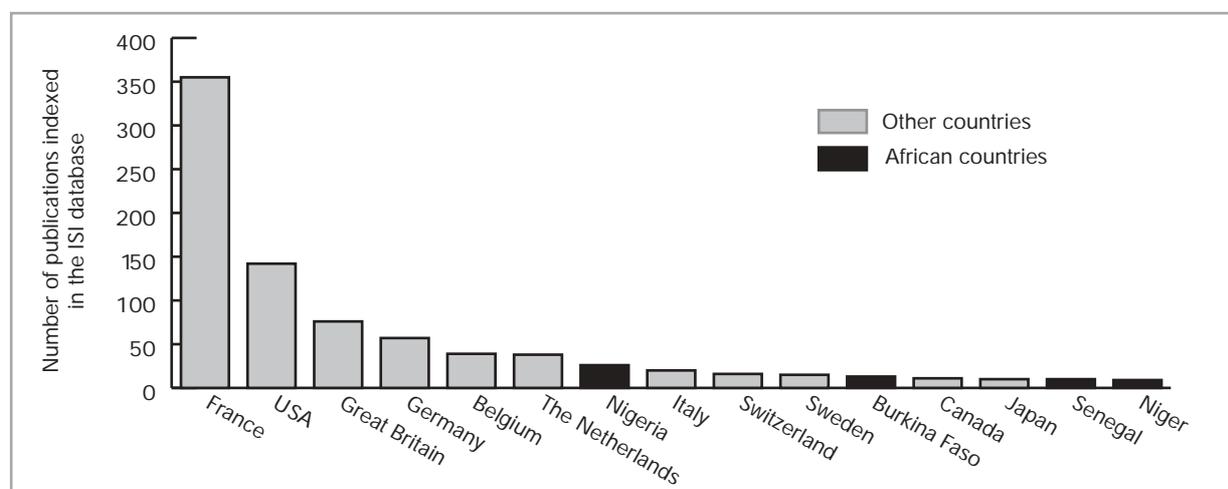


Figure 15
Cameroonian scientists and international collaboration: Top 15 collaborating countries

7. IFS research project completion

In this chapter we will consider IFS grantees who have finished their IFS supported research. Since IFS began its activities in Cameroon up until the first half of 2003, 47 researchers have won research support from IFS and later had their support terminated. This group of 47 have received a total of 79 IFS research grants (see Table 19 for an indication of how they were distributed). Nearly half (47%) of all former grantees in Cameroon received at least one renewal grant.

Research projects are expected to have durations of between one and three years. In reality, however, the projects of grantees in Cameroon tend to be longer in duration. The average amount of time that passes between the moment that a grant is awarded to a researcher in Cameroon and the moment that IFS officially terminates its active support of the research project is five years. The total time that a researcher receives active support from IFS can be much longer if they receive multiple research grants, the longest being 16 years. Meanwhile, grantees that received multiple grants for multiple projects tended to have a shorter project duration (4.2 years) than did grantees that only received one research grant (5.6 years). The tendency of projects to extend beyond the three year limitation has also been noticed in other parts of Africa (Gaillard, Zink and F Tullberg, 2002, and Gaillard and F Tullberg 2001).

A number of factors can explain the duration of IFS research projects. Grantees have reported difficulties in obtaining supplies, administrative dif-

ficulties, unforeseen obstacles to their research, personal crises and unstable political situations, among other factors that have slowed the progress of their research. In such cases, IFS strives to find solutions to solvable problems, and to provide extensions whenever necessary. In addition, the IFS staff prefer to close grantee files upon receipt of a final report (see below). However, final reports are delinquent with some frequency, thus causing files to be kept open long after the actual project has been completed.

As has been shown in previous chapters, Cameroonian grantees live in a context where salaries are insufficient to meet the needs of their families, and where time must be invested where it is likely to result in improved livelihoods. Given this situation, IFS must develop strategies for increasing the timeliness and quality of reports that do not impede grantees' work (i.e. with-holding a portion of the grant meant for research). IFS is addressing this challenge with two supporting services to grantees. First, a mentorship programme has been initiated that will link IFS Advisers to grantees and support grantees in the writing of their final reports and scientific articles at the conclusion of their IFS supported research project. Secondly, a new strategy is being implemented in 2003, whereby completed final reports of satisfactory quality are acknowledged with a travel grant to be used for the researchers further professional development and the dissemination of their research results (i.e. at an international scientific conference). Future impact assessments will be able to analyse the impact of these recent initiatives.

No. of research grants awarded	No. of researchers
One grant	25
Two grants	10
Three grants	9
Four grants	2

Table 19
Number of research grants awarded to individual grantees in Cameroon

There are a number of reasons for closing a grantees' file (i.e. "closing a grant") at the IFS Secretariat (see Box 8). Table 20 shows the different reason for closing the files of 47 grantees in Cameroon. IFS has had greater success in obtaining final reports and renewal applications than was the case in Tanzania (Gaillard, Zink and F Tullberg, 2002), where roughly one third of grantees did not submit a

Box 8
Closing a file

Reasons for closing a file include:

- The project was never started. For example, occasionally a new grantee wins a fellowship to a university in the North before beginning the research and must therefore decline the grant.
- The project was completed with a final report. This is the ideal reason for closing a grant.
- A grantee's renewal application was not approved (in many cases because the grantee is too established in his/her research career).
- The project is terminated by IFS. For example, a grantee might be promoted/moved to an administrative position and is unable to complete the project.
- The project is completed, but the grantee fails to submit a final report despite reminders.
- A grantee dies.

Reason for closing	No of grantees
Closed with partial report	3
Grantee deceased prior to project completion	3
Closed without report	6
Project terminated	1
Renewal not approved	18
Closed with report	15
Not started	1

Table 20
Closed files in Cameroon

Quality	Percent of final reports
Unsatisfactory	6%
Mediocre	6%
Satisfactory	47%
Good	29%
Excellent	12%

Table 21
Quality of final reports received from grantees in Cameroon

renewal application or a final report. In Cameroon only six projects (13%) were closed without final reports. Nevertheless, it is hoped that the new mentorship and travel grant strategies will further reduce this number.

Each final report that is received by IFS is reviewed by a Scientific Advisory Committee with expertise in the grantee's field of research. The committee grades the quality of the report, and if necessary requests improvements be made by the grantee. Most final reports submitted by grantees in Cameroon have been satisfactory or better (Table 21).

The MESIA Project is an important tool for IFS for keeping track of the activities of grantees following the completion of their IFS supported project. In this chapter the academic and professional advancement of current and former grantees in Cameroon is documented, as well as the international circulation of Cameroonian grantees. Information regarding the advancement and movement of former grantees is essential for the evaluation of the impact of IFS support in supporting the careers of young scientists and the strengthening of capacity in developing countries.

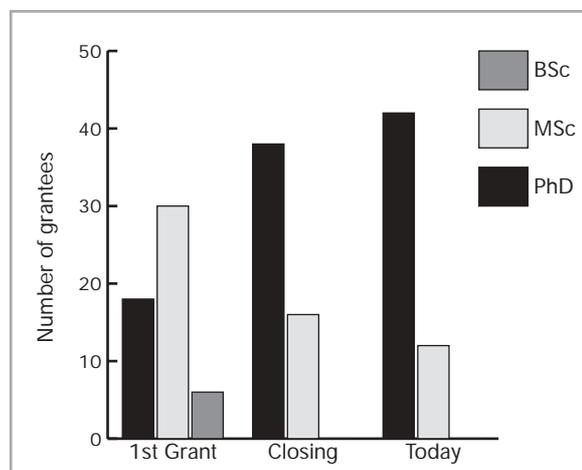
8.1 Academic progression

Information on the academic progression of 54 grantees was available for this impact assessment

Box 9
IFS grantees: science leaders

An explicit objective of the IFS Granting Programme is to identify and support promising scientists that will likely become the science leaders of the future in their country. During the course of the MESIA Impact Study, correspondences, interviews and tracer studies revealed that IFS had been successful in this regard in Cameroon. Positions held currently or in the past by IFS grantees include:

- Minister of Science and Technology, Cameroon
- Director General, *Institut de Recherche pour la Recherche Agronomique pour le Développement (IRAD)*
- Director, *Institut de Recherche Médicale et Plantes Médicinales (IRMEPM)*
- Director, Limbe Botanical Garden
- Vice Rector, University of Buea
- Vice Rector, University of Dschang
- Dean, Faculty of Science, University of Yaoundé I



the scientists that later become science leaders in Cameroon. IFS support contributed to grantees being promoted to positions of leadership in universities, research institutes, and in at least one case, politics¹ (see Box 9).

An objective of the MESIA project is to learn from grantees which factors are most important for advancing to positions of leadership. The MESIA questionnaire asked Cameroonian scientists to rate the importance of eight different criteria for the promotion of scientists in their country (see Figures 17 and 18). While in Tanzania it was found that there were clear differences between grantees working in research institutes and those working in universities (Gaillard, Zink and F Tullberg 2002), in Cameroon the differences were marginal. Grantees generally agreed that publications in international journals was the single most important criteria for promotion, followed by publication in local journals and seniority. Contribution to teaching was of moderate importance for promotion at universities, and of little importance at research institutes. Award of research grants was not an important direct contributing factor for promotion, but to the extent that research grants improve a researchers opportunity to publish they are important for career advancement.

8.3 Mobility

Questions 12 and 13 of the MESIA Questionnaire asked grantees to report on the amount of time that they have spent outside of Cameroon for higher education and training (including postdoctoral studies and academic visits), and the total time they have spent abroad for all reasons during their lifetime. Their answers reveal that Cameroonian grantees spend very little time outside of Cameroon for non-academic reasons. Grantees spent an average of 3.6 years abroad for academic reasons (see Figure 19 for the distribution), and 4.2 years abroad in total.

At the time that a grantee is conducting an IFS sponsored research project, he or she is expected to be attached to a university or research institution in a developing countries. After completing their IFS research grants, and sometimes before, grantees have found new positions both locally and internationally. As illustrated in Box 10 (see page 50), very few grantees are “true cases of brain drain”. Out of 84 grantees, only 3 are working in North America today. The three of them maintain

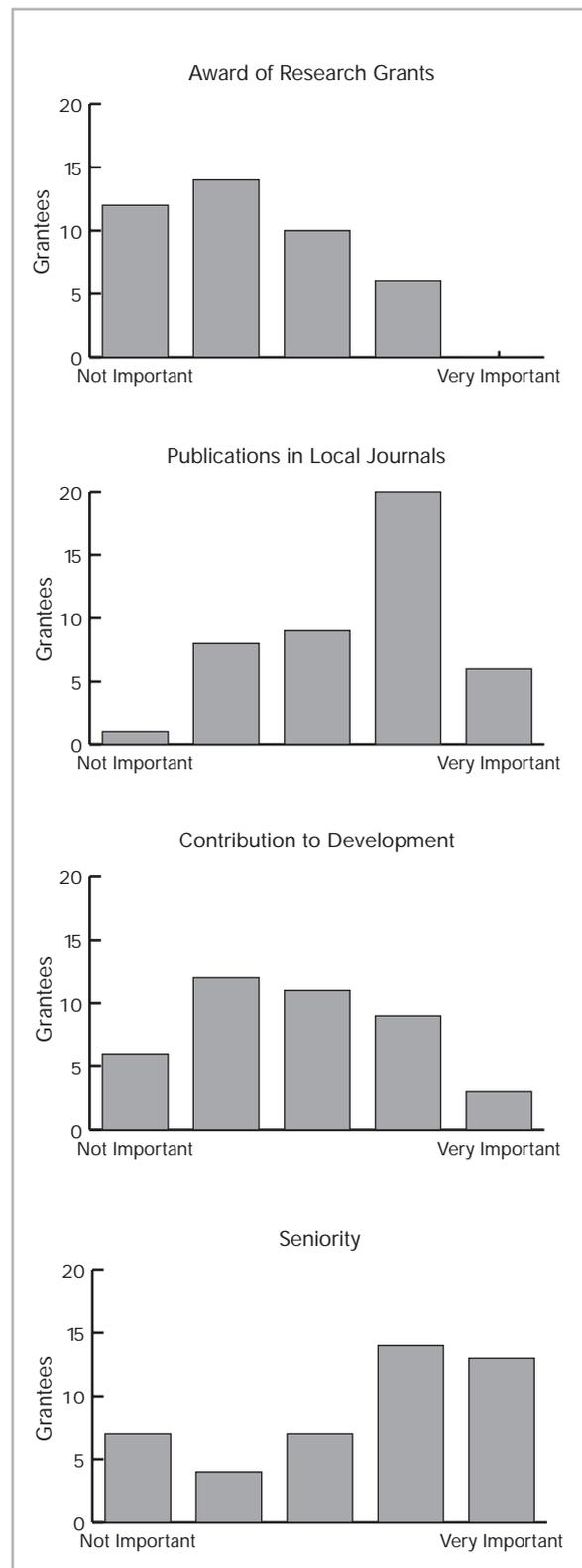


Figure 17
Importance of criteria for the promotion of scientists in Cameroon (part 1)

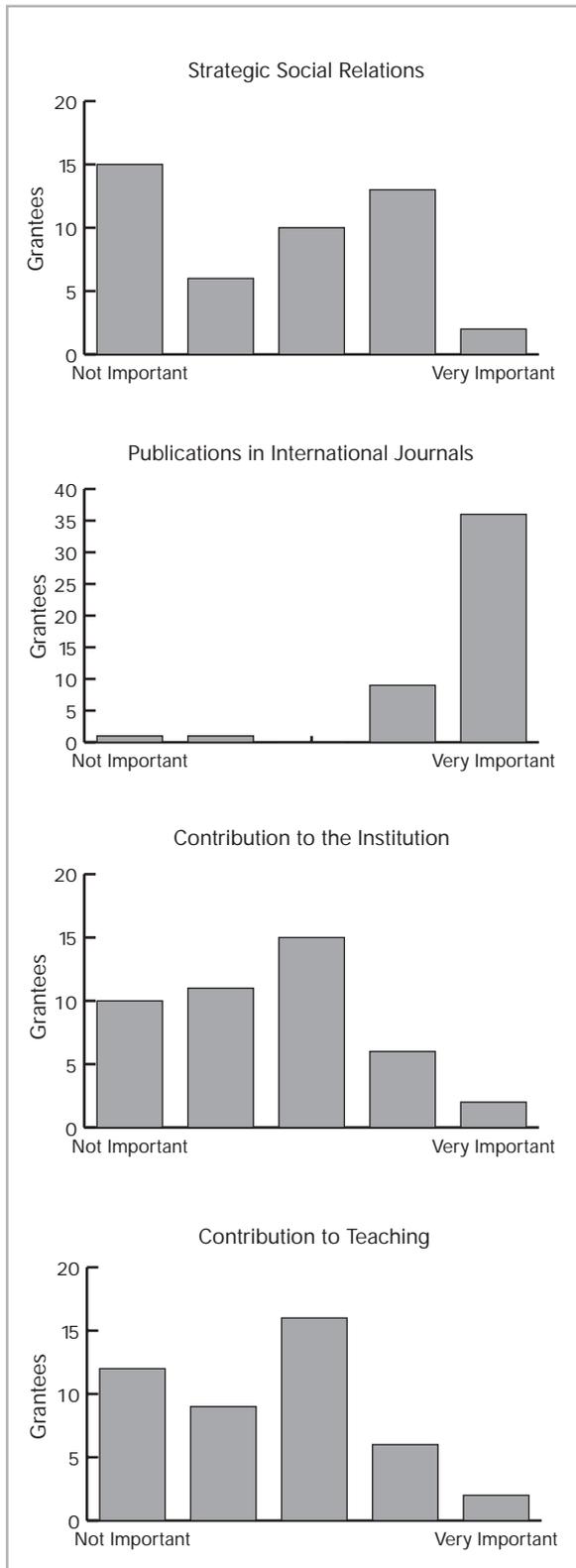


Figure 18
Importance of criteria for the promotion of scientists in Cameroon (part 2)

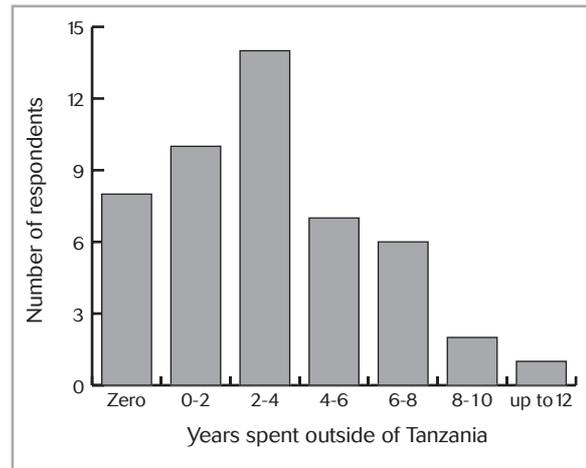


Figure 19
Years spent outside Cameroon for higher education and training

contact with their colleagues back at home and at least one, presently in Canada, is likely to come back once his post-doc is completed in Canada. The former grantee that is Assistant Professor at Delaware State University is setting up his lab to work on the molecular biology of cassava viruses and looks forward to continued collaborating with IFS and IFS grantees. The four other foreign jobs are (or were) on the African continent and include responsibilities for regional and continent-wide research and training programmes.

In the course of this tracer study we also discovered that more grantees had just returned from training abroad with a PhD or were abroad for further training (short term, PhD or post-doc). For grantees that remain in Cameroon, it should be noted that circulation between the different centres of IRAD or between the University of Yaoundé I and the newly established universities in the Provinces seems to occur quite frequently. This internal mobility is often accompanied by a promotion.

A number of IFS grantees, while remaining in Cameroon, have accepted employment opportunities or part time consultancies offered by private companies, NGOs or international organizations (see also Chapter 5). Nevertheless, with the exception of one grantee that left his job at IRAD to join the World Wild Fund for Nature in Cameroon, all of these grantees have at the same time maintained their affiliation with a national institute. For example, one grantee continued to teach at Dschang University while he was director of a livestock programme sponsored by UNDP. This perceptible trend is characteristic of what we found elsewhere

Box 10

The brain drain or regional circulation?

Capacity for the production and utilisation of scientific knowledge is understood by IFS to be one of the many prerequisites for local and regional development. Hence, one of the primary goal of IFS is to reduce the brain drain by providing incentives and means for scientists to remain in their country and to contribute to the building of a critical mass of local scientific expertise. Of the 84 grantees in Cameroon, seven left their country for an important portion of their scientific career (five years or more). However, it is insufficient to classify all seven

9. An assessment of IFS support

It is essential for the success of IFS that the organisation have an understanding of what the needs of its grantees are, and what effect the provision of IFS support has for the amelioration of those needs. In previous chapters we have identified research funding, access to working research equipment, and access to the international community through conferences, internet and libraries as key constraints to the work of researchers in Cameroon. At the same time we have seen that the advancement of researchers careers in Cameroon are heavily dependent upon international and local publications, areas where IFS grantees have been successful. In this chapter we present grantees' own evaluation of the quality of support provided by IFS.

9.1 Relative importance of IFS support

In an effort to understand the importance of IFS support to grantees' research, they were asked to indicate whether or not they would have been able to carry-out their research without IFS funding. Of 48 grantees, twelve (25%) would not have been able to carry out research without IFS support. An additional 26 (52%) would have been able to carry out a similar research project, but it would have been on a reduced scale. Seven grantees reported that they would have been able to carry out research projects, however they would not have been the same projects. Two grantees would have been able to find support from elsewhere and one would have been able to carry out the research without support. In sum, 45 of 48 projects would not have been carried out, or would have been carried out differently if IFS support were not available.

When one examines the importance of IFS support to researchers' work in the context of the changing Cameroonian research infrastructure in the early 1990s, it is clear that the importance of IFS support has increased as the local research infrastructure has weakened (See Box 11). In 1992

the economic crisis that had begun in 1989 fully impacted the Cameroonian research infrastructure: university budgets were slashed and salaries and research budgets withered (see Chapter 2 for a description). Meanwhile, grantees that received their first grants during and after 1992 reported more frequently that they were entirely dependent upon IFS support than did grantees that received first grants prior to 1992 (Figure 20). Of the 25 researchers receiving first grants between 1992 and 1999, nine would not have been able to carry out their research without IFS support. In comparison, only three of 23 reported this level of dependence for the period before 1992. The three grantees that reported having other means available to support their research were awarded first grants in the 1970s or 1980s.

9.2 An assessment of IFS support

To assess the IFS mode of work and support, grantees in Cameroon were asked to rate 13 activities from "selection process" to "follow-up activities once support was terminated" using a numerical

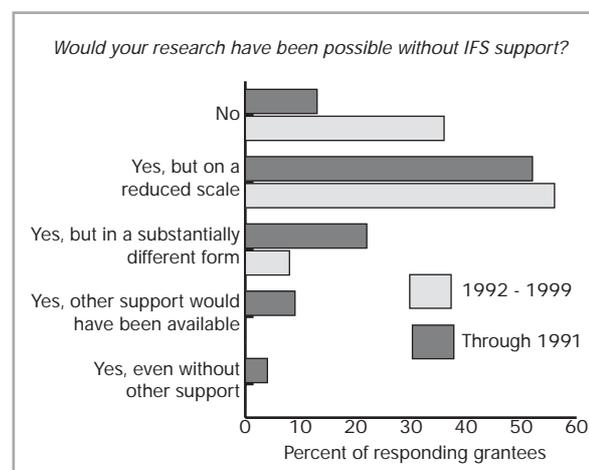


Figure 20
Importance of IFS support to grantees research: before and after 1992

scale from one to five: unacceptable (1), poor (2), satisfactory (3), good (4), or excellent (5). The comparison of the different activities can help to identify areas that deserve strengthening and areas that are problematic for grantees (Figure 21 and Table 22).

IFS received the most appreciation for the manner in which it administers its research grants. A majority of respondents graded the IFS as excellent in this regard and all respondents were at least satisfied. The IFS selection process, the service whereby IFS purchases and ships research equipment, monitor-

ing and follow-up of research projects, and contact with the IFS staff also received high marks from grantees in Cameroon. IFS workshops were also rated highly, although a small minority did rate them as unsatisfactory (5 of 43).

Areas of mixed success in which 65% to 80% of grantees were satisfied included providing access to literature, providing access to further research training, providing scientific counselling, and pro-

Box 11

Scientific research capacity in Cameroon and IFS : a grantee's view-point

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 the 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 better crop production, sustainable agriculture, environmental protection, etc.

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. The 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 without foreign aid. With the advent of the economic revival, new attention is being focused on scientific research as evidenced by the set-up in 1998 of the national competitive research grant schemes, code named FUAR (*Fonds Universitaire d'Apui à la Recherche*) at the University of Yaoundé I, and the presidential decrees aimed at improving the working and living conditions of researchers and teachers. Although these efforts are very laudable, they are still inadequate as far as the research infrastructure is concerned. 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 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 I. 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.

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same time striving to improve them. For example, workshops have been held in Africa together with scientists and technicians to determine how best to support the maintenance and repair of scientific equipment. A new service offered in partnership

with the Swedish Agricultural University (SLU) assists grantees to obtain abstracts and bibliographies of the most recent research articles published in their area of interest. Meanwhile, a strengthened Mentorship Programme is drawing upon the

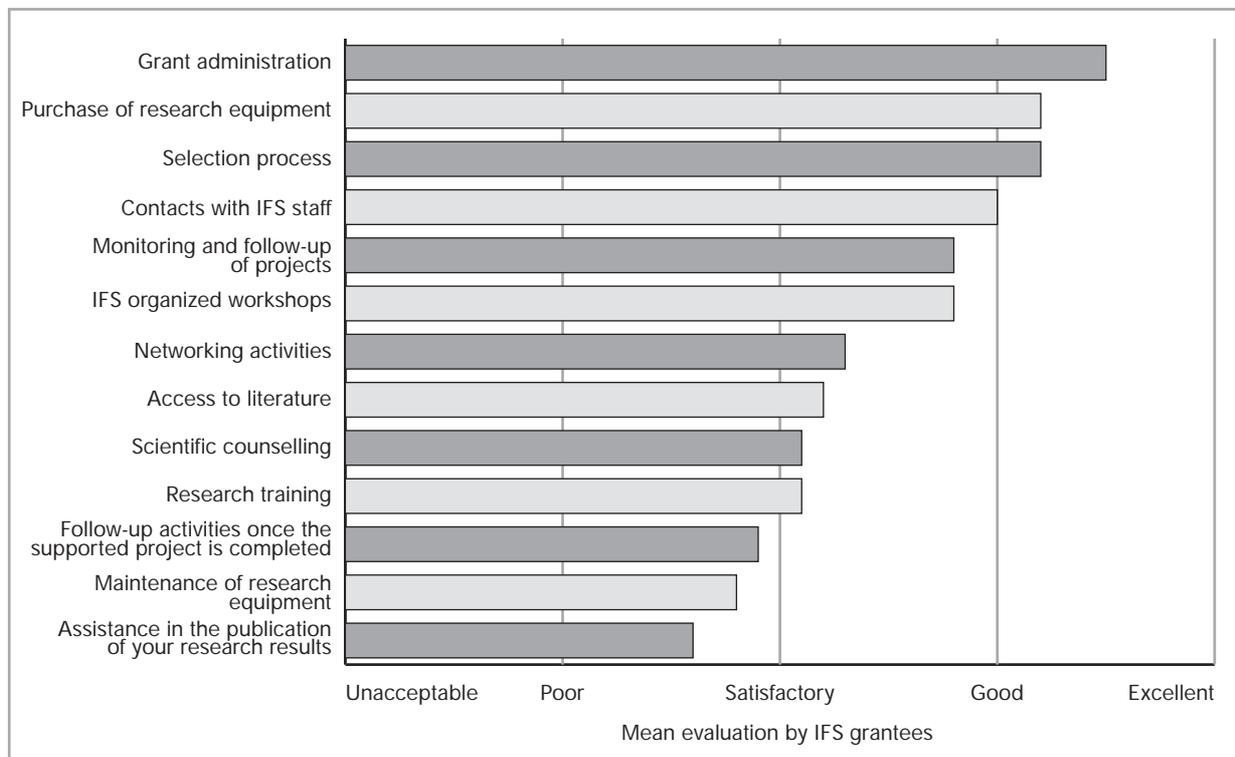


Figure 21
Grantees' mean assessment of the IFS mode of work and support

Services	No. of grantee responses				
	Unacceptable	Poor	Satisfactory	Good	Excellent
Selection process	0	0	8	20	16
Grant administration	0	0	3	16	27
Monitoring and follow-up of projects	0	2	13	21	9
Contacts with IFS staff	1	2	6	22	15
Purchase of research equipment	0	2	7	13	21
Maintenance of research equipment	4	9	19	6	2
Access to literature	0	10	19	10	5
Research training	0	11	17	11	2
Scientific counselling	0	11	15	15	1
IFS organized workshops	0	5	11	14	13
Networking activities	0	11	14	9	8
Assistance in the publication of your research results	1	20	8	6	1
Follow-up activities once the supported project is terminated	2	10	9	4	3

Table 22
Grantee assessments of the IFS mode of work and support

resources of the IFS Scientific Advisors to provide scientific counselling and to assist grantees in the improvement of their research projects. Furthermore, new joint initiatives such as the UNU/IAS – IFS Agriculture for Peace Fellowship and the CODESRIA – IFS Sustainable Agriculture Initiative are organising more opportunities for grantees to both network with other researchers and improve their research skills.

More than 25% of the grantees surveyed were critical of IFS for not sufficiently supporting the maintenance of research equipment. Recognising the equipment maintenance is an important hindrance to research among grantees, IFS has revived its efforts to respond to this problem. In Buea, Cameroon on November 5th – 8th, 2002 an international workshop was organised by IFS together with a national and international organisations, and businesses on the topic of “Purchasing, Servicing and Maintenance of Scientific Equipment in Western Africa.” The workshop brought together stakeholders from the region to discuss and plan activities to improve the state of research equipment in Western Africa.

Other areas where grantees have been critical of IFS support are assistance in the publication of their research results and follow-up activities once IFS support is terminated. Here grantees have correctly identified

10. Science, society and grantees' career goals

In earlier chapters we have seen that public appreciation of researchers has eroded in Cameroon due at least partially to shrinking opportunities to carry out research for the public good. Meanwhile, we have also seen that researchers are increasingly forced to consider alternative sources of income to guarantee their livelihoods. In this brief chapter we present grantees own views regarding the role of research(ers) in Cameroon, and their own personal career goals.

Grantees in Cameroon were given 11 statements concerning the role of science and scientists in society and were asked to assign a score from 1 (meaning that they disagreed completely with the statement) to 5 (indicating complete agreement) to each statement. Table 23 summarises their responses.

While the public may doubt the role of science in improving the lives of Cameroonians, Cameroonian scientists strongly believe that science contributes to development. They are also in general agreements that science should lead to innovations and goods. These values do not inhibit Cameroo-

nian scientists from also believing that scientific knowledge is universal and that the production of knowledge is a legitimate goal in itself.

Despite the difficulties encountered by researchers in Cameroon, 31 of 47 grantees indicated that they have a national scientific career as one of their career goals (see Table 24). Slightly more than half indicated that they would like to work with foreign or international organisations. Other careers were

Career choice	Percentage of grantees
National scientific career	66%
Career with foreign or international organisations	51%
Career in administration	13%
Own consultancy or medical practice	11%
Career within national development programmes	6%
Career in politics	4%
Private business	4%

Table 24
Future career goals of IFS grantees in Cameroon

Value statements	No. of grantees responding					Average
	Disagree 1	2	Neutral 3	4	Agree 5	
Science contributes to development	0	0	1	6	40	4.8
Scientific knowledge is universal	1	0	3	4	36	4.7
Science should firstly produce knowledge	2	1	6	17	21	4.1
Science should mainly lead to useful innovations	1	3	9	12	21	4.1
Researchers should have entrepreneurial and managerial skills	1	5	9	14	17	3.9
Researchers should produce goods for a competitive market	4	5	7	12	18	3.8
Science is public knowledge	2	6	11	10	12	3.6
Researchers are free to choose their own research topics	1	8	16	9	13	3.5
Research topics are set by clients	3	6	14	15	8	3.4
Research topics are set by sponsors	8	4	17	11	7	3.1
Research topics are set by employers	8	8	14	12	3	2.9

Table 23
Grantee responses to eleven value statements

of much less interest to the grantee population as a whole.

A national scientific career was of more interest to grantees in Cameroon than it was to grantees in Africa in general (43%). However, if one compares the situation in Cameroon to a country with a strong national science and technology infrastructure such as Mexico, it is clear that a national career is less attractive to researchers (66% in Cameroon compared to 83% in Mexico).

In sum, it is clear that in Cameroon the grantee population is generally committed to science in their country, and believes that research can play an important role in the further development of the nation. However, with more than 50% of grantees having a career with international organisations as one of their career goals, the grantee population is also vulnerable to the brain drain if the circumstances of researchers in Cameroon do not improve.

Box 12

The role of IFS support in my research career

I applied for an IFS grant in December 2000, one year after I obtained my PhD from the University of Hannover, Germany with honours (*magna cum laude*). The topic was 'Towards developing an integrated crop management strategy for the African stemborer, *Busseola fusca* (Fuller) in maize systems in Cameroon'. The recommendations ensuing from the thesis was a plan for further research into Integrated Pest Management (IPM) options for lepidopterous maize borers in Cameroon, mainly habitat management (use of trap plants, management of natural habitats; intercropping with non-host plants and soil nutrients) and biological control solutions (augmentation, expanding the geographic range of indigenous natural enemies' species or strains, use of viruses).

I then wrote a proposal on biodiversity and biological control of *Busseola fusca*, the predominant stemborer species in Cameroon which IFS is currently funding. The goal is to investigate how disturbed habitats in the forest zone can be managed in order to lower borer pressure in maize fields by increasing the proportion of trap plants and efficacy of borer natural enemies. My thesis supervisor at Hannover also wrote a proposal on the effect of intercropping and soil fertility technologies on the population dynamics of stemborer pests and their natural enemies as well as maize yields in the forest zone of Cameroon. The work is being funded by the German Research Council (DFG) and carried out as part of a PhD programme at the University of Hannover.

We started implementing both projects in January 2002. As part of our vision for the future, we have developed another research project proposal, this time on an international scale involving other African countries, International Agricultural Research Centres and the University of Hannover. The goal is to assess, evaluate and validate either singly or in combination and in both on-station and on-farm farmer participatory trials the various IPM technologies developed in the IFS and DFG projects. Ex-ante economic impact assessment of the technologies is an integral part of the project proposal. Also as much as possible the work will be carried out by students as part of post-graduate degree related studies.

In a nutshell, the funding from IFS was a stepping stone in my career as a budding young scientist. Hopefully, if the latter project is funded, I will move from working only on a national scale to an international one.

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11. Conclusions and lessons learned

The science and technology infrastructure in Cameroon was steadily eroded during the 1990s. A nationwide economic crisis that began in the late 1980s caused the evaporation of national sources of research support, and drove researchers in Cameroon to greater dependence upon international sources of funding. The declines in the quantity of and incentives for research lead to a drop in the status of researchers in the public sphere and the scarcity of recruitment contributed to an ageing of the scientific community. This study finds that the lack of investment during the 1990s poses a threat to a sustainability of the Cameroonian S&T infrastructure and thereby seriously undermines one of the pillars of national development.

Nevertheless, the situation of the S&T community in Cameroon in 2003 was one of hope, with young researchers beginning to enter the system, and the persistence and strengthening of nodes of highly qualified senior researchers in key centres and departments. It is clear to the authors of this report that the rejuvenation of the Cameroonian S&T infrastructure must build upon these beginnings and continue to involve, first and foremost the government of Cameroon but also national and international partners and donors.

The questionnaire survey indicates that grantees in Cameroon are committed to science and strongly believe that science will be an important contributor to the development of Cameroon. Most grantees have a national scientific career as one of their goals, but they also indicate that they are not opposed to contributing to the development of Cameroon from abroad if the possibilities for pursuing a career in science in Cameroon do not improve.

11.1 Success and failure among applicants

Cameroonian applicants to IFS were successful in more than one of three cases. This rate of success

puts them among the most successful groups to apply for IFS support. The reasons for their success include excellent training, the existence of strong research nodes that have long-standing relationships with IFS, and an informal system of peer review of applications. For example, many of the Cameroonian scientists did their graduate and postgraduate studies at the University of Yaoundé, the quality of which is praised both in Cameroon and outside Cameroon. Furthermore, a research grant application submitted by a scientist in Cameroon is rarely sent to IFS directly. It is first peer-reviewed in Cameroon by colleagues who are most often former IFS grantees (and who are often part of the highly qualified research nodes mentioned above). This practice is most common among organic chemists and food scientists, and about one-half of the applications received from them have been approved for funding. This experience indicates that the strengthening of peer review mechanisms within formal and informal alumni groups or other capable networks could be successful strategy for increasing the success rate of applications to IFS.

While the quality of proposals received by IFS may be increased through national networks that provide peer review, the information available indicates that the quantity of applications received is linked to IFS activities in the country. For example, a high number of applications from Cameroon in 2000 (19 applications) followed upon visits and information seminars held at various institutions in 1999 in conjunction with the first phase of research for this impact report. This report concludes that there is no substitute for IFS events and staff travel to target countries to generate increases in the numbers of applications.

One group in Cameroon that does not apply to IFS in significant numbers is women. While relatively few women are active in science in Cameroon, the percentage of women scientists in the population of IFS grantees in Cameroon is half the percentage of women scientists in the population of scientists

in Cameroon. This indicates that IFS should further explore why women are not better represented. For example, do women researchers in Cameroon have more fragile networks of support, are they poorly represented in IFS fields or, due to commitments to family and children that delay their research careers, are they too old to qualify for IFS support? As IFS looks to expand its support to researchers in the poorest countries, women may be a group whose participation in the IFS small grants programme could be significantly increased. In order to see such an increase, IFS must obtain a better understanding of why women are poorly represented among applicants from some countries.

11.2 Research conditions

Researchers indicated that the present division of their labour as researchers between teaching, research, administration, and other activities was near ideal. One variation from this was that researchers at research institutes would like to become more involved with teaching.

Meanwhile, there was wide agreement among grantees on the nature of the primary limitations to research in Cameroon. Grantees cited a lack of equipment, materials and facilities for research as the leading problem. Lack of funds, few possibilities for equipment maintenance and repair, poor access to literature and bibliographic databases, limited access to the Internet, and scientific isolation were also key problems.

Cameroonian researchers were nearly unanimous in deploring researcher salaries. They generally agreed that they were unable to support their families on their income as a scientist, and most were either working as consultants, farmers or in private businesses, or else looking forward to such work in the future. IFS does not provide support to researchers for their cost of living except in the case that their research takes them away from their home institution. Nevertheless, IFS must remain aware of the difficulties that researchers encounter in supporting themselves and their families, for, as salaries stagnate and decrease, these adversities affect the amount of time that researchers can afford to devote to their scientific work.

Information regarding researchers' funding sources indicates that they are heavily dependent upon

foreign sources of funding to carry out their work. The open nature of the IFS programme does not impose strict limitations on the topic or nature of grantees' research, but this may not be the case for all foreign donors. Future research might explore the extent to which individual researchers and research teams are free to determine their own research agenda.

11.3 Communication and team research

As would be expected, grantees communicated most often with colleagues in their own department regarding their research. Meanwhile, grantees more frequently communicated with researchers in Europe than they did with their colleagues in Cameroon (but outside their department). The large majority of grantees communicated with other researchers in Africa (but outside Cameroon) only annually or less frequently. This demonstrates a concrete lack of South-South communication and research cooperation both nationally and regionally.

Though a large share of IFS travel support to grantees in Cameroon has gone towards fostering South-South communication, IFS could probably do more in this regard. Grantees find other sources of funding to visit Europe and to attend conferences in Cameroon, but sources of support to attend events in Africa, Asia or Latin America are meagre. IFS could both create a niche for itself in travel support and be a leader in supporting South-South cooperation by focusing more of its efforts towards facilitating South-South communication and cooperation.

IFS provides incentives in the form of research grants to individual scientists while recognising that through collaboration scientists generally achieve their best results. Grantees' patterns of collaboration suggest that the individual nature of the IFS grant does not hinder scientists from working in teams. For example, more than four-fifths of the journal articles that grantees gave credit to IFS for supporting were the result of team research. At the same time, IFS has succeeded in identifying individuals at an early stage in their career that remain productive members of their scientific community long after the IFS research grant has been exhausted.

11.4 Incentives

In a context where salaries are insufficient and grantees must carefully weigh the advantages of carrying out essentially unpaid research work against earning income through consultancies and other extra jobs, IFS must increase the incentives for grantees to submit final reports and publicise their research results. IFS is doing so through two new initiatives, mentorship support to increase grantee capacity in these areas and travel support linked to the successful completion of research projects. The success of these initiatives should be the subject of a future impact assessment or external evaluation.

11.5 The brain drain

Capacity for the production and utilisation of scientific knowledge is one of the many prerequisites for local and regional development. Hence, one of the primary goals of IFS is to reduce the brain drain by providing incentives and means for scientists to remain in their country and to contribute to the building of a critical mass of scientific expertise. It is a measure of the success of the IFS programme in meeting this goal that out of 84 grantees in Cameroon, only three have left Africa. An additional four grantees have left Cameroon, but are part of a continental circulation of scientists that are contributing to the science capacity of the continent. Interviews conducted indicated that some of them will eventually come back (and as of October 2003 one already has).

11.6 Grantees' assessment of IFS

Grantees' responses indicate that the importance of IFS in the research community is growing in Cameroon as the local infrastructure deteriorates. The percentage of grantees with projects that could not be carried out without IFS support has risen from levels similar to those found in Mexico (Gaillard et al 2001) to levels that are greater than the average for all of Africa (Gaillard and F Tullberg, 2000). While dependency on IFS in this respect has not yet equalled the levels reported for Tanzania (Gaillard, Zink and F Tullberg, 2001), they indicate that Cameroon is a country where the need for IFS support is great.

Areas where grantees have been critical of IFS support are assistance in the publication of their research results and follow-up activities once IFS support is terminated. Here grantees have correctly identified areas where IFS has traditionally been weak. Furthermore, they have also identified areas that can be crucial to the success of grantees in the long-term. IFS expects that its recently initiated mentorship programme together with a travel grants policy that rewards grantees for publicising their research results will address the concerns of grantees with respect to publication support. Follow-up activities upon the conclusion of IFS support could be strengthened through the establishment of IFS alumni networks that facilitate grantee communication and collaboration after formal IFS support expires. Such networks could also be important sources of support for researchers wishing to apply to IFS if they were to provide a peer-review service. One such association of former and present IFS grantees is being established in Yaoundé.

Areas of mixed success included providing access to literature, supporting the maintenance of research equipment, providing access to further research training, providing scientific counselling, and providing additional networking opportunities. While the rates of approval for these categories are considered good by the IFS secretariat, they are at the same time striving to improve them through a number of initiatives and workshops (e.g. a literature search service, mentorship support, service and maintenance workshops and network support).

IFS received the most positive assessments for its core activity: the manner in which it administers its research grants. A majority of respondents graded the IFS as excellent in this regard and all respondents were at least satisfied. The IFS selection process, the service whereby IFS purchases and ships research equipment, monitoring and follow-up of research projects, and contact with the IFS staff also received high marks from grantees in Cameroon.

In conclusion, the grantee evaluations of the IFS programme indicate that IFS support in Cameroon is well-targeted to ameliorate the most significant limiting factors to research. Furthermore, it has significantly contributed to enhancing the research environment of many scientists in Cameroon to the extent that most of them are still active in their national scientific community today.

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Appendix 1: The questionnaire

Questionnaire for IFS Grantees in Africa

N°
(leave blank)

This questionnaire is intended for all IFS grantees. Even those grant recipients no longer receiving support from the Foundation for their research work are invited to participate in this survey.

To answer, use the space provided, or circle the relevant number (1, 2, 3 ...).

I Civil status, education and mobility

1. Family name: _____ Middle name: _____ First name: _____ (underline the name under which you publish)	2. Name and address of your home institution: _____ _____ _____
3. E-mail address: _____	
4. Citizenship: _____	5. Sex: __ male __ female
6. Year of birth: 19 ____	7. Civil status: __ single __ married __ widowed
8. How many children do you have?	9. If you are married, what is your spouse's principal occupation?

10. Academic degrees obtained

Degrees	Area of specialisation	Year degree awarded	Educational establishment	Fellowship/study grant obtained from
BSc/Licence				
MSc/Maîtrise/Ingénieur				
PhD/thèse de 3ème cycle/ Docteur Ingénieur				
Post-Doc/Doctorat d'Etat				

11. List your academic visits abroad (stay of at least 2 months) since you were awarded your highest degree

Year	Institution	Country	Duration (x months)

12. How many years have you spent outside your country for higher education and training, including postdoctoral studies and academic visits abroad? _____ years

13. How many years in total have you spent abroad? _____ years

II Career

14. List all the positions you have held since the beginning of your career

Position	Employing institution	Country	Starting date	% of re-search time

15. In your present position give the approximate amount of time devoted to the different activities listed below and indicate in the second column what, according to you, it should ideally be.

Activities	Present %	Ideal %
Teaching		
Research		
Administration		
Extension		
Consultancy		
Other (specify)		

16. Do you consider that the salary you receive as a scientist is adequate to support you and, if applicable, your family? __adequate __Inadequate

17. How many times higher than the minimum salary in your country is your salary as a scientist/teacher ? _____ times more

18. In which institutional framework do you work today?

- Public University Private University
 Public Institute Private Institute
 Non Governmental Organization (NGO)
 Others (specify) _____

19. Given the institutional framework in which you work, would you consider the following elements as relative advantages or disadvantages ?

	Advantage	Disadvantage
Salary scale	—	—
Career development	—	—
Job security	—	—
Social benefits	—	—
Retirement	—	—
Others (specify) _____	—	—

20. If you have extra jobs to supplement your income and, if applicable, your family, indicate how many additional hours you spend working per week. _____hours

21. If you have extra jobs, how many times more income do they provide you with in comparison to your basic salary as a scientist ? _____ times more

22. Specify the nature of your extra jobs

<u>Teaching</u>	<u>Farming</u>
<input type="checkbox"/> Own consultancy or medical private practice	<input type="checkbox"/> Somebody else's consultancy or medical private practice
<input type="checkbox"/> Own private business	<input type="checkbox"/> Somebody else's business
<input type="checkbox"/> Other (specify) _____	

23. Compare your total family income with your salary as a scientist/teacher or and, if applicable, indicate how many times more it corresponds to: _____ times more

24. Have you been offered employment abroad? Yes No

If yes, in which country (ies)? _____

Did you accept the offer(s)? Yes No

III Research Choice and perception of research

25. Since the beginning of your research career, have you substantially changed your scientific orientation/research subjects? Yes No

26. What is your main field of science at present, e.g., agronomy, zoology, parasitology, etc.?

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

Alone With other scientists

28. Whenever you work with other scientists do you usually work in monodisciplinary or multidisciplinary research teams ? monodisciplinary multidisciplinary

29. How often do you communicate with the following people regarding your research? (1 = never, 2 = rarely, 3 = annually, 4 = monthly, 5 = more often.)

- 1 2 3 4 5 Scientists in your department
- 1 2 3 4 5 Scientists from other institutions in your country
- 1 2 3 4 5 Scientists in other African countries
- 1 2 3 4 5 Scientists in Europe
- 1 2 3 4 5 Scientists in USA or Canada
- 1 2 3 4 5 Scientists in Asia or Latin America
- 1 2 3 4 5 Funding agencies
- 1 2 3 4 5 Non Governmental Organizations (NGOs)
- 1 2 3 4 5 Private clients
- 1 2 3 4 5 Consultancy groups
- 1 2 3 4 5 Extension staff
- 1 2 3 4 5 Others (specify) _____

30. Indicate whether you agree with the following assertions by circling a number from 1 = “disagree completely” to 5 = “agree completely”.

- 1 2 3 4 5 Science is public knowledge
 1 2 3 4 5 Scientific knowledge is universal
 1 2 3 4 5 Science contributes to development
 1 2 3 4 5 Science should firstly produce knowledge
 1 2 3 4 5 Science should mainly lead to useful innovations
 1 2 3 4 5 Researchers are free to choose their own research topics
 1 2 3 4 5 Research topics are set by sponsors
 1 2 3 4 5 Research topics are set by employers
 1 2 3 4 5 Research problems are set by clients
 1 2 3 4 5 Researchers should produce goods for a competitive market
 1 2 3 4 5 Researchers should have entrepreneurial and managerial skills

IV Access to scientific literature and attendance of conferences

31. Do you have easy access to the Internet? Yes No
 32. Do you have access to bibliographic databases? Yes No
 If yes, which one(s)? _____

33. How many scientific conferences have you attended since the beginning of your research career?

Conferences	With national support	With IFS support	With foreign support**	no support
Within your country				
In Africa*				
In Europe				
In USA or Canada				
In Latin America & Caribbean				
In Asia				

*Except your own country

**Except IFS

34. How many scientific conferences have you attended outside your country during the last five years? _____ conferences

V Main Factors holding back your research work and evaluation

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

1. _____
 2. _____
 3. _____

36. Certain recurring difficulties have been listed below. Indicate by circling the relevant number (1, 2, 3, 4) whether they are 1 = insignificant, 2 = tolerable, 3 = serious, or 4 = obstructive, according to you, in your research work.

1 2 3 4	Access to equipment	Lack of technician(s)	1 2 3 4
1 2 3 4	Purchasing equipment	Field work difficulties	1 2 3 4
1 2 3 4	Equipment repairs	Access to vehicle	1 2 3 4
1 2 3 4	Access to supplies	Access to scientific documentation	1 2 3 4
1 2 3 4	Lack of time	Data processing	1 2 3 4
1 2 3 4	Others (specify) _____		

37. How do you perceive your government's attitude toward research? Indicate the attitude by circling one number between “very negative” (1) and “very positive” (7).

1 2 3 4 5 6 7

38. Which criteria are the most important for the promotion of scientists in your country? Circle one number from 1 = not important at all to 5 = very important

1 2 3 4 5	Seniority	Contribution to teaching	1 2 3 4 5
1 2 3 4 5	Contribution to development	Contribution to the institution	1 2 3 4 5
1 2 3 4 5	Publications in local journals	Publications in international journals	1 2 3 4 5
1 2 3 4 5	Award of research grants	Strategic social relations	1 2 3 4 5
1 2 3 4 5	Others (specify) _____		

39. Is your research work evaluated regularly? Yes No

40. If yes, by whom? _____

VI Research Funding

41. What was your annual research budget (excluding salaries) last year, to the nearest U.S. \$1,000 ? U.S. \$

42. What were your sources of research funds as percentages (excluding salaries) last year ?

Sources	%
Home institution	
National public funds	
Industry or private foundation (national)	
Industry or private foundation (foreign)	
International organization	
Other (specify)	
Total	100

43. List the different funding institutions from which you have received fi

VII Relative importance of IFS support and future research goal

44. Would you have pursued your research if IFS funding had not been made available?

- Yes, other support would have been available Yes, but on a reduced scale
 Yes, but in a substantially different form No
 Yes, even without other support Other (specify) _____

45. Since becoming an IFS grantee, has it become easier for you to obtain:

- | | Yes | No |
|---|-----|----|
| 1. Additional funding from your institution | — | — |
| 2. Additional funding from a national funding institution | — | — |
| 3. Additional funding from an international institution | — | — |
- If yes to 3, give name _____

46. After receiving support from IFS, did it become easier for you to obtain scientific and technical assistance from your institution?

Yes No

47. Has the IFS support provided opportunities to collaborate with new partners ?

Yes No

48. Whenever applicable, did you continue to collaborate with them once the support was terminated ?

Yes No ? Not applicable

49. How would you assess the IFS mode of work and support to your research work ? (1 = unacceptable, 2 = poor, 3 = satisfactory , 4 = good and 5 = excellent)

- 1 2 3 4 5 Selection process
 1 2 3 4 5 Grant administration (including transfer of funds)
 1 2 3 4 5 Monitoring and follow-up of projects
 1 2 3 4 5 Contacts with IFS staff
 1 2 3 4 5 Purchase of research equipment
 1 2 3 4 5 Maintenance of research equipment
 1 2 3 4 5 Access to literature
 1 2 3 4 5 Research training
 1 2 3 4 5 Scientific counselling
 1 2 3 4 5 IFS organized workshops
 1 2 3 4 5 Networking activities
 1 2 3 4 5 Assistance in the publication of your research results
 1 2 3 4 5 Follow up activities once the supported project is terminated
 1 2 3 4 5 Other (specify) _____

50. What is your future career goal?

<input type="checkbox"/> National scientific career	<input type="checkbox"/> Career in administration	<input type="checkbox"/> Career in politics	<input type="checkbox"/> Private business
<input type="checkbox"/> Own consultancy or medical practice	<input type="checkbox"/> Career within national development programs	<input type="checkbox"/> Career within foreign or international organisations	<input type="checkbox"/> Other (specify) _____

Thank you for your co-operation. Please return the completed questionnaire together with a complete list of publications (articles, books, papers in proceedings, reports, etc...) in the original language of publication, including names of co-authors, full titles of articles, books, papers, scientific journals, volume(s), first and last pages, date of publication, etc..., and **mark with an asterisk in the margin the ones which are directly derived from IFS support.**

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Appendix 5: Acronyms and abbreviations

CCCE	Caisse Centrale de Coopération Economique
CDC	Cameroon Development Corporation
CFAf	Franc de la Communauté Financière Africaine
CIRAD	Centre de coopération internationale en recherche agronomique pour le développement
CODESRIA	Council for the Development of Social Science Research in Africa
CRBP	Centre Régional Bananiers et Plantains
DEA	Diplôm d'Etudes Approfondies
DFG	German Research Council
DFID	Department for International Development
DGRST	Délégation Générale à la Recherche Scientifique et Technique
ENSA	Ecole Nationale Supérieure d'Agronomie
EUR	Euros
FAC	Fonds d'Aide à la Coopération
FASA	Faculté d'Agronomie et des Sciences Agricoles
FASA	Faculté d'Agronomie et des Sciences Agricoles
FF	French francs
FUAR	Fonds Universitaire d'appui à la recherche
GDP	Gross Domestic Product
GERDAT (now CIRAD)	Groupement d'Etude et de Recherche pour le Développement de l'Agronomie Tropicale
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
IFS	International Foundation for Science
IMPM	Institut de Recherches Médicales et d'Etudes des Plantes Médicinales
INADER	Institut National de Développement Rural
INADER	Institut National de Développement Rural
INCO-DEV	The Research for Development programme within the International Co-operation programme of the European Union
INFU	Institute of Environmental Research at the University of Dortmund
IPM	Integrated Pest Management
IRA	Institut de Recherche Agricole
IRAD	Institut de Recherche Agricole pour le Développement
IRD	Institut de Recherche pour le Développement
IRHO	Institut de Recherche sur les Huiles et Oléagineux
IRZV	Institut de Recherches Zootechniques et Vétérinaires
ISI	Institute for Scientific Information
ISP	International Science Programme
JUST	Journées Universitaires pour la Science et la Technologie
MESIA	Monitoring and Evaluation System for Impact Assessment

NGO	Non-governmental organisation
ODA (now DFID)	Overseas Development Administration
ONAREST	National Office for Scientific Research and Technology
ORSTOM (now IRD)	Office de la Recherche Scientifique et Technique Outre Mer
S&T	Science and technology
SCI	Science Citation Index
Sida-SAREC	Swedish International Development Cooperation Agency, Department for Research Cooperation
SLU	Swedish Agricultural University
UNDP	United Nations Development Programme
UNU/IAS	United Nations University Institute of Advanced Studies
USAID	US Agency for International Development
USD	United States dollars

IFS MESIA Impact Studies

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