INTERNATIONAL FOUNDATION FOR SCIENCE

IFS ANNUAL REPORT 2024–2025

IFS – DEVELOPING SCIENCE, SCIENCE FOR DEVELOPMENT

Recent IFS Annual Reports have been structured to align with our Strategy 2021–2030, with three main sections on Impact – how IFS grantees' research is being put into use; Grants – the awarding of Basic and Advanced Grants; and Capacity-enhancing support – or IFS's value as a scientific partner. We hope you enjoy this year's report!

IFS Annual Report 2024–2025

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Cover photo: Dr Allah Ditta (left) selecting cotton plants in the field, along with Mr Muhammad Akram, Pakistan Administrative Service.
All photos according to bylines or by IFS.
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Foreword

Dear friends, former grantees, supporters and funders of IFS …

I could add other groups from society who have supported IFS in one capacity or another during our 53 years of operational existence. But as most of you know now, IFS will officially cease to exist on 30 June 2025. A few years back we were informed by SIDA (Swedish International Development Agency), our main sponsor since IFS's beginning, that it would stop all support by the end of 2024. As we had been informed well in advance, we ramped up our efforts to find viable alternatives, but eventually all proved to be in vain. Covid and the Ukraine war diverted lots of funding from organisations such as ours that financed activities working to provide structural solutions to problems faced by the Global South.

In its more than five decades of existence, IFS provided some USD 100 million in grants to early career researchers in over 100 countries in the Global South. Especially from the 1970s until the early 2000s we supported grantees from a wide range of countries. Gradually, with improving socioeconomic situations, the range of countries supported was narrowed, with some of the larger ones – think China and India – that had been early recipients, even becoming interested in supporting the organisation financially. Apart from grants, we also financed capacity-enhancing activities, travel grants and participation in conferences. Over the last decade in particular, IFS became increasingly aware of the importance of putting into practice the results from the research it had been supporting. Science popularisation, policy development, interacting with a broad range of stakeholders, including policymakers and political decision-makers, became the new buzz words, and were added to our vocabulary and intervention focus.

I think all of us who were and still are involved with IFS, as well as all those who have worked for IFS, be it formally or as one of the many volunteers, can be proud of what the organisation did and eventually achieved. The positive testimonies and support messages we have been recently receiving confirm that we managed to contribute a lot and even made a difference when it came to building research capacity in the Global South.

In February 2025, we organised a last major conference in Cotonou, Benin, to document and share our legacy with the wider international development community. Representatives of our stakeholders testified, developed recommendations and shared ideas and experiences aimed at inspiring international, governmental and non-governmental organisations and the private sector to invest money in innovative ways to build research capacity.

In recent years, IFS has also supported the emergence of vibrant alumni communities in several of its focal intervention countries in Africa. We hope that they will be able to further our legacy! The latter was not only documented in the report of the Benin 2025 conference (as you will see in this report), but also through the many historical documents that we left with the Swedish national archive, which can be accessed for further information. I am confident that our legacy will in future be shared by all of you who have been with us for all these years. You, our staff, alumni, collaborators, volunteers, and friends are and will be the living testimony of what an organisation like IFS has done and should do. Thanks for that!

As a last word, I wish you all the best: vive valeque!

PHOTO: PETR ZMEK, CZU

Dr Patrick Van Damme
Interim director of IFS

Summary

This year's IFS Annual Report covers 2024 through the organisation's closing on 30 June 2025. Our work is presented so that the Impact of how grantees' research is put into use is at the forefront, along with Capacity-enhancing Support activities, and a retrospective and prospective Postscript. No new research grants were awarded in 2024–25, although we were able to provide 270 Supplementary Grants, totalling USD 600,000, in our final year.

Impact

We supported and followed up with 116 grantees of 2020 who were finishing their research. Through a representative selection of research results and achievements of grantees, IFS has documented evidence of numerous impacts from its support for the research of early career scientists. So far, they have published 87 articles in peer-reviewed scientific journals and established numerous national and international scientific contacts. Of the 56 grantees who submitted their Project Completion Forms, all but four are working in their home countries. While the majority are affiliated with universities, six are with research institutions and four with national or governmental bodies. Overall, IFS grantees are using their research in immediate, near-term and long-lasting ways, in communities, villages, forests, fields, policy discussions, government practices and the global scientific community. For example, impact has been demonstrated through:

- Careers being launched
- Useful research coming from relatively small grants
- Peer-reviewed scientific publications and other media products resulting from research
- Women scientists succeeding at high rates
- Graduates and postgraduates returning to a science community in their home countries
- Successful alumni associating in support of each other and younger colleagues
- Like-minded scientists participating in disciplinary and interdisciplinary networks
- Scientists in less-resourced countries having access to a source of funding
- Influential individuals who acknowledge the support of IFS in developing their careers
- Scientists working and researching together across continents and building strong, lasting scientific relationships, and
- Building institutional capacity.

Featured in this year's Annual Report are two essays on "Impact of IFS on my life" by Professor Silvana Vero of Uruguay and Dr Samson Shimalse Jemaneh of Ethiopia.

Capacity-enhancing Support

In 2024–25, IFS jointly engaged with several strategic partners in four capacity-enhancing support activities on topics including food sciences and technology (IUFOST), natural resources (Tropentag), mentorship (SEARCA), and data analysis (R learning workshop). Former and current grantees continued to be supported through mentoring and coaching, and we also supported our alumni to associate in former grantees' countries, and to meet in Nairobi, Kenya; Hanoi, Vietnam; and Grand-Bassam and Abidjan, Côte d'Ivoire.

Postscript

In this final section, we respond to questions about IFS's past, present and future, touching upon our history, origins, operations, grantees, impacts, women's focus, reviews, the closure, our final round of Supplementary Grants, and the initiatives and aspirations of our alumni.

IFS Strategy

The IFS Strategy 2021–2030 – Investing in Future Scientists – represents an evolution in IFS's approach to enhancing research capacity, driven by changes in the contemporary context. While IFS continues to emphasise the quality and development relevance of the research it supports, the 2021–2030 Strategy sets out the case for increased resources for the support of promising early career scientists as essential to addressing national and global challenges. Building on five decades of experience, the Strategy reaffirms the organisation's vision of scientists in Low- and Lower-Middle-Income Countries (LLMICs) assuming ownership and development of local and regional research agendas and contributing to a global research community committed to supporting sustainable development and building science literacy.

IFS's Theory of Change is that investing in research and complementary skills of promising early career LLMIC scientists enhances research capacity, thereby helping secure the cadre of LLMIC scientists needed to participate in the generation of the science, technology and innovation, and supporting policies, essential to eliminating poverty and hunger.

To realize its vision, IFS's Mission is to enhance the capacity of early career women and men scientists in LLMICs to acquire the skills needed to conduct research and communicate their results, contribute to science literacy, influence science priority setting, and network and collaborate with the global research community to shape research agendas, both local and global.

The overall objective is to enhance capacity of early career scientists in LLMICs to conduct relevant research, increase science literacy, and influence research agendas at local, regional and global levels.

Specific objectives are to support:

1. The generation and dissemination of scientific knowledge produced by early career LLMIC scientists, and
2. Enhanced capacity of early career LLMIC scientists to influence, lead, network, fundraise and put research into use.

IFS provides tailored research capacity-enhancing support to promising early career scientists centred around the provision of individual Basic Grants and Advanced Grants.

Capacity-enhancing support includes training workshops, usually with partners, in such topics as science writing, putting research into use, data protection, and ethics in research. Support may also be provided to help grantees purchase equipment, visit laboratories, attend conferences and present research results.

Dr Sandra Akugpoka Atindana using a multiparameter water quality meter in the Anyanui coastal watershed.

IMPACT

Putting grantee research into use

IFS's vision is for scientists in Low- and Lower-Middle-Income Countries (LLMICs) to contribute fully to a global research community committed to reducing poverty and supporting sustainable development, both nationally and regionally. It monitors realisation of its vision through a number of output- and outcome-related metrics, including:

> Increased numbers of LLMIC early career women and men scientists supported
> Increased support per scientist, in terms of grant support, mentoring and capacity-enhancing activities
> Increased numbers of publications, including in more high-impact journals
> Improved research and research-associated skills, including organisational, communication and interpersonal skills
> Greater translation of research into use, through involvement in evidence-based decision-making and uptake of science, technology and innovation (STI) by society
> Improvements in science literacy, via the development of research communities, including Alumni Associations, and
> Improved career pathways.

Grantee performance is monitored through project reports when the grant is finalised. These consist of a scientific report of the grant progress, any scientific publications that are a direct outcome of the IFS grant, and responses to an IFS questionnaire called a Project Completion Form (PCF). In the online PCF, grantees are asked to answer more detailed questions regarding any "indirect" results of the IFS grant, e.g. the number of colleagues and students that benefitted from the grant, any promotion, increased scientific networks, or additional funding that has been obtained.

The PCFs capture early career scientists' own assessment of how their skills have developed as a result of IFS support; the PCFs also facilitate the assessment by scientific peers of grantee development as researchers. Data are analysed to identify the aspects of research grant support and complementary activities that can be improved to better support research capacity enhancement and validate the assumptions underpinning the approach. In addition, IFS conducts periodic countrywise surveys with grantees, in particular to more clearly understand their research and career achievements.

Dr Workiyie Worie Assefa (left) and adviser Dr Belachew Getnet making a preliminary reconnaissance survey aimed at identifying suitable sampling locations within the wetlands of the Fetam River watershed, situated in the Upper Blue Nile Basin (Bure and Wonberma districts). These sites were used for physicochemical and macroinvertebrate sampling.

A selection of research results and achievements of IFS grantees

IFS grantees are contributing significantly to changes around the world, through their commitment to scientific advancements, their enthusiasm to learn and to work with others, and their attainment in getting their research results put into use at local, national and global levels. In 2024, we followed up on the results and achievements of the 116 grantees awarded grants in 2020. (For a detailed list of approved projects we refer to the IFS Annual Report 2020.) As gleaned from 56 grantee responses to the questions on the Project Completion Forms (PCFs), numerous impacts are evident from IFS's support of early career scientists, in immediate, near-term and long-lasting ways, in villages, forests, fields, policy discussions, government practices, and the global scientific community. The results and impacts of grantees' research are documented in the 88 (so far) publications relating to their IFS-supported work as reported during the grant period. (A selection of 2020 grantee publications can be found in Annex 1.) In terms of how the results of their IFS-funded research have been put into use, 2020 grantees mentioned contact with government officials or local communities with whom research outcomes have been shared, as well as the uptake of practices by people who were involved in the project.

Of the 17 UN Sustainable Development Goals that their research projects were meant to address, the top six were:

SDG 1: No poverty
SDG 2: Zero hunger
SDG 3: Good health and well-being
SDG 12: Responsible consumption and production
SDG 13: Climate action, and
SDG 15: Life on land

Commonly throughout the responses in the PCFs, grantees mentioned reduced interactions with communities and potential end-users due to the Covid pandemic, in addition to reporting delays and practical problems in their project implementation due to pandemic restrictions. Most of the grantees reported that other persons in their institutions benefitted from their grants. Fifty-one IFS grantees mentioned 226 other scientists, 48 reported 116 technicians and 55 at least 679 research students. Fourteen grantees mentioned more than 43 scientists, technicians, students or collaborators from other institutions, while eight others reported local communities, farmers, producers, forest and park staff, or indigenous people who benefitted from their grant. Five grantees specifically mentioned local technicians, fieldworkers and local vendors as beneficiaries of their grant. Only seven of the 56 respondents did not mention any other benefits to their home institution resulting from the IFS grant, while the others indicated a wide variety of benefits.

Most important and most often mentioned were direct and indirect benefits resulting from the purchase of scientific equipment as well as expendable supplies, enabling laboratory technicians to be trained in the use and maintenance of advanced equipment, and other early career scientists to carry out their own research projects. The purchase of scientific equipment also contributed to increased capacity-enhancement for students, trainees and other researchers through improved teaching and research capacities.

Fifty-two respondents reported establishing multiple professional contacts, most commonly with other scientists in their own or other countries and other IFS grantees in their own countries. Forty-three grantees mentioned contacts with 113 grantees in their own country, while fifteen established contacts with 74 grantees in other countries. Forty-five grantees had contact with 221 scientists in their own country and 30 had 89 contacts with scientists in other countries. Twelve grantees established contacts with 22 national IFS advisors while 19 had contact with 34 IFS advisers from other countries.

Forty-one respondents reported a wide variety of 84 learned societies or scientific networks that they are involved with, 41 being national organisations and the others international or regional. As examples, organisations with more than one IFS grantee reporting involvement include:

> African Association of Insect Scientists
> American Society for Microbiology
> Association Béninoise de Pastoralisme
> Biotechnology Society of Nepal
> Botanical Society of Nepal
> Entomological Society of Nigeria
> IFS Women in Science
> Mycological Society of Nigeria
> National Young Academy (NaYAN) Nepal
> Organization for Women in Science for the Developing World, and
> Soil Science Society of Zimbabwe

IFS support contributed to PhDs that twelve respondents obtained and facilitated enrolment of seven grantees whose PhD research is still ongoing. Twenty grantees were promoted a total of 27 times. A variety of other forms of international, national or institutional recognition were mentioned by one or several grantees, such as international or national research grants; awards and prizes; travel grants to international workshops; being an invited speaker; institutional or national representatives on research boards; or additional institutional administrative tasks.

Twenty-three grantees reported that they had received additional funding, with 17 having one opportunity and seven from two to eight sources. Twenty of the twenty-eight research funding bodies who also supported IFS grantees were a wide range of recognised, highly regarded international bodies, such as:

> Carnegie Corporation of New York
> CIMMYT
> DAAD, Germany
> Direct Aid Program (DAP), Australia
> Fulbright Scholarship program
> ICT Virtual Organization of ASEAN Institutes and National Institute of Information and Communication Technology (NICT) (ASEAN IVO), Japan
> Islamic Development Bank (IsDB)
> RUFORUM
> Save Our Seas Foundation, Switzerland
> The World Academy of Science (TWAS)
> USAID
> VLIRUOS, Belgium, and
> Western Indian Ocean Marine Science Association

As an indication of national recognition, seven grantees received additional support from funding bodies in their own countries:

> Bahir Dar University, Ethiopia
> Government of Uganda
> Kyambogo University, Uganda
> Sokoine University of Agriculture, Tanzania
> Tanzania Commission for Science and Technology, Tanzania
> Tertiary Education Trust Fund (TETFund), Nigeria, and
> VINIF, Vietnam

Forty-seven respondents are living and working in their home country while four are working at universities or institutions in other countries, including France, Netherlands, UK and USA. Forty-two grantees are affiliated with universities, six with research institutions and four with national or governmental bodies. Five grantees were enrolled in PhD programmes while 36 have full-time positions and one works on a volunteer basis. Most of them are involved in teaching and research. While many do research that deals with issues of relevance to local communities, only four explicitly stated that they are involved in outreach and community service. Six grantees had affiliations with more than one research institution or university.

The following quotes are examples of what 2020 grantees view as the significance of the IFS support for their careers:

Through the IFS grant, I have learnt everything about research and the process of writing a winning grant application. I have also gained skills in grant implementation, writing peer-reviewed-publications and report writing. The skills gained in academic research have been tremendous. I have been able to offer the right supervision and guidance to undergraduate students in their final-year research projects. I have also had the opportunity to mentor students in grant writing and research. Additionally, I have been promoted to a Lecturer position by Kenyatta University.
Dr Julius Maina Waititu, Kenya

IFS support has significantly enhanced and improved my research career as a woman early career researcher from a developing country, where research is not often supported. Researcher scientists from countries like mine are mostly searching for fellowships or grants like IFS to conduct their research with necessary equipment and to challenge other researchers around the world. Having a passion for science in general and research in particular, I am grateful to IFS for giving me this opportunity to realise this research project.
Dr Peguy Djuidje, Cameroon

The support I received from IFS has been invaluable to my career. It not only facilitated my research in eco-hydrology and nature-based solutions but also significantly enhanced my academic and professional trajectory. The IFS grant allowed me to focus intensely on my projects in the Lower Mekong Region, contributing to a deeper understanding and implementation of sustainable urban drainage systems. This focus has solidified my position as a committed researcher and educator in my field, furthering my journey towards meaningful contributions in environmental sustainability and education. The IFS support has indeed been a cornerstone in my career development.
Dr Loc Ho Huu, Vietnam

This opportunity has given me the next level of experience beyond the laboratory activities and helped me to understand why scientists should interact with stakeholders to understand the true value and the things happening in nature. Moreover, I had an opportunity to share my experience during the field visits and my research findings with the government which helped to bring the issue of P. pollyphyla *into policy discussions as well as new ways of collaboration, which is the significance I got from the IFS grant.*
Dr Bal Kumari Oliya, Nepal

Thanks to the IFS grant, I have expanded my research career to a broad field. I have collaborated with other Vietnamese scientists working on mechanical engineering who fabricate a 3D-in-printing machine for tissue engineering applications. As a biologist, I understand that the broad collaboration with other fields of research could benefit me in not only gaining more scientific knowledge but also increasing my chances for future joint projects.
Dr Thi Hong Minh Nguyen, Vietnam

The funding I received from IFS had a significant impact on the development of my professional career. I obtained it at a time of uncertainty when I had just defended my thesis and didn't have a permanent position at the time. Obtaining this funding was a real wake-up call, because it opened my eyes to my abilities as a young researcher, and therefore to my duty to persevere to achieve the goals I had set myself in my professional life. The following year, I was recruited by the university, and thanks to this self-confidence, I was able to draw up other bankable research projects, which now enable me to carry out my research activities in the best possible conditions.
Dr Mariama Ngom, Senegal

The funding support has given me the independence to conduct good research, train junior scientists and mentor colleagues within Africa, especially in my institution. The impact on the trained junior scientists has already yielded results with opportunities for employment and furthering of their education locally and internationally. It served as a springboard for the opportunity to be at University of Greenwich to further sharpen my research skills and establish collaborations. I can't wait for the next chapter of opportunities once I start communicating the findings of the research via publications, conference presentations and community engagement.
Dr Osman Adamu Dufailu, Ghana

The IFS support provided me with the opportunity to conduct cutting-edge research on wheat resistance, leading to valuable findings that have enhanced my expertise in plant breeding and genetic improvement. The grant facilitated important collaborations with international research organizations and institutions, broadening my professional network and opening doors for future research opportunities. Additionally, the IFS support helped me secure further funding and recognition, including a Postdoctoral Fellowship funded by the Islamic Development Bank. Overall, the IFS grant has been instrumental in advancing my career and contributing to my growth as a researcher.
Dr Fahim Ullah Khan, Pakistan

The support of IFS means important support for my career since it gives me the opportunity to grow not only in the line of research that I have and am strengthening with the grant, but also to support collaborative ties with other national or international institutions.
Dr María Eugenia Flores-Giubi, Paraguay

IFS is one of the research funding hopes for upcoming scientists in the Global South, especially in Nigeria and African countries. IFS supported my career and enabled me to have the experience of being funded. I have been able to mentor many other growing scientists through the IFS funded project. This is an incredible addition to my portfolio. I am grateful to IFS.
Dr Taiwo Crossby Omotoriogun, Nigeria

In a country like Nepal, working in science and technology as a researcher has many challenges. Despite the odds, my continuous hard work and seeking other researchers' help from different institutions meant I could successfully complete my PhD degree with the help of the IFS grant support, and now I also can continue research in various dimensions of natural product chemistry.
Dr Janaki Baral, Nepal

DR AGBÉMÉBIA YAWOVI AKAKPO
Research Center in Biological, Food and Nutritional Sciences of Joseph KI-ZERBO University, Burkina Faso

Development of nanoemulsion oil formulation from Cymbopogon citratus *essential oils and application into fresh soymilk and tiger nut milk production in Burkina Faso*

Tiger nut milk and soy milk are popular beverages in Burkina Faso. Despite their nutritional and socio-economic importance, these beverages, produced using local traditional methods, have a short shelf life due to microbial deterioration. Although chemical preservatives have been found satisfactory in inhibiting and/or delaying the development of spoilage bacteria, restrictions imposed by international organisations on the use of synthetic preservatives due to their short- or long-term toxicological and carcinogenic effects have sparked renewed interest in developing more innovative and natural preservation approaches. Recently, the application of essential oils (EOs) has received attention from both researchers and agrifood companies, as they present rich potential sources of bioactive molecules. However, stabilisation remains a crucial problem for local processing units. Thus, the objective of this project was to stabilise tiger nut milk and soy milk through the antimicrobial efficacy of the *Cymbopogon citratus* EO emulsion. The results showed that collected milk samples had a high microbial load in total flora, and milk preservation tests showed stabilisation under storage at 4 °C for 21 days with a concentration of pure EO greater than 0.30% compared to 0.15% for the emulsion. Under storage at 25 °C, the stabilisation time was 3 days with 0.40% of pure EO compared to 0.15% for the emulsion. Although the results are not in practice yet, some advice was given to tiger nut milk and soymilk manufacturers on the elaborate process and the concept of the use of good hygienic practice to produce microbial milk for a long preservation.

DR TRẦN DUNG
University of Science, Vietnam National University, Ho Chi Minh City (VNUHCM-US), Vietnam

Mercury in the environment around the coal-fired power plants in the Mekong Delta, Vietnam

In recent years, Tra Vinh, a coastal zone in the Mekong Delta, Vietnam, has faced significant developments in thermal power plant operations, raising concerns about mercury (Hg) and trace element pollution. To better understand pollution dynamics over time, this study sought to assess the contamination levels of Hg and trace elements using Sediment Quality Guidelines (SQGs) and pollution indices, evaluate their mobility and potential ecological risk, and analyse seasonal trends in sediment quality. The project assessed the Hg levels in the environment around coal-fired power plants and investigated the human health risk of local people from exposure to Hg. The assessment of sediment quality reveals a persistent pollution status in sediments along with a consistent ecological risk, particularly for arsenic (As) and Hg, the most concerning pollutants. These findings highlight the need for pollution management. The outcome of this study is useful for local managers and communities to understand the Hg levels in the environment as well as the potential hazards associated with exposure to this element. This project is of significance for filling gaps concerning data on Hg in Vietnam in particular, and in developing countries where coal power is primary energy in general.

DR KAINA AYÉKI
Université de Lomé, Togo

Sustainability of fuelwood production systems and supply chains in the Central Region of Togo

In the face of climate change and the challenge of sustainable development, renewable energy sources such as bioenergy are often considered a stop gap measure to meet energy needs. However, the high demand for this energy increases pressure on wood resources, thus compromising their sustainability for future generations. The central region of Togo, despite being a biodiversity conservation area containing 68.84% of the national species wealth, remains one of the main providers of wood energy. Increased knowledge of wood energy production models or systems can be a tool for the preservation and sustainable management of wood resources in this region. This study contributed to a better understanding of the characteristics of wood energy production models to propose a process for a sustainable wood energy sector in the central region of Togo. The project results are now being used by the Environment Ministry to increase awareness of better wood energy production models amongst farmers. Dr Ayéki is also associated with a programme named WACA that trains master students and an NGO on wood energy production species and its sustainability, thus increasing the impact of her study further.

DR ANNE NYAMBURA KARUMA
University of Nairobi, Kenya
Effect of watering regimes on taro (Colocasia esculenta) *yields in Embu, Kenya*

In the tropics, taro is an important staple food in the human diet. Taro has suffered low production in Kenya due to various factors, among them its utilisation. Taro is primarily grown in riverbeds, although they are deteriorating due to climate change and periods of water scarcity. To increase taro production, there is a need to understand the edaphic and crop management factors that affect the crop. This study investigated the best watering regime for improved taro yields in the semi-humid areas of Kenya. As a result of the project, farmers in the research area are actively exploring the potential of growing taro in upland regions, as an alternative to the traditional swampy areas. The utilisation of moisture beds in taro cultivation allows drip irrigation to be implemented in plant rows, and some farmers have already adopted this approach with great success. Dr Karuma attended farmer field days at the research centre and witnessed the enthusiasm of some farmers to implement this innovative technique on their farms.

DR NANDRIANINA RAMIFEHIARIVO
Laboratoire des RadioIsotopes, University of Antananarivo, Madagascar
Soil fertility mapping of main rice production areas in Madagascar

Approximately 95% of global population growth is occurring in developing countries. In Madagascar, the population growth rate is high at 3%. The increasing population results in a mounting pressure on food production leading to intensification of agricultural activities. This can in turn lead to soil degradation, a decrease in soil fertility and a decline in agricultural productivity. It is therefore essential to understand the state of soils, particularly their fertility, to adjust cultivation practices to ensure their sustainability. Using remote sensing software and geographical information systems coupled with field observations, it is possible to digitally map soil fertility. However, there are multiple methods to analyse the data. This study identified the most accurate methods for digitally mapping soil fertility in Madagascar's rice-growing plains. The data from Dr Ramifehiarivo's project are now being used in another project to improve soil phosphorus prediction using infrared data. The carbon map produced by this IFS project will be used as part of the annual soil degradation assessment of Madagascar by the Ministry of Environment and Sustainable Development.

DR OUMAROU ZANGO
Université de Zinder, Niger
Quality and establishment of a pollen bank of date palms in Sahel area

In the Sahel, ongoing climate change has in recent decades caused droughts that have made populations highly vulnerable to famine. In this context, the date palm, an iconic species of arid zones and with great phenological plasticity, can play a bigger part in Sahelian agriculture. The date palm is a dioecious species, which means each plant is single sexed. For it to produce dates, both male and female plants must thus be on the same land and flower synchronously. In the Sahel, the date palm has two production seasons, of which the first is most productive in quantity, yet produces dates of poor quality due to the early arrival of the rains. The second season, which ends in the dry season, is the least productive in quantity, but is the most profitable. It mainly features female plants and fewer male plants, and therefore produces less pollen. This study provided innovative solutions to practical problems in date production, to improve food security and incomes of poor date farmers in the Sahel. As a result of this project, farmers have adopted pollen techniques for harvesting, drying and preserving pollen at room temperature and pollinating female inflorescences. One farmer is developing his business during the dry season using preserved pollen. He has been marketing pollen preserved from the previous wet season. This previously little-known practice among farmers has become a lucrative business today through Dr Zango's work.

DR WINNIE OKEYO
Kenya Agricultural and Livestock Research Organization, Kenya
Population structure of G. pallidipes *in Turkana and West Pokot counties in Kenya*

Tsetse flies are the main insect vectors responsible for transmission of the trypanosome parasite, the causative agent of Human (HAT) and Animal African Trypanosomiasis (AAT). Both diseases cause great economic losses owing to the morbidity and mortality of humans and animals. To date, no vaccines exist against HAT and AAT, and available drugs are expensive and difficult to administer. Control of the diseases through vector control has proven viable through the Sterile Insect Technique (SIT) in specific locations. This has highlighted the need to understand the dynamics of the genetic diversity of G. pallidipes, the most widely spread tsetse species in Kenya. While previous work has been conducted on populations along the Kenya-Tanzania border, *G. pallidipes* populations in Northern Kenya have not been analysed. To create a clearer picture of the genetic connectivity of *G. pallidipes* Kenya-wide, this study sought to map the population structure of *G. pallidipes* in Turkana and neighbouring counties by assessing the presence of and analysing the genetic structure of *G. pallidipes*, as well as investigating the infection status of the trypanosome parasite. The results from the geographical description of *G. pallidipes* presence in Turkana County has been shared with Dr Okeyo's collaborators, KENTTEC, to be included in their world atlas for tsetse and trypanosomiasis. Information about the possible genetic isolation of *G. pallidipes* from northern Turkana (Oropoi) has also been shared with KENTTEC as a possible first target site for SIT in Kenya.

DR ROMUALD HOUNYEME
UNESCO Chair of Mathematical Physics and Applications (ICMPA), Benin

Bayesian inference modelling of the ecological status of a tropical lagoon under the influence of multiple pressures: Case study of Nokoué Lagoon, Benin

Many of Africa's aquatic ecosystems are deteriorating year by year. At the same time, measures for monitoring and assessing the state of these ecosystems are in most instances extremely poor. This project sought to analyse the ecological status of a freshwater lagoon in Sub-Saharan Africa (Nokoué, Benin) that is subject to strong anthropogenic pressures, with the goal of optimising its management. However, due to the lack of long-term physicochemical, biological, functional and pressure data, as well as reference stations, the project focused on data collection and developing ecological monitoring tools. A local database was established, and the methodological approaches developed using Bayesian inference have proved valuable in monitoring the ecological status of the Nokoué lagoon. These developed tools have been instrumental in identifying key physicochemical parameters and functional metrics that indicate the lagoon's health, allowing for more targeted and effective management strategies. The multimetric indices derived from the selected metrics are currently being used to assess the ecological quality of the lagoon on an ongoing basis. These indices are also being considered for application in similar aquatic ecosystems within the region, offering a scalable approach to ecological monitoring and management in Sub-Saharan Africa. Additionally, the reference stations defined through this work are serving as baseline points for future monitoring efforts, helping to track changes in the ecosystem more accurately and to inform restoration initiatives.

DR WORKIYIE WORIE ASSEFA
Blue Nile Water Institute, Bahir Dar University, Ethiopia

Development of macroinvertebrate-based multimetric wetland index of biotic integrity for assessing wetland ecosystems health in Upper Blue Nile Basin (West Gojjam), Northwest Ethiopia

Invertebrates are one of the major elements of wetland biodiversity and play an important role in the decomposition, nutrient cycling, and translocation of materials between the lower and higher trophic levels in wetland food webs. They can also be used as indicator organisms for monitoring the ecological conditions of aquatic ecosystems, as studies have demonstrated that macroinvertebrate assemblages have responded to anthropogenic and natural influences. However, environmental gradients can vary considerably among various wetlands even within neighbouring wetlands, resulting in different assemblages. This suggests the need for more research at the local level. This project focused on understanding the relationship between macroinvertebrate assemblages and physicochemical variables in wetlands affected by agricultural activities and to develop a robust multimetric index (MMI) for assessing wetland health in the Upper Blue Nile Basin, specifically in the West Gojjam region of Northwestern Ethiopia. The results of the project have practical potential use in the assessment of wetland ecological conditions in predominantly agricultural landscapes in the Upper Blue Nile Basin and beyond. The developed MMI has been successful in detecting the effects of anthropogenic pressures on macroinvertebrate community assemblages and has been endowed with high precision, good responsiveness, and higher sensitivity in distinguishing impacted sites from reference sites. This indicates its worth for practical use in assessing wetland ecological conditions.

DR DAWIT HAWARIA LOGITA
Hawassa University, Ethiopia

The impacts of water source development on the malaria vector bionomics and diseases transmission, Ethiopia

Major investments in water resource development are taking place in Ethiopia, both small and large scale, but how these environmental modifications are impacting the risk of malaria is unclear. As in many developing countries, Ethiopia is building massive irrigation schemes to address issues of food insecurity. While irrigation schemes answer food security questions, they may exacerbate other health problems like malaria. Mosquitoes that transmit malaria breed and lay their eggs in shallow pools of water and irrigation canals provide shorelines that may contain many such shallow pools. Therefore, this study assessed the

impact of human-induced environmental modifications due to irrigation and shifting agricultural practices on the epidemiology of malaria in Ethiopia. It found that irrigation agriculture increases malaria incidence, vector density, and anopheline mosquito breeding habitats in Ethiopia. These findings have important implications for the Ethiopian healthcare system and have been communicated to the local health authorities as intervention-guiding information.

DR MOUSSA DJAOUDA
University of Maroua, Cameroon

Monitoring water sources for environmental reservoirs of Vibrio cholerae with its O1 serogroup and toxigenic subpopulations in the cholera endemic areas of North Cameroon

Cholera has been endemic in the Lake Chad basin, including north Cameroon, since 1971. Potential cholera hotspot reservoirs, including polluted surface waters and groundwater, have been pointed out in previous research. However, the relationship between the cholera outbreaks and the persistence of pathogenic Vibrio cholerae O1 epidemic strain in the water sources remains largely unknown. This study investigated the water sources in the cholera endemic areas of north Cameroon for contamination with V. cholerae O1 with pathogenic potential, to highlight their role in disease transmission. Of 30 water sources investigated, 21 were positive for V. cholerae culture, but none of the isolated strains were V. cholerae O1. Resistance of the isolates to some antibiotics was also assessed, and results indicated a significant circulation of resistant strains of V. cholerae in the waters. Hence, continuous environmental surveillance for the presence of V. cholerae in water sources is necessary to take preventive measures in a timely manner. As a result of this study, awareness has been raised among the population in some endemic cholera areas in Cameroon (e.g., Bibemi, Maroua, Mokolo), where locals are now treating water, especially from streams, before its use for drinking to prevent waterborne diseases.

DR SANGAY TSHERING
College of Natural Resources, Royal University of Bhutan, Bhutan

Diversity and distribution of bat communities along an elevational gradient in the districts of Haa and Gasa, Western Bhutan

Bhutan is estimated to have a record number of 65 bat species, and the second highest bat diversity among South Asian countries. However, detailed information about these 65 species – such as genetic diversity, distribution, location and habitat data – are missing. Furthermore, the actual number of bat species present in Bhutan remains uncertain. At present, diversity and distribution information is available for species recorded from nine districts, while the remaining 11 districts are still data deficient. To contribute to knowledge on Bhutan's bats, field studies were conducted on the distributions and diversity of bat communities along an elevational gradient in the Districts of Haa and Gasa, Western Bhutan. This research project contributed three new species records for the country. As a part of the project, capacity-building events and conservation awareness programmes were conducted with stakeholders from the Department of Forest and Park Services. Foresters were inspired to start working with bats, and so far, three foresters have conducted research in different regions. The results from this project were used by the foresters as reference data and have also been used by national authorities and research institutes to compile and finalise baseline data for the country. Two book chapters have been written based on this study, which are being used by foresters to monitor bat populations and to protect against the loss of roosting caves and feeding habitats. This has also contributed to positive attitudes towards bats, and as a result, less bats are harmed or killed.

DR SAFINA MUSA
Kenya Marine and Fisheries Research Institute, Kenya

Estimation of nutrient loading in the waste of Nile Tilapia reared in cages in a eutrophic lake

With the rapidly growing trend of cage fish farming in freshwater, practices to enhance fish farming sustainability are increasing. This study estimated how different levels of phytase enzyme affects the growth performance and nutrient load of tilapia reared in cages. The most significant increase in growth was observed in the groups that were given a diet supplemented with phytase at 4000 FTU kg−1 of feed. These groups reached a slaughter size of 420.2±6.6 g and experienced weight gain approximately three times greater than the control group. The groups mentioned above had the lowest feed conversion ratio and highest protein efficiency ratio, which were significantly different from the other supplementation levels. Hence, it is advisable to add phytase at a concentration of 4000 FTU kg−1 of feed to improve the growth performance and increase the availability of nutrients, while also minimizing waste in the cage culture of tilapia. Dr Musa has trained feed producers on the importance of using phytase in feed formulation. Currently,

phytase enzyme is being incorporated in fish feeds for cages around Lake Victoria, Kenya.

DR CHEFOR FOTANG
Center for Indigenous Resources Management and Development Institution (CIR-MAD), Cameroon

Plant diversity, ant availability and conservation status of wild Nigeria-Cameroon chimpanzee in Kom-Wum Forest Reserve, Northwest Region, Cameroon

Over the last three decades, the wild chimpanzee populations in tropical Africa have declined by more than 66%. The Nigeria-Cameroon chimpanzee population is the least numerous and least studied out of four subspecies, with only about 3,500 to 9,000 individuals remaining in the wild. Their population has decreased by more than 50% over the last thirty years due to habitat loss, bushmeat hunting, and trafficking of body parts for traditional medicine. Strategies to prevent further population declines include estimating population abundance, studying their ecology, intensifying law enforcement, and engaging communities to reduce hunting and habitat destruction. Chimpanzees are dependent on fruits for part of their diet, but insects, including ants, are another significant dietary component. To prevent further decline of the Nigeria-Cameroon chimpanzee population, this study elucidated the ecology of its habitats by determining plant diversity, density, and fruit availability, army ant availability and relative abundance, and determining trends of illegal activities in relation to chimpanzee populations in Kom-Wum Forest Reserve in Cameroon. The findings of this project showed that the Kom-Wum Forest Reserve is home to a diverse range of plant species, including several threatened ones essential for maintaining ecosystem balance and supporting wildlife, particularly the Nigeria-Cameroon chimpanzee. As a result of Dr Fotang's research, the Kom-Wum Forest Reserve has been recognised as an Important Plant Area. A comprehensive final report was also submitted to the Government of Cameroon and other relevant parties, emphasising the designation of the Kom-Wum Forest Reserve as a newly recognised Important Plant Area.

DR NGO THANH SON
Vietnam National University of Agriculture, Vietnam

Integrated assessment of nonpoint pollution sources and water quality responses in agricultural watershed of northwestern Vietnam

The global challenge of managing water resources is increasingly influenced by non-point source pollution, particularly in agricultural watersheds. The Upper Ma River Basin in northwestern Vietnam is currently undergoing rapid land use changes and experiencing the effects of climate variability. To understand how land use transitions and climatic factors impact hydrology and water quality in the basin, this project utilized the SWAT (Soil and Water Assessment Tool) model to simulate hydrological and water quality responses to real and projected changes for the period from 2010 to 2030. The results from this study have laid the foundation for developing Total Maximum Daily Load programs to assess and manage pollutant loads, allowing authorities to allocate specific load reductions at key watershed sites effectively. Based on the study, sustainable land-use practices, such as buffer strips and terracing, were recommended to reduce sedimentation and manage pollution. These strategies are designed to mitigate the impact of agricultural runoff and deforestation, ensuring better land-use planning for local authorities. The study provided a framework for integrating water quality models with land use components. It informs zoning laws to limit deforestation, strategies for reservoir construction, and adaptive policy frameworks to mitigate the compounded effects of climate change and land use pressures. The project included a socio-economic survey to understand the local practices affecting water quality. This participatory approach enabled direct engagement with communities, helping raise awareness and guide localised interventions to improve water management practices.

DR SANDRA AKUGPOKA ATINDANA
C.K. Tedam University of Technology and Applied Sciences (CKT-UTAS), Ghana

*Application of inorganic and organic proxies in determining water quality and health of the West African mangrove oyster (*Crassostrea tulipa*) in Ghanaian coastal waters*

Water quality is essential for sustaining aquatic ecosystems and supporting human uses such as fisheries, agriculture, and recreation. It is influenced by both natural and anthropogenic factors, such as climate, geology, and pollution. The Keta Lagoon and Densu Estuary are two Ramsar sites in southern Ghana that play a crucial role in providing food, economic benefits, and ecological services to surrounding communities. However, these water bodies face varying degrees of environmental stress, with the Densu Estuary experiencing significant pollution from nutrient and trace metal loads, and potential contamination from an abandoned burial ground. In Ghana, several water quality indices have been used to assess aquatic systems, but none have incorporated macroinvertebrate-based proxies alongside hydrological properties. Biological proxies, such as macroinvertebrates, chlorophylla, and bioindicators, help assess productivity, pollution, and ecological stability. Bioindicators, including specific species or communities, are particularly valuable in long-term monitoring and environmental impact assessments. This study monitored physicochemical parameters influencing the growth of *Crassostrea tulipa* (West African mangrove oyster), assessed biological indicators of water quality using macroinvertebrates in the Densu Estuary and Keta Lagoon, and evaluated the wellbeing, or condition factor, of *C. tulipa* in the waterbodies. As a result, two water quality indices have been developed for the two waterbodies which have been shared with the Water Resources Commission, Digital Observer for Protected Areas (DOPA) and the Water Research Institute (WRI) for use in management activities.

CAPACITY-ENHANCING SUPPORT

IFS supports promising early career scientists through a flexible but structured process, centred around securing funding to conduct research in the researchers' home countries, complemented by the provision of capacity-enhancing activities, coordinated by the IFS Secretariat, and in collaboration with strategic partners.

The development of national cadres of research scientists in Low- and Lower-Middle-Income Countries (LLMICs) helps identify and address pressing societal problems and build shared values, including an appreciation of science and its role in society. Scientists acquire their skills by conducting research in an enabling environment that includes access to resources and mentorship, both of which are in short supply in LLMICs. As scientists gain experience over time in planning, conducting and publishing their research, they establish a reputation in their field. This helps improve their abilities to identify and prioritise research, collaborate with others, develop and lead successful research groups and influence policy. Scientists who acquire such skills also help empower the institutions in which they work and build science literacy in their home countries.

Dr Safina Musa (standing) measuring water transparency at fish cage culture site in Lake Victoria, Kenya.

IFS as a valuable scientific partner

In 2024–2025, IFS was jointly engaged in four events or workshops with various strategic partners or alumni associations across a spectrum of topics, most in response to requests from grantees and partners.

The workshops conducted in 2024–2025 included (descriptions below):

> IFS Connecting People through Exposure of IFS Grantees to an International Food Science, Technology and Industry Audience, Rimini, Italy, September 2024
> Tropentag Conference, Vienna, Austria, September 2024
> IFS SEARCA Mentorship Programme Workshop, Hanoi, Vietnam, December 2024
> R Learning Workshop, Grand Bassam, Côte d' Ivoire, January 2025

IFS Connecting People through Exposure of IFS Grantees to an International Food Science, Technology and Industry Audience, Rimini, Italy, September 2024

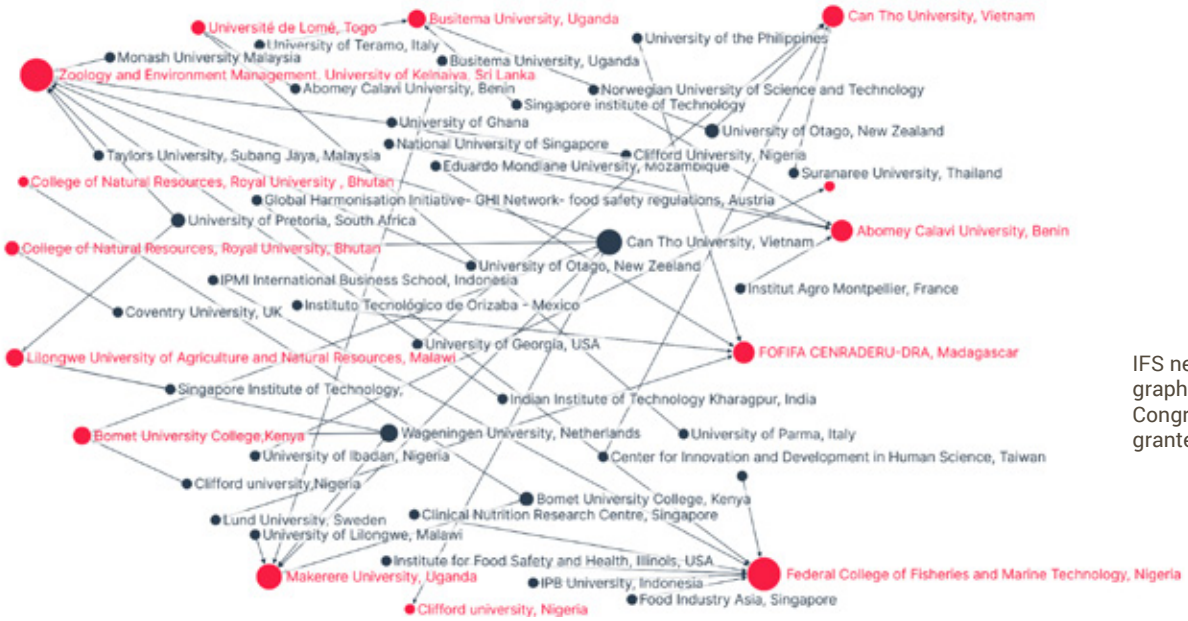
IFS supported 16 grantees (nine women and seven men) in food science and technology research to attend the 22nd World Congress of Food Science and Technology, held in September 2024 in Rimini, Italy. It was organised by the International Union of Food Scientists and Technologists (IUFOST), and focused on advancing global food science, and challenges in food security, safety, innovation and sustainability. Only 13 grantees could attend because visas were refused to three of our grantees in Côte d'Ivoire, Egypt and Ghana.

Attending the IUFOST Congress was a good opportunity to showcase the results of IFS grantees in our target countries and to make their voices heard on major research issues to be addressed in the Global South. Based on the importance of IFS-supported food safety research, grantees were first given the opportunity to attend a one-day pre-Congress Workshop on Food Safety Validation and Verification: Key Requirements for Global Food Safety. Grantees were informed about emerging regulatory trends and global legislative developments with potential to impact preventive controls. Different preservation techniques were discussed including novel and non-thermal processing, parameters and requirements for validation, and appropriate analysis methods. Furthermore, they were informed about the need for manufacturers to establish and document verification procedures. On the following days of the Congress, grantees presented the results of their IFS-supported projects orally or in a poster session.

IFS had a 90-minute session entitled "Science beyond Science: Communication with Policy Makers and Stakeholders to Catalyse Positive Changes in Society – The Case of IFS Food Science and Technology Grantees in Low and Lower Middle Income Countries". The session was moderated by Associate Professor Sijmen Schoustra from Wageningen University, a Dutch member of the IFS Scientific Advisory Committee in Food science. Prof Eleonore Yayi Ladekan, IFS alumna, Minister of Higher Education and Scientific Research, Benin, had kindly accepted to open the IFS session. However, due to her governmental responsibilities she could not attend the meeting. Professor Oyewole B Olusola, IFS alumnus, Secretary General of the Association of African Universities, gave the closing remarks at the end of the session.

After the speakers' presentations, IFS grantees shared their experience regarding the communication of their results with stakeholders, what they could carry out, with whom and what the challenges for making it happen were, or what could be improved. Many pointed out that, depending on the research questions, while a single 1–3-year project may generate useful information, further research is often needed before one can apply the results in real life. Some IFS projects had sufficiently interesting results for stakeholders to apply them relatively quickly. Street food hygiene and safety was one such example, as illustrated by cases from Benin, Bhutan, Uganda and Vietnam. Grantees were able to share their results and recommendations through workshops with vendors. Actors along the value chain were trained to increase their awareness about public health and what should be done to deliver a safe, ready-to-eat food. However, grantees agreed that this should be upscaled to the country level and recommended that a national policy should be set to train vendors regularly. Grantees felt that they could share their results and recommendations to public health policymakers but reaching them remained a challenge. This calls for training for researchers about how to share results with policymakers.

Other cases about mycotoxins (Nigeria) and heavy metals (Sri Lanka) in food were discussed. Again, grantees could share their recommendations with farmers through



IFS network connection graph at the IUFOST Congress (red circles for grantees' institutions).

workshops, and with industries through specific reports. How to effectively reach policymakers remained a challenge. Might incentivisation to support lobbying and convening of government workers to attend meetings with the farmers be a solution? Sri Lanka has an issue with heavy metal contamination in commonly consumed green leafy vegetables. Risks through consumption and sources of contamination were discussed. The grantee shared her results with relevant government officials in the Central Environmental Authority. Food contamination being relevant to food safety and public health, it was suggested that a specific institutional unit for dissemination of results beyond a scientific audience might be effective in communicating scientific results, not only for industrial marketing purposes but also for public health.

Some of the other topics discussed were nutrition, affordable sources of protein, climate resilience, preservation techniques for extended product shelf life. Our Malawian grantee discussed the case of quinoa's acceptability by Malawians. The results aligned with Malawi's goals of improving food security and nutritional diversity. Again, the challenge of directly reaching out to relevant officials remains but at least the grantee's institution has a communications team charged with engaging with stakeholders.

A Ugandan IFS grantee reported her results of extending the shelf life of edible insects using plant extracts. The results are of interest both to the local communities that harvest insects for food as well as policymakers who are faced with malnutrition challenges, especially among children. The grantee explained how she approached policymakers. She directly contacted the Ugandan Minister of Health, making an appointment to go to her office to discuss the potential for upscaling the results of her work to enhance utilisation of edible insect powder in supplements to feed malnourished children in nutrition clinics. This discussion is ongoing. The grantee also discussed with local council chairpersons of three villages on the possibility of adapting the technology developed in insect preservation for use at household and community levels.

Grantees' attendance at the IUFOST Congress strengthened their exposure to an international scientific audience and provided opportunities to network with peers from different countries as well as with food industry representatives. See the IFS network connection graph at the IUFOST Congress (red circles for grantees' institutions). For some, it was their first attendance at an international scientific event outside of their country or region, or their first opportunity to make an oral presentation in English or chair a scientific session.

Grantees had the opportunity to discuss potential collaboration with scientists in Africa, Asia, Europe, and the USA. They received advice from well-established peers on methods to further improve their projects and use more environmentally-friendly food processing (e.g., solar drying), from scientists who upscaled their research results into applicable or marketable products, and from industry representatives on how to approach industries and market their results for potential industrial application.

Last and not least, grantees formed a group to map who is doing what, where and how they can complement their skills and join forces in project proposals that include different countries from the Global South. All of them acknowledged with gratitude the encouragement by the moderator of the IFS session, Assoc Professor Sijmen Schoustra, who shared with them on-going projects or future calls so that grantees might participate.

Tropentag Conference, Vienna, Austria, September 2024

IFS sponsored 39 recent grantees from 25 different countries in Africa and Asia to attend the September 2024 Tropentag conference on "Explore opportunities ... for managing natural resources and a better life for all". The conference was held in Vienna and organised by the University of Natural Resources and Life Sciences. Tropentag provided ample opportunities for grantees to network with the more than 800 participants, many of them also early career scientists from the Global South. Our grantees particularly appreciated the closed IFS pre-and post-conference workshop where they – together with IFS staff – discussed their roles, responsibilities, and opportunities as early career scientists to contribute to carrying science forward.

IFS/SEARCA Mentorship Programme Workshop, Hanoi, Vietnam, December 2024

In 2021 IFS and the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) launched a joint call for Accelerating Transformation through Agricultural Innovation in Southeast Asia. The theme was selected in response to the Covid pandemic. As a culminating activity of the 2021 call, IFS and SEARCA held a workshop in December 2024 in Hanoi to follow up on grantees' results and to discuss and share challenges that they had faced with each other and with the IFS and SEARCA representatives in charge of the programme.

The ten advanced grant recipients were:

1. Bui Thi Lam, Vietnam National University of Agriculture, Hanoi
2. Huu Tien Nguyen, Vietnam Academy of Science and Technology, Hanoi
3. Magdalena Lenny Situmorang, Institut Teknologi Bandung, Indonesia
4. Mildred O Guirindola, Food and Nutrition Research Institute, Taguig City, Philippines
5. Oanh Nguyen Cong, Vietnam National University of Agriculture, Hanoi
6. Quoc An Trieu, Nguyen Tat Thanh University, Ho Chi Minh City, Vietnam
7. Thanh Dien Le, Van Lang University, Ho Chi Minh City, Vietnam
8. Thien Trong Nguyen, Duy Tan University, Da Nang, Vietnam (at time of grant award)
9. Tran Nguyen Duy, Can Tho University, Vietnam
10. Thi Tam Thu Nguyen, Institute of New Technology, Academy of Military Science and Technology, Hanoi, Vietnam

Before the workshop, all ten grantees had fulfilled their IFS/SEARCA grant agreement obligations by submitting their scientific and financial reports. Eight grantees attended the workshop in person, one attended online from Can Tho University, and one could not physically attend due to institutional restrictions during the dates of the event. Four SEARCA representatives attended: Dr Gerlie T Tatlonghari, Program Head and scientific resource person for the workshop; Ms Anna Gale C Vallez, Program Specialist; Ms Donna Bae N Malayang, Program Associate; and Ms Maria Carla M Dolores, Senior Program Associate. Two IFS staff took part: Nathalie Persson Andrianasitera, Coordinator of the IFS/SEARCA collaborative programme, and Bahati Orlendo, Technical Program Manager. In addition, five scientific resource persons from the IFS family attended: Professor Jose Gil Roig, CREDA Director, Barcelona, Spain, IFS scientific committee member and mentor for the IFS/SEARCA grant programme; alumnus Professor Vu Nguyen Thanh, IFRI Director, Hanoi; alumna Professor Ngo Thi Phuong Dung, Can Tho University, Vietnam; and alumnus Professor Radu Son.

During a day and a half, grantees presented their projects and results. On the whole, they had completed their projects without major hindrances. This call generated ten scientific publications, four manuscripts ready to be submitted in December 2024 and four publications in conference proceedings, improving the grantees' international and national visibility. As to the impact of the IFS/SEARCA support, grantees reported that they had strengthened different aspects of their skills: scientific, teamwork, project management, leadership, and student mentoring, as well as English writing. They had more self-confidence in their capability to raise international funds. The support also benefitted their institutions' human resources with better qualifications.

Mentorship, an important element of support, was also discussed. The consensus was that there is room to improve its mechanism. Grantees reported that they mainly benefitted from the mentorship at the beginning of the grant applications process. Grantees were in touch with mentors relatively often to discuss methods and how to improve them. However, once they had started their projects, they reported that they did not feel the need to maintain the relationship, with one exception who continued to be in touch and was grateful for advice by his mentor in manuscript writing. One grantee did not maintain any contact with the mentor. One of the reasons for not maintaining contact was the challenge for grantees to share with outsiders the progress of the project as this might not fit their institution's policy. Another reason was grantees' misunderstanding of the role of the mentor. Some of them perceived that the role of the mentor was to check on the progress of their mentees when they had time; they did not dare to approach the mentor, a senior scientist, on a spontaneous basis. They wished that IFS/SEARCA would help to set up the mentor relationship and timeline together with the grantee and mentor.

On one of the afternoons, the resource persons each held a lecture: Professor Jose Gil Roig on writing scientific proposals for bigger funders; Professor Vu Nguyen Thanh on the scientific review process, what is important and attention to be paid by scientists who want to publish their results; Professor Radu Son on scientific leadership, supervising and encouraging PhD students; Ms Anna Gale C Vallez on the publication process with examples of SEARCA journals; and Nathalie Persson Andrianasitera on research budgets and knowing your donors.

To summarise, the IFS/SEARCA call generated satisfactory results and met the goals that were set by the collaboration programme. A final wish expressed by grantees was to see continued support for bigger projects for grantees who performed well with their first advanced grants. This would be more likely to generate results with socio-economic impacts.

Participants at R Learning Workshop, Grand-Bassam, Côte d' Ivoire.

Dr Christophe Kouamé, Director of ICRAF Côte d'Ivoire.

R Learning Workshop, Grand-Bassam, Côte d' Ivoire.

R Learning Workshop, Grand-Bassam, Côte d' Ivoire, January 2025

IFS organised a learning workshop on the use of R software for scientists in Grand Bassam, Côte d'Ivoire, in partnership with ICRAF Ivory Coast. IFS alumnus Dr Christophe Kouamé, Director of ICRAF Côte d'Ivoire, and his team provided efficient logistics support. Moreover, his team ensured the visibility of the event on different communication platforms, at national as well as regional levels under the coordination of Ms Gilberte Koffi, ICRAF Communications Officer. Twenty-five IFS grantees (11 women and 14 men) took part in the training. They came from twenty research institutions in ten African countries, including universities in Benin, Burkina Faso, Côte d'Ivoire, Ethiopia, Ghana, Kenya, Madagascar, Mali, Togo and Uganda. The training was held under the leadership of Dr Joris De Wolf, agronomist, biostatistician and consultant from Highwoods, Belgium, with the support of Bahati Orlendo as facilitator and Nathalie Persson Andrianasitera as the coordinator for the R learning workshop. Professor Patrick Van Damme, IFS Interim Director, and Dr Christophe Kouamé welcomed grantees at the opening of the training.

Participants were a mixture of total beginners and those already reasonably acquainted with R software and its use for their research data analysis and visualisation. This mixture was helpful for beginners during the group sessions as those with more advanced use of R could help the newcomers in making progress during the practice. Those who had more experience with R appreciated the training, and the mixture of participants as they developed their skills to teach others in their working groups. At the same time, they were inspired by the training leader's methods, how he introduced the basics and a medium to advanced use of R. Their future students will benefit from their improved skills after the IFS workshop on R learning.

Participants learnt about the basic principles of R, data import, data manipulation, data visualization (plotting via ggplot), reproducible analysis flows, basic linear modelling (regression, Anova in R and discussions), appropriate linear modelling (what is wrong with simple regressions and Anova), and introduction to mixed methods and how to use them in R. Participants brought their own shareable data from their IFS research projects, and this was helpful in the practical exercises, as it made concrete sense within their research context. At the end of the training, the participants were reminded to continue using R within their regular research context, as one learns by doing.

Impact of IFS on my life
Professor Silvana Vero
Universidad de la República, Uruguay

Empowering science in developing countries

My progress in biological control of postharvest diseases research through IFS support

I hold a degree in Chemistry and completed my PhD in Microbiology in 1998 at the Universidad de la República, Uruguay. That same year, I received my first International Foundation for Science (IFS) grant, which marked a pivotal moment in my career. This grant allowed me to initiate my research in the biological control of postharvest diseases in apples, an area in which I have been actively working ever since. The initial support from IFS was instrumental in establishing my research trajectory and provided me with the foundation to develop expertise in this field. In 1999, the work resulting from this grant was recognised with the National Award in Microbiology in my country – a significant milestone that reinforced my commitment to this area of research.

In late 1999, I was awarded a postdoctoral grant to work at the University of Córdoba in Spain for a year. During this period, I continued my research in food safety and gained valuable experience in molecular microbiology, particularly in DNA-related techniques. This experience significantly enhanced my skill set and broadened my scientific perspective, equipping me with tools that would prove essential for my future work.

Upon returning to Uruguay, I faced significant challenges due to budget limitations caused by the country's difficult economic situation. Despite these constraints, I remained committed to my research, convinced that advancing biological control methods for postharvest fruit diseases could make a meaningful contribution to a developing country like Uruguay. To continue my work, I applied for and was awarded another IFS research grant, this time focusing on the biological control of postharvest pathogens in citrus. This grant was crucial in enabling me to expand my research and establish valuable international connections.

IFS connecting its grantees to worldwide renowned researchers

One of the most significant outcomes of this IFS grant was the opportunity to connect with Dr Michael Wisniewski from the USDA, who reviewed my grant proposal and agreed to collaborate with me. Dr Wisniewski is a globally recognized pioneer in the field of biological control of postharvest diseases, and establishing contact with him was a transformative experience, especially at a time when international communication was not as seamless as it is today.

Professor Silvana Vero.

His generosity and mentorship were invaluable; he provided critical advice that helped me refine my research and begin publishing in this specialized area. Today, I am honored to be considered one of his friends and colleagues.

Continued development

After completing my IFS grants, I was awarded a Lindbergh Foundation grant (USA), which allowed me to continue my research in the identification, characterization, and control of fungal diseases in plants. This support was crucial in enabling me to establish and lead my own laboratory, which became a hub for research and training in biological control in our region. In 2005, the economic situation in my country improved, and national financial support became available for many developing researchers. Since then, our group has received both national and international funding to continue advancing work related to plant pathogen control. Over the

years, my laboratory has hosted numerous graduate students, many of whom completed their theses under my supervision. Today, we have a small but strong research group that continues to work on related areas, contributing to the field and training the next generation of scientists.

The knowledge and experience I gained through those initial projects inspired me to develop, in 2004, an international course on the Biological Control of Plant Diseases. This course has been attended by students from across Latin America, many of whom also completed research internships in my laboratory. These collaborations fostered strong professional relationships and laid the foundation for a robust network of researchers in the field.

One of the most significant outcomes of this network was the successful application for a CYTED project (Spain), which I directed. This project strengthened international collaborations and facilitated impactful research across multiple countries. Through these efforts, we were able to advance scientific knowledge, share resources, and build lasting partnerships that continue to this day.

At present, I am a Full Professor in the Microbiology Area and the Director of the Biosciences Department at the Chemistry Faculty of the Universidad de la República, Uruguay. In this role, I continue to lead research, mentor graduate and undergraduate students, and organize academic courses and scientific meetings that foster collaboration and knowledge exchange within the scientific community.

From grantee status to IFS scientific adviser role

My relationship with the International Foundation for Science (IFS) did not end with the submission of my last grant report. On the contrary, it has continued to grow over the years, evolving into a meaningful role as a reviewer and adviser for the program. Many years ago, I had the honor of being invited by Nathalie Persson from IFS to serve as an adviser, a role I have embraced with great responsibility and dedication. In this capacity, I have strived to provide thorough and constructive reviews of grant proposals, offering guidance and advice to applicants. It is my hope that my contributions have been valuable in supporting early career scientists and advancing the mission of IFS to promote scientific research in developing countries.

My advice to early career scientists

As someone who has navigated the challenges and opportunities of a scientific career, I would like to share some advice for early career scientists who are just beginning their journey. First of all, embrace challenges and persist. Early in your career, you may face obstacles such as limited resources, rejection of grant applications, or failed experiments. These challenges are part of the process. Stay resilient, learn from setbacks, and keep pushing forward. Persistence is often the difference between success and stagnation. Stay passionate about your research and remain open to new ideas. Your enthusiasm will not only fuel your own progress but also inspire those around you. Ask for advice and build a strong network. Don't forget that science is a collaborative endeavor. Attend conferences, workshops, and seminars to connect with peers and established researchers. Don't be afraid to reach out to experts in your field for advice or collaboration. Seek funding opportunities early. Grants and fellowships, such as those from organizations like the International Foundation for Science (IFS), can be transformative. They not only provide financial support but also open doors to networking, collaboration, and recognition. Don't hesitate to apply for grants, even if you feel inexperienced – every successful scientist started somewhere. Be grateful and give back to the community. As you grow in your career, remember to support and mentor the next generation of scientists. Sharing your knowledge and experiences can have a lasting impact on others, just as mentors and collaborators have influenced your own journey.

> One of the most significant outcomes of this IFS grant was the opportunity to connect with Dr Michael Wisniewski from the USDA, who reviewed my grant proposal and agreed to collaborate with me.

Finally, remember that a scientific career is a marathon, not a sprint. It requires patience, dedication, and a willingness to adapt. Stay true to your goals, embrace the journey, and never stop learning. The challenges you face today will shape the scientist you become tomorrow.

Closing words

Looking back on my career, I am deeply grateful for the opportunities and support I have received, particularly from IFS, which played a transformative role in my early years as a scientist. The grants, collaborations, and experiences I gained through IFS not only shaped my research trajectory but also allowed me to contribute to the scientific community in meaningful ways. As I continue my work today, I remain committed to advancing science, mentoring the next generation of researchers, and supporting initiatives like IFS that empower scientists in developing countries. I hope that my journey can inspire others to persevere, collaborate, and strive for excellence in their own scientific endeavors.

Impact of IFS on my life
Dr Samson Shimelse Jemaneh, Ethiopian Biodiversity Institute

From early career junior to senior researcher in biodiversity

How the International Foundation for Science (IFS) changed my career path and professional growth

It was in 2013 that I had the chance to pursue my PhD studies in plant biology and biodiversity management at Addis Ababa University, Ethiopia. During that time, even though I secured my study leave, research funds were limited and I was unable to do the intended research. Therefore, in the belief that I could compete for research grants and knowing that research funds are limited in developing countries, I had to look for sources of funding myself and apply where I was eligible. It was during this tough time that I heard of the funding opportunity from International Foundation for Science (IFS). In 2014, I secured my first round of funds from IFS for the project entitled: *Carbon sequestration and plant biodiversity in the exclosures of restored vegetation in Tigray, Ethiopia and its implication in climate change mitigation*. When I received the news that my research proposal had been selected for funding by IFS, I was both elated and humbled. As an early career scientist, this was more than just financial support; it was a turning point in my professional journey. The IFS grant did not just enable me to carry out my research; it transformed the way I work, the way I think, and the trajectory of my career.

Because of IFS support, I was able to successfully conduct my research project, and in 2018, I completed my PhD and graduated. This was a stimulating factor for me to continue further in scientific research and a career in higher education. Immediately after my graduation, I again applied for a renewal grant in 2019; I was successfully selected for a second IFS research grant for my research project. I managed to successfully achieve the scientific objectives and publish in high-impact journals. In addition, the experience gained from the IFS grants also encouraged me to build a team. Hunting research grants and scientific conference participation becomes easy with the wide linkage created and sharing of information among the team. In addition, I could advise colleagues, encourage and support them to apply for research grants, not only to IFS but also to other research funding agencies. This was to help them understand that it is a part of a scientist's life to raise funds for their research. You may not succeed at first, but this should not discourage you from continuing to try. IFS has also been a good catalyst for my networking.

Dr Samson Shimelse Jemaneh.

Expanding my skills: From a research idea to a publishable outcome

One of the most profound impacts of the IFS support was how it helped me develop the skills necessary to thrive in the competitive world of research. The grant process itself was a learning experience. Crafting a strong, coherent proposal taught me how to frame scientific questions clearly, define realistic objectives, and develop methodologies with both rigor and feasibility.

Once the project was underway, I had the opportunity to engage in practical, hands-on research. This experience not only deepened my technical knowledge but also honed my project management skills. I learned how to budget, how to report findings, and how to work with diverse stakeholders

including local communities, collaborators, and institutions.

With IFS support, I was able to produce meaningful data that led to my first peer-reviewed publication. This milestone boosted my confidence and laid the foundation for applying for other grants and funding opportunities. The process of publishing taught me how to communicate scientific results to a wider audience, a skill that continues to serve me well.

The IFS grants and publications opened further doors to me to be exposed to regional and international scientific arenas, and to present my research findings orally or on posters at conferences. I developed an understanding of how important it is to continue interacting with other scientists to broaden my network and community and to increase collaboration. I also applied successfully more than seven times for different travel grants from different sources, enabling me to participate in international scientific meetings abroad, such as in Yaoundé, Cameroon in 2018; Kampala, Uganda in 2020, 2021 and 2022; Mombasa, Kenya in 2022; Nairobi, Kenya in 2023; Uppsala, Sweden in 2023 and Stockholm, Sweden in 2024. This exposure made me known to other scientists working on the same research topics and opened avenues for potential collaboration. In addition, with an IFS travel grant I secured in 2025, I was able to participate in CGIAR Science Week in Nairobi, Kenya. The transformative impact of IFS on my research career, academic development and achievements is immeasurable, as it projected me from being a local researcher and academic to being a passionate scientist who is internationally recognized as an innovative researcher and invited for different scientific conferences in the science arena.

IFS and my professional development

The IFS experience did more than strengthen my research; it gave me credibility. Being an IFS grantee added value to my CV, which helped me secure collaborations, participate in international conferences, and eventually apply for advanced research funding. The mentorship and network that came with the grant were equally invaluable. I had access to experienced researchers who offered guidance and encouragement, and I found myself part of a global community of scientists facing similar challenges and sharing innovative solutions.

Today, when I look back at my professional milestones, I can confidently say that the IFS grant was a catalyst. It helped shape my identity as a researcher, opened new doors, and fueled my motivation to contribute meaningfully to science and society.

IFS played a significant role in my career, because it was my first international research grant that supported me with sufficient funding to conduct research and publish in high-impact journals. IFS research grants and the published papers enriched my record of accomplishment as a senior researcher in my current institution, the Ethiopian Biodiversity Institute (EBI). In addition to the research undertakings with the registered merit, I am also appointed as a lead executive officer for the Training, Consultancy, Project Support and Monitoring Directorate since 2022. In that position I continue grant completion and coordinating research grant competing teams. As a team and institution, we have many success stories as well. Without the early support from IFS, it would have been difficult for me to achieve my present position. Citations of my publications over the years have positively attracted the attention of authorities in Ethiopia, in addition to that of peers abroad. EBI appointed me as a National Focal Point of Ethiopian Forest Genetic Resources of FAO since 2021, where I share my knowledge and technical expertise in the Working Group. This has led to research and publishing collaborations as well.

> One of the most profound impacts of the IFS support was how it helped me develop the skills necessary to thrive in the competitive world of research.

My advice to early career scientists

To young researchers who are just beginning their journey, my advice is simple: do not underestimate the value of early support. Programs like IFS can be life changing, but you must be prepared. Focus on building a solid proposal, reach out for feedback, and be open to learning throughout the process. Also, never stop developing your skills beyond your research. Learn to write well, present your work clearly, and collaborate generously. Science is not done in isolation; your ability to connect, communicate, and contribute to your field will define your success.

Please do not be discouraged by setbacks. Rejections are part of the process, but each one teaches you something new. Keep refining your ideas and pushing forward. If IFS taught me anything, it is that with the right support and determination, even modest beginnings can lead to impactful outcomes.

During our professional life, we face various challenges and obstacles to conducting research, publishing, and in securing research grants. Scientists must show resilience throughout our careers. Ask for advice from senior researchers and colleagues, as collaboration and networking are keys to success. Learn about the donors' interests and focus areas to whom you want to apply for funding before applying.

IFS Alumni network

IFS Alumni Workshop 2024: IFS Legacy & Transition – Establishing ARAS for Africa's Scientific Future, October 2024

In late October 2024, at the Royal Tulip Canaan in Nairobi, Kenya, a transformative workshop unfolded – a milestone event marking the evolution of the International Foundation for Science (IFS) into a new era. IFS alumni from across Africa gathered with a shared vision: to create a sustainable, alumni-led research network that would continue IFS's legacy of supporting early career scientists. This workshop became the birthplace of the Africa Research Alliance for Science (ARAS), an entity envisioned to empower African scientists and address pressing challenges such as climate resilience, food security, biodiversity, and health.

The narrative of the workshop was one of collaboration and strategic foresight. Participants engaged in in-depth discussions to define a robust governance structure that would include a Board of Directors, an Advisory Council, and an Executive Leadership Team, ensuring transparency and accountability. There was a strong emphasis on building and strengthening networks, as alumni recognised the importance of strategic partnerships with local and international organisations. These relationships were seen as essential to secure sustainable research funding and foster an environment of mentorship and capacity building.

Central to the discussions was the development of a comprehensive master plan that laid out clear themes around governance, partnerships, resource mobilization, and research priorities, setting a strategic roadmap for ARAS. A diversified funding strategy was crafted, incorporating alumni memberships, grants, and collaborations with government and industry partners. In a heartfelt declaration, the alumni pledged their commitment to support ARAS – not only through their time and expertise but also by actively contributing resources and building a network of support across Africa.

Dr David Chiawo emerged as a key leader, poised to guide ARAS as its Executive Director. His selection underscored the workshop's determination to ensure continuity and strategic leadership during this critical transition. With the support of the Alumni Chairs from Benin, Ghana and Nigeria the next steps were outlined – finalizing ARAS's registration in Kenya and setting a clear course for the future.

The event was not only a farewell to IFS but also a celebratory step towards a new beginning. The alumni's vision for ARAS is to cultivate a self-sustaining, pan-African scientific network that carries forward the high research standards and capacity-building ethos of IFS, while fostering innovative solutions to both regional and global challenges.

IFS Alumni Meeting in Hanoi, Vietnam, December 2024

Twelve IFS-supported scientists, from Malaysia, Philippines and Vietnam, ten alumni and two IFS SEARCA grantees were invited to meet on 4 December 2024. Their IFS grants ranged from 1998 to 2021. In the end, two could not attend as their institutional authorisation for one-day leave was still pending on the day of the meeting. All together ten colleagues met in Hanoi to report on IFS's impact on their career and their impact on society.

After a welcome by the IFS coordinator, participants discussed the impacts of IFS on their scientific skills development and career, and the socio-economic impacts of their IFS-supported projects. The youngest participant, Dr Mildred Guirindola, Food and Nutrition Research Institute (FNRI), Philippines, reported that the grant was instrumental for her PhD completion. Dr Quyen Van Nguyen, Research Director, Hanoi National University of Education, was able to set up the research on the medicinal Drynaria plant development. They commonly reported that their first IFS grant was a self-confidence booster to continue with a research career. IFS remains an effective tool to maintain the hope and research passion of early career scientists. Having an international grant has increased their credibility at their institution. Publishing proved a valuable means of increasing their visibility and that of the institution at national, regional and international levels.

A few examples illustrate their claims:

> Prof Radu Son, University Putra Malaysia: My publication in a high ranking journal attracted the attention of a prolific professor from Kyoto University, who contacted me by email and took a flight to Kuala Lumpur within two weeks of contacting me. We have collaborated ever since and published many journal papers together. I was also invited by FAO as one of their Expert Consultants of Microbial Risk Assessment until before the Covid-19 pandemic.

> Assoc Professor Tran Thi Bich Ngoc, National Institute of Animal Sciences, Hanoi: Visibility and credibility led to my conducting research projects in food safety under FAO funding.

> Dr Mildred Guirindola represented her office, the Department of Science and Technology of FNRI, in the Congress Committee Meetings, both in the House of Representatives and the Senate, concerning the need for interventions on food security and nutrition.

> Prof Ngo Thi Phuong Dung, Can Tho University, Vietnam, could develop a collaboration network to broaden her international contacts with scientific communities. Examples: Country Ambassador of American Society for Microbiology, Country Coordinator in Core-to-Core Program, joint organising committee for international conferences and workshops, scientific paper reviewer for high impact international and national journals.

> Dr Thien T Nguyen, Institute of Research and Development, Duy Tan University, Da Nang, Vietnam, highlighted his case: equipped researchers with advanced analytical skills using experimental and computational Nuclear Magnetic Resonance (NMR) techniques, enhanced capacity in lipid chemistry and food safety research, and provided our laboratory with a framework for detecting lipid oxidation products (LOPs) in food samples.

> Associate Professor Vu Nguyen Thanh, Food Industries Research Institute (FIRI), Hanoi, was awarded two grants for his project "Conservation of the biodiversity of Vietnam's traditional alcohol fermentation starters", resulting in FIRI supplying the microbial strains obtained through the project to farmers for alcohol fermentation. FIRI also provided training to farmers interested in learning how to make alcoholic drinks using pure microbial strains. The farmer who collaborated with them during the first phase of the project has received valuable advice on controlling fermentation (e.g., temperature, aeration, water quality, maturation), leading to a strong business. They have maintained a lasting friendship. His publication was read not only by academics but also by the industry (as revealed later by the owner of Song Cai Distillery, https://www.songcaidistillery.com/, when they contacted IFRI for microbial strains). The anticipated long-term impact has materialized only after more than ten years. At least three distilleries (Bac Ha Food, Song Cai Distillery, and Tung Lam) are now approaching them to collect yeast and fungi to develop their own unique products.

Regarding grantees' impacts on society, a common feature is first the direct benefit for their institutions with regards to equipment, increased availability of reagents and chemicals in their laboratories and departments, and inclusion of students and technicians in their research projects.

To end the meeting, some grantees expressed their improved awareness of gender roles, and needs for solutions along the food value chain with a circular approach to sustainability. The need for support to early career scientists remains and if IFS were to continue with limited funding possibilities, participants proposed focusing on a specific target, such as early and mid-career women in science. Women are still under-represented when it comes to their presence and visibility in science in Southeast Asia.

IFS Alumni Meeting in Grand-Bassam, Côte d'Ivoire, January 2025

Twenty-one participants in the R Learning Workshop attended the alumni meeting. There were three grantees from Benin, three from Burkina Faso, one from Ethiopia, two from Ghana, three from Kenya, four from Madagascar, one from Mali, one from Togo, and three from Uganda. This was an opportunity to create an icebreaker among participants in different fields of research, with different languages. They could meet and find the common feature that is unifying their profiles: being an IFS alumnus, having benefitted from the

encouragement and advice of IFS scientific committee members, and of IFS voluntary scientific advisers and reviewers. The sessions were organised as group work composed of different research profiles and countries. Grantees reported on the impacts of IFS on their careers and societies. They ended the session by expressing their wishes for IFS to continue its support in a different way.

Regarding impacts on their scientific skills development and careers, it appears that they are similar regardless of the countries and research institutions. IFS support helped to create better visibility, and to strengthen their self-confidence for subsequently applying further for funding from other sources. With their IFS projects, grantees strengthened their research skills and vision, their abilities to include students in their research, and to work in teams with colleagues.

For further impacts, some have developed new products and technologies from their research results but these remain at the level of the laboratory. To name three examples:

> Dr Lydia Bunalema, Makerere University, Uganda: Development of antimalarial products
> Dr John Edem Kongor, CSIR-Food Research Institute, Ghana: Development of a new product such as dark chocolate with beetroot as sweetener; and
> Dr Resty Naiga, Makerere University, Uganda: Succeeded to share with community leaders the importance of women's roles in Community-Based Water Management, and to give trainings to enhance women's participation in water user committees.

Grantees were aware that from potentially applicable results to implementation for policy, regulation is a lengthy process. For industrial applications it can require lengthy periods of time – depending on the type of product, it can be up to 10–15 years.

There was a general wish for extended support to facilitate scaling up of laboratory prototype results. Certainly, this calls for bigger funds as well. Alumni wished to see facilitation from the foundation to connect scientists to industry once they have potentially applicable results and for commercialisation of their research results. Grantees wished to have training on how to approach industry. Setting up a collaboration platform would also be useful. They also expressed a strong need for training on the importance of patents and property rights for their research.

IFS Alumni meeting in Abidjan, Côte d'Ivoire, January 2025

Twenty Ivorian grantees attended the alumni meeting, consisting of researchers at Centre National de Recherche Agronomique de Côte d'Ivoire (CNRA), Université Nangui Abrogoua (UNA), Université Félix Houphouët-Boigny (UFHB), OCP Côte d' Ivoire, Université Peleforo Gon Coulibaly (UPGC) in Korhogo, and ICRAF Côte d' Ivoire. The coordination of the meeting was co-shared by alumnus Dr Christope Kouamé from ICRAF and Nathalie Persson (IFS). The meeting benefitted from the technical support of ICRAF team and Bahati Orlendo from IFS.

Participants worked in mixed groups of junior scientists, and mid-career and senior researchers. They discussed the impact of IFS on their careers and societies, as well as the gaps that need to be filled to enable them to be agents of change in their countries and when possible, at regional and global levels. Junior scientists reminded the meeting that the first impact for them was the completion of their PhD with the IFS grant as complementary funding. This paved the way for meeting one of the criteria to be recruited by their universities and research centres. As IFS is a competitive grant scheme, this has stimulated grantees to continue in that direction when applying for funds from other sources, as scientific quality is important when competing for research funds. Grantees made efforts in writing reports, articles and manuscripts for publications, and in drafting research project proposals to mobilise resources for their research. IFS grants also enabled the acquisition of a first personal laptop for many of the participants. Some grantees gained recognition, for example as a sub-regional expert in plantain, or in shea-related matters.

Publications are important in raising visibility. In addition, some grantees who performed well were awarded travel grants to attend conferences which led to exchanges with peers from different parts of the world and a starting point for potential collaboration. IFS travel grants to visit advanced labs for a short stay to learn advanced methods were an eye-opener about conducive research environments, whilst providing opportunities to learn new techniques.

Coming to the impact of grantees' research results on society, they made these points by area:

Crop science

> Increase the availability of good quality seedlings (Garcinia cola) and seeds (indigenous vegetables: jute mallow, amaranth, spinach, black nightshade, Celosia, spider plant) to producers
> Conserve genetic resources
> Contribute to the development of agroforestry systems through the use of orphan plants (*Garcinia cola, Ricinodendron heudelotii, Irvingia gabonensis*)

Food science and nutrition

> Include new (nutrition) and speculative (leafy vegetables) topics within research domains at their home institution (CNRA)
> Promote leafy vegetable consumption in school canteens
> Train canteen personnel on cooking techniques to preserve nutritional values

Forestry, biodiversity and ecology

> Give training and capacity building for women and shea tree nursery operators, with the aim of reducing the shea tree production cycle from 15 to five years.
> Young plants of improved varieties of plantain banana to be made available to farmers at their research centre because of their many years of research
> Lobbying for professionalisation of plantain banana production (farmers awarded by Minister for Agriculture)
> The Comoe National Park is an UNESCO World Heritage Site, which was listed as under threat in 2003. With their many years of research experience, efforts to maintain biodiversity, to combat poaching, to reduce agriculture pressure and overgrazing by cattle, grantees who have been working in collaboration with the Comoe National Park Research Station have contributed to its removal in 2017 from the list of sites in danger.

Grantees' wishes for the future included:

> Technology transfer requires funding and there is a disconnect between research and industry as they perceive it in the context of their country. It would be useful to establish a research collaboration framework between businesses and researchers.
> Create a collaborative research platform with industry.
> Provide guidance for researchers on how to commercialise their innovations.
> There is a need for support from funding agencies for the lengthy and costly process of patenting.
> Secure intellectual property: increase awareness for grantees and support them.
> Provide incentives to innovate through the equitable sharing of innovation benefits among researchers, industry and public institutions.
> Increase research funds for monitoring and evaluation activities.
> The cost of carrying out the pilot phases should be included in the budget of funded projects.
> Lack of collaboration between grantees, which could be effectively addressed through the creation of an alumni network.
> Alumni should act as mentors to help young people find financing.
> Language barrier (English): It would be helpful to support grantees with English language training courses.

Postscript – past, present and future

Introduction

In late October IFS has had a long and venerable track record thanks to its core of funders, dedicated staff, fantastic partners and, of course, applicants and grantees. A brief history of the organisation appears in Annex 2.

What is IFS and when and why was it founded?

In 1965, scientists at the Nobel Pugwash Science and World Affairs Conference in Venice proposed the establishment of an organisation to foster original research and scientific growth in the Global South. The International Foundation for Science (IFS) was established in 1972 by Academies of Sciences from sixteen countries around the world as an independent, globally-operating, fundraising-financed foundation. Its objective was to build capacity of early career scientists to conduct relevant research, influence research agendas at local, regional and global levels, and increase science literacy.

How did IFS work?

IFS support targeted self-nominating and promising early career scientists. Following a research call, applicants submitted an application on a topic which is innovative and/or relevant to local or national development needs. Proposals had to demonstrate knowledge of the subject area, identify knowledge gaps, elaborate testable hypotheses and research objectives, and develop convincing, doable and appropriately-costed research and results dissemination plans. Applicants, both successful and unsuccessful, received feedback from reviewers, Scientific Advisers and the IFS Secretariat. The value of individual capacity support packages, which increased over the years, was determined by the needs of the grantee and the nature of the research. Following screening by the IFS Secretariat, applications were circulated for review among the organisation's global network of 1400 Scientific Advisers. Thematically-organised Scientific Advisory Committees (SAC) made the final recommendations. Grants covered costs of additional manpower, consumables, equipment, literature and travel for field work. Grantees could also seek help from IFS with purchasing of equipment and consumables.

Grants were complemented by individually-tailored capacity-enhancing support, such as training workshops, usually co-organised with partners, on e.g. science writing, putting research into use, programming and statistics, data protection and ethics in research. Support was also provided to help grantees visit laboratories, attend conferences and present research results.

On completion of an award, IFS required clear, documented evidence of development of research and organisational skills (e.g., a strong Project Completion Form; publications in peer review journals). Alumni could apply for up to three awards, thereby supporting their development as a researcher over a sustained period.

Over time, IFS support to individuals both increased and evolved to seek progression in research skills and in the application of research. Two categories were recognised: Basic and Advanced Grant. Using funds from the Carolina MacGillavry Trust, IFS and partner SEARCA[1] also successfully trialled collaborative research among individuals from different institutions and scientific disciplines[2].

How many researchers has IFS supported?

For more than five decades, IFS invested in strengthening the research capacity of more than 8500 young scientists[3] in more than 105 countries[4]. The research aligned well with priority global issues, focusing on terrestrial and aquatic natural resources, their conservation, management and sustainable use, and food and nutrition security, including social and economic aspects.

1. Southeast Asian Regional Center for Graduate Study and Research in Agriculture
2. https://www.ifs.se/IFS/2015%20Update%20on%20the%20Collaborative%20Research%20Approach.pdf.
3. Estimates from in-country M&E studies suggest numbers of beneficiaries of IFS equipment are approximately nine times that of the numbers of grantees.
4. Eligibility of countries was based on World Bank per capita Gross National Income. Approximately 25% of grants in Latin America and the Caribbean, 38% in Sub-Saharan Africa, 31% in Asia and the Pacific and 6% in the Middle East and North Africa.

What are the scientific outputs, outcomes and impacts?

Research outputs were primarily assessed by scrutinising publications in international peer review journals. In 2023[5], for example, 98 papers had been published in peer review journals by the cohort of 2019 grantees.

In recent years, the impacts of individual grantees' research and associated activities have been documented. National level studies have also been conducted[6].

Outcomes and impacts have been assessed by SACs through evaluation of Project Completion Forms, as to whether and why investments by IFS had been worthwhile[7]. It also took account of grantees' self-assessments of their progress as researchers.

How has IFS support had an impact on scientific careers?

There are many personal testimonies from individuals attesting to the impact of IFS support on their lives and careers[8]. Studies have also been carried out on the impact of IFS support on national science capacity in a number of countries[9].

How successful has the IFS been in supporting early career women scientists?

IFS has worked to encourage women to apply by changing age qualifications to accommodate career breaks for family reasons, running gender-targeted research calls, offering mentoring opportunities (also initiated via members of IFS alumni associations) and providing capacity-enhancing workshops with partners that focus on women's inclusion in grant writing and scientific communication[10].

The numbers of successful women applicants have steadily increased, in recent years comprising in excess of 30% of all grantees, which is significant compared to worldwide trends in the Global South, where women researcher representation can be much lower. Many women supported by IFS have advanced their careers and gained leadership roles in academia and research institutions[11].

What have IFS reviewers said?

IFS has had numerous external reviews over the years, all positive in overall terms. Criticisms focused on the costliness of IFS, but tended to assess the organisation's role simply as a grant awarding organisation, assessing value for money primarily on the cost per successful grantee. This ignored the extensive feedback provided to unsuccessful applicants, facilitating subsequent and often successful reapplication, as well as tailored capacity-enhancing support.

Why has IFS ceased operations?

IFS ceased operations when the priorities of existing donors changed and when no other significant donors could be found. Priorities often change with changes in government, due to emerging and growing pressures such as conflicts and refugee issues.

What is the IFS legacy?

IFS has provided support to almost 9000 young researchers in more than a hundred countries. The fruits of their research can be appreciated through reading the stories in the Impact sections of recent Annual Reports (2020 onwards). Many grantees have assumed influential positions in universities, research institutions, government and the private sector, thereby strengthening research and teaching institutions.

How has IFS used supplementary grants in its final year?

In 2025, IFS offered final support through a supplementary grant scheme, the purpose of which was to ensure that remaining funds are used according to IFS's mandate to support early career scientists in low-income countries. To this end, a closed call was sent to 480 recent grantees, of which 270 grantees applied for additional funding. The applications are currently under consideration and a sum of USD 600 000 is expected to be allocated to proposals submitted by grantees by 2025. The supplementary grant will go toward purposes related to the grantees' IFS projects, such as publication fees, travel costs for participation in international conferences, additional equipment and/or expendable supplies, additional field or laboratory work, and will be around USD 2000 each.

How is IFS preserving its legacy?

As this Annual Report goes to press, and as IFS prepares for closure, it is the intention that our extensive Salesforce records – encompassing historical data dating back to 1974 along with the most recent updates – are exported and prepared for preservation. Because of time constraints the records have not been as thoroughly screened as intended and there is thus likely to be some redundancy in the digital records and archiving of information of secondary importance. However, due care has been taken to ensure that the data are stored in accordance with established data governance policies to maintain confidentiality and integrity.

The final transfer method is currently being coordinated with the archive custodians. In archiving IFS historical records, we aligned with the archive's preferred method to ensure the data were delivered in the most secure and accessible format according to their requirements.

This digital archiving initiative aims to safeguard IFS's legacy, preserving the rich history of our work for future generations.

5. Publications were usually documented four years after grants were awarded.
6. See recent Annual Reports, where a dozen or so such case studies are presented each year, and also some half-a-dozen national reports to be found in IFS Monitoring and Evaluation/Published Impact studies, both in https://www.ifs.se/ifs-publications/
7. Conducted on Advanced Grants Project Completion Reports.
8. See recent Annual Reports https://www.ifs.se/ifs-publications/.
9. See https://www.ifs.se/ifs-publications/ for Monitoring and Evaluation Impact Studies on a range of countries. Also https://www.ifs.se/ifs-blog/ifs-a-model-organization-for-nurturing-young-scientists-in-developing-economies.html.
10. The gender equality efforts align with UN SDG 5 (Gender Equality and SDG 9 (Industry, Innovation and Infrastructure). See also https://www.ifs.se/ifs-blog/investing-in-women-scientists,-fostering-gender-equity-and-equality.html.
11. See 'Impact of IFS On My Life' stories in recent annual reports.

Group photo of stakeholders at the IFS YROC, 24–26 February 2025, Golden Tulip in Benin.

The future of capacity development for young researchers in the Global South

One of the ways in which IFS responded to its closure in mid-2025 was to convene a conference in Cotonou, Benin, 24–26 February 2025, to document the achievements, challenges, opportunities, and lessons learned over the lifespan of the organisation. The conference was dubbed "The Future of Capacity Development for Young Researchers in the Global South: Opportunities and Challenges", and welcomed more than 60 invitees from the Middle East and North Africa (6%), Sub-Saharan Africa (42%), Latin America and the Caribbean (25%), Asia and the Pacific (27%). The diverse group of stakeholders included early career researchers, academic leaders, policy-makers, funding organisations, and representatives from research institutions across the Global South, IFS and beyond. The three-day conference facilitated deep engagement and knowledge exchange through various formats, including plenary sessions, panel discussions, a world café and networking opportunities. Discussions focused on funding constraints, mentorship gaps, research infrastructure deficiencies, policy integration, the persistent challenge of brain drain, and the opportunities offered by emerging trends in digital integration and soft skills.

Summary of outcomes and proposed actions

Based on the discussions, the following key actions were recommended to strengthen research capacity in the Global South. Implementing these will require a coordinated effort among governments, research institutions, funding bodies, and the private sector.

Recognition of the need for sustainable research funding

> Governments were urged to allocate at least 2% of their national budgets to research and innovation.
> The establishment of regional funding mechanisms, such as an African-led Research Support Fund, was emphasized to reduce dependency on external donors.
> Universities were encouraged to develop endowment funds to provide long-term financial stability for research activities.

Strengthening institutional and human capacity

> A structured mentorship framework for young researchers was recommended to enhance career development.
> Increased investment in research infrastructure, including laboratories, digital tools, and high-speed internet, was identified as a critical need.
> South-South collaboration was emphasized as an effective way to build local expertise and reduce reliance on partnerships with developed nations.

Enhancing policy integration and research impact

> The need to bridge the gap between research and policy was widely acknowledged. Participants recommended developing concise policy briefs to ensure that research findings inform decision-making.
> Science communication training was identified as a key area for development to improve engagement with policy-makers, industry leaders, and the public.

For further information, please see the full report online: THE_FUTURE_OF_CAPACITY_DEVELOPMENT_FOR_YOUNG_RESEARCHERS_IN_THE_GLOBAL_SOUTH.pdf

The support of IFS through donors, strategic partners and individuals

We are deeply thankful for the support of the long-time donors and strategic partners:

Sida, the Swedish International Development Cooperation Agency

SNSF, the Swiss National Science Foundation

OPCW, the Organisation for the Prohibition of Chemical Weapons, and

COMSTECH, the Ministerial Standing Committee on Scientific and Technological Cooperation of the OIC (Organization of Islamic Cooperation).

We would also like to highlight and thank the Carnegie Corporation and the Belgian Science Policy Office (Belspo), as donors, the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), as a strategic partner, and Carolina MacGillavry, as an individual. Through their support, IFS has been able to successfully pilot three collaborative research projects in Africa and Asia, involving 112 individual grants to 57 women and 55 men, 31 team grants, 17 countries, five implementing partners and the above four funding partners. In addition, the pilot projects resulted in:

- Three research themes of neglected and under-utilized species, biodiversity, and climate change adaptation and mitigation being addressed
- A facilitated social networking platform and a web-based application review system being built
- The three pilot iterations each attracting around 500 eligible scientists who expressed interest in joining, and
- Collaborative research capacity-enhancing activities and peer-to-peer learning being designed and implemented.

Donors, strategic partners and individuals like Carnegie, Belspo, SEARCA and Carolina MacGillavry are the reasons we can continuously support early career researchers and we truly cannot thank them enough.

Carolina MacGillavry

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Professor, Department of Global Development and Planning, University of Agder, Kristiansand, Norway

Dr Anders Malmer,
International coordinator /Adjunct Professor (SLU Tropical Forestry), Swedish Forest Agency, Jönköping, Sweden

Ms Elisabeth Schenker,
Scientific Officer International Co-operation, Swiss National Science Foundation, Berne, Switzerland

Dr Bishnu Raj Upreti,
Executive Director, Nepal Center for Contemporary Research, Kathmandu, Nepal

IFS STAFF

Dr Patrick Van Damme *(Interim-Director),*
Professor, Faculty of BioScience Engineering, University of Ghent, Belgium, and Dean of the Faculty of Tropical AgriSciences, Czech University of Life Sciences, Prague

Mr Ulf Edin, *Head of Administration*

Ms Annika Eriksson, *Programme Administrator, Animal Production, Aquatic Resources and Water Resources*

Dr Ingrid Leemans, *Scientific Programme Coordinator, Animal Production, Aquatic Resources and Water Resources*

Ms Ingrid Lindhe, *Programme Administrator, Crop Science and Forestry/Agroforestry*

Mr Elvis Bahati Orlendo, *Web Editor, Social Media and Information Manager*

Ms Nathalie Persson Andrianasitera, *Scientific Programme Coordinator, Food Science, Natural Products and Social Science*

Ms Sirilak Pongpatipat, *Accounting Administrator*

STATEMENT OF INCOME AND EXPENSE (in thousands SEK)

	1 January– 31 December 2024	1 January– 31 December 2023
Programme Revenue		
Core and Restricted Contributions	10 608	11 956
Grants Withdrawn	458	309
Other Programme Revenue	5	17
Total Programme Revenue	11 071	12 282
Programme Expense		
Programme Services	12 860	17 027
Fundraising and Partnership Building	781	691
Management and General	2 199	1 552
Total Programme Expense	15 840	19 271
Programme Income less Expense	-4 769	-6 989
Result from financial assets		
Income from other investments held as fixed assets	9 297	1 868
Interest Income	87	10
Exchange gain / loss	133	139
Asset Income less Expense	9 516	2 017
Net Income less Expense	4 747	-4 972

BALANCE SHEET (in thousands SEK)

	31 December 2024	31 December 2023
Assets		
Fixed Assets		
Tangible Assets		
Equipment, Furniture and Fixtures	86	89
Financial Assets		
Other long-term investments	0	18 007
Long-term Donor Receivables	0	0
Total Fixed Assets	86	18 097
Current Assets		
Current Receivables		
Donor Receivables	0	1 343
Other Current Receivables	839	569
Prepaid Expense and Accrued Income	2 160	198
Total Current Receivables	2 999	2 111
Cash and Bank Balances	25 230	8 208
Total Current Assets	28 228	10 319
Total Assets	28 314	28 416
Equity and Liabilities		
Designated funds		
Board Designated Fund for Contingencies	4 050	11 861
Carolina MacGillavry Fund	0	16 731
Total Designated Funds	4 050	28 592
Balanced capital		
Balance, 1 January	16 624	-2 946
Net Income less Expense for the Year	4 747	-4 972
Total Balanced Capital	21 371	-7 918
Total Equity	25 421	20 674
Current Liabilities		
Research Grants Payable	606	2 611
Deferred Restricted Contributions	381	553
Other Current Liabilities	598	433
Accrued Expense and Prepaid Income	1 308	4 145
Total Current Liabilities	2 893	7 742
Total Net Assets and Liabilities	28 314	28 416

AFFILIATED ORGANISATIONS

NATIONAL ORGANISATIONS

ARGENTINA
Academia Nacional de Ciencias Exactas, Físicas y Naturales (ANCEFN)
Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET)

AUSTRALIA
Australian Academy of Science (AAS)

AUSTRIA
Fonds zur Förderung der Wissenschaftlichen Forschung (FWF)
Österreichische Akademie der Wissenschaften (ÖAW)

BANGLADESH
Bangladesh Council of Scientific and Industrial Research (BCSIR)

BELGIUM
Académie Royale des Sciences d'Outre Mer (ARSOM)
Académie Royale des Sciences des Lettres et des Beaux Arts de Belgique
Koninklijke Academie voor Wetenschappen, Letteren en Schone Kunsten van België (KVAB)

BOLIVIA
Academia Nacional de Ciencias de Bolivia (ANCB)

BRAZIL
Academia Brasileira de Ciencias (ABC)
Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPQ)
Fundaçao Oswaldo Cruz (FIOCRUZ)

BURKINA FASO
Ministère des Enseignements Secondaire, Supérieur et de la Recherche Scientifique (MESSER)

CAMEROON
Ministry of Scientific and Technical Research

CENTRAL AFRICAN REPUBLIC
l'Enseignement Supérieur et de la Recherche Scientifique

CHAD
Direction de la Recherche Scientifique et Technique, MESRS

CHILE
Academia Chilena de Ciencias
Comisión Nacional de Investigación Científica y Tecnológica (CONICYT)

CHINA
Chinese Academy of Sciences (CAS)

COLOMBIA
Academia Colombiana de Ciencias Exactas, Físicas y Naturales (ACCEFYN)
Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria (CIPAV)
Instituto Colombiano para el Desarrollo de la Ciencia y Tecnología (COLCIENCIAS)

CONGO (BRAZZAVILLE)
Direction Générale de la Recherche Scientifique et Technique, MENRST

COSTA RICA
Consejo Nacional de Investigaciones Científicas y Tecnológicas (CONICIT)

CÔTE D'IVOIRE
Académie des Sciences, des Arts, des Cultures d´Afrique et des Diaporas Africaines

CUBA
Academia de Ciencias de Cuba (ACC)
Ministry for Foreign Investment and Economic Cooperation

DENMARK
Akademiet for de Tekniske Videnskaber (ATV)
Det Kongelige Danske Videnskabernes Selskab (RDVS)

ECUADOR
Fundación para la Ciencia y la Tecnología (FUNDACYT)

EGYPT
Academy of Scientific Research and Technology (ASRT)

EL SALVADOR
Consejo Nacional de Ciencia y Tecnología (CONACYT)

ETHIOPIA
Ethiopian Science and Technology Commission (ESTC)

FINLAND
Delegation of the Finnish Academies of Science and Letters

FRANCE
Académie des Sciences
Centre de Coopération Internationale en Recherche Agronomique pour le Développement (CIRAD)
Institut National de la Recherche Agronomique (INRA)
Institut de Recherche pour le Développement (IRD)

GERMANY
Deutsche Forschungsgemeinschaft (DFG)

GHANA
Council for Scientific and Industrial Research (CSIR)

GUINEA
Direction Nationale de la Recherche Scientifique et Technique

GUINEA BISSAU
Instituto Nacional de Estudos e Pesquisa (INEP)

GUYANA
Institute of Applied Science and Technology

HONDURAS
Consejo Hondureño de Ciencia y Tecnología (COHCIT)

INDIA
Indian National Science Academy (INSA)

INDONESIA
Lembaga Ilmu Pengetahuan Indonesia (LIPI)

ISRAEL
The Israel Academy of Sciences and Humanities

JAMAICA
Scientific Research Council (SRC)

JORDAN
Royal Scientific Society (RSS)

KENYA
Kenya Agricultural Research Institute (KARI)
Kenya National Academy of Sciences (KNAS)

KOREA DPR (NORTH)
Academy of Sciences of DPR Korea

KOREA R (SOUTH)
National Academy of Sciences (NAS)

KUWAIT
Kuwait Institute for Scientific Research (KISR)

LATVIA
Latvian Academy of Sciences (LAS)

LESOTHO
The National University of Lesotho (NUL)

LIBERIA
University of Liberia (UL)

MADAGASCAR
Académie National Malgache

MALAWI
National Research Council of Malawi (NRCM)

MALAYSIA
Malaysian Scientific Association (MSA)
Ministry of Science, Technology and Innovation

MALI
Centre National de la Recherche Scientifique et Technologique (CNRST)
Comité National de la Recherche Agricole (CNRA)

MEXICO
Consejo Nacional de Ciencia y Tecnología (CONACYT)

MONGOLIA
Mongolian Academy of Sciences

MOROCCO
Centre National de Coordination et de Planification de la Recherche Scientifique et Technique (CNR)
Institut Agronomique et Vétérinaire Hassan II

MOZAMBIQUE
Universidade Eduardo Mondlane (UEM)
The Scientific Research Association of Mozambique (AICIMO)

NEPAL
Royal Nepal Academy of Science and Technology (RONAST)

NETHERLANDS
Koninklijke Nederlandse Akademie van Wetenschappen (KNAW)

NIGER
Université Abdou Moumouni

NIGERIA
Federal Ministry of Science and Technology (FMST)
The Nigerian Academy of Science (NAS)

NORWAY
Det Norske Videnskaps Akademi (DNVA)

PAKISTAN
Pakistan Council for Science and Technology (PCST)

PANAMA
Secretaria Nacional de Ciencia y Tecnologia e Innovación (SENACYT)
Universidad de Panamá

PAPUA NEW GUINEA
The University of Papua New Guinea

PERU
Consejo Nacional de Ciencia y Tecnología (CONCYTEC)

PHILIPPINES
National Research Council of the Philippines (NRCP)

POLAND
Polish Academy of Sciences (PAS)

SAUDI ARABIA
King Abdulaziz City for Science and Technology (KACST)

SENEGAL
Délégation aux Affaires Scientifiques et Techniques, MRST

SEYCHELLES
Seychelles Bureau of Standards (SBS)

SIERRA LEONE
Institute of Agricultural Research (IAR)

SOUTH AFRICA
National Research Foundation (NRF)

SRI LANKA
National Science Foundation (NSF)

SUDAN
National Centre for Research (NCR)

SWEDEN
Ingenjörsvetenskapsakademien (IVA)
Kungliga Skogs och Lantbruksakademien (KSLA)
Kungliga Vetenskapsakademien (KVA)

SWITZERLAND
Council of the Swiss Scientific Academies (CASS)
Swiss National Science Foundation (SNSF)

TANZANIA
Tanzania Commission for Science and Technology (COSTECH)

THAILAND
National Research Council of Thailand (NRC)
Thailand Research Fund (TRF)

TUNISIA
Direction Générale de la Recherche Scientifique et Technique, MES

UGANDA
National Agricultural Research Organisation (NARO)
Uganda National Council for Science and Technology (UNCST)

UNITED KINGDOM
The Royal Society
Natural Resources Institute (NRI)

URUGUAY
Programa de Desarrollo de las Ciencias Basicas (PEDECIBA)

USA
American Academy of Arts and Sciences (AAAS)
National Academy of Sciences (NAS)
New York Academy of Sciences (NYAS)

VENEZUELA
The Ministry of Popular Power for Science and Technology

VIET NAM
Ministry of Science and Technology (MOST)

ZAMBIA
National Institute for Scientific and Industrial Research (NISIR)

ZIMBABWE
Scientific and Industrial Research and Development Centre (SIRDC)
University of Zimbabwe

REGIONAL ORGANISATIONS

AFRICA
Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA)
Association of African Universities (AAU)
Centre Regional pour l'Eau Potable et l'Assainissement à faible coût (CREPA)
Institut du Sahel (INSAH)
The African Academy of Sciences (AAS)
West and Central African Council for Agricultural Research and Development (WECARD/CORAF)
Western Indian Ocean Marine Science Association (WIOMSA)

LATIN AMERICA AND THE CARIBBEAN
Centro Agronónomico Tropical de Investigación y Enseñanza (CATIE)
The Caribbean Academy of Sciences (CAS)
Caribbean Agricultural Research and Development Institute (CARDI)

INTERNATIONAL ORGANISATIONS

BioNET (The Global Network for Taxonomy)
International Organisation for Chemical Sciences in Development (IOCD)
International Union of Forest Research Organisations (IUFRO)
The Academy of Sciences for the Developing World (TWAS)
Consultative Group on International Agricultural Research (CGIAR): CGIAR Secretariat
Bioversity International
Centro Internacional de Agricultura Tropical (CIAT)
Centre for International Forestry Research (CIFOR)
International Centre for Agricultural Research in the Dry Areas (ICARDA)
International Centre for Research in Agroforestry (ICRAF)
International Water Management Institute (IWMI)
World Fish Center

ANNEX 1: A SELECTION OF 2020 GRANTEE PUBLICATIONS

Abarike, E. D., Atuna, R. A., Agyekum, S., Akongyuure, D. N., & Alhassan, E. H. (2022). Isolation and characterization of *Aeromonas jandaei* from Nile Tilapia in Lake Volta, Ghana, and its response to antibiotics and herbal extracts. *Journal of Aquatic Animal Health*, 34(3), 140–148. https://doi.org/10.1002/aah.10165

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Ali, H. M., Karam, K., **Khan, T**., Wahab, S., Ullah, S., & Sadiq, M. (2023). Reactive oxygen species induced oxidative damage to DNA, lipids, and proteins of antibiotic-resistant bacteria by plant-based silver nanoparticles. *3 Biotech, 13*(12), 414. https://doi.org/10.1007/s13205-023-03835-1

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ANNEX 2: A BRIEF HISTORY OF IFS

Founding Fathers of IFS. From left: Sven Brohult, Roger Revelle, Abdus Salam and Robert E Marshak.

As IFS is preparing to close, we wanted to look back and acknowledge our rich history through the years, to celebrate the legacy we leave.

The idea for an International Foundation for Science was first proposed at the 1965 Pugwash Conference on Science and World Affairs in Venice. Following two devastating world wars, scientists from around the world banded together with the goal to achieve global peace and stability. The growing gap between the developing world and richer countries in the west was considered a risk factor for world peace. To address this issue, a foundation that could support the development of strong scientific traditions and institutions around the world would be created.

The first meeting to discuss the founding of an International Foundation for Science was held in Stockholm in 1970. Members from 16 different scientific academies were present, among them Professors Pierre Auger, Robert Marshak, Roger Revelle, Abdus Salam and Sven Brohult. The former four were credited with the idea for IFS, but Sven Brohult would quickly become just as important for the foundation.

In 1971, Professor Pierre Auger, who had hitherto spearheaded the project, withdrew from the Chairmanship of the Interim Board following a disagreement on the intended legal status of IFS. As Auger was formerly head of mathematical and natural sciences at UNESCO, he had contributed many of his contacts to IFS and subsequently his departure delayed plans for an inaugural assembly that was to be held on the UNESCO premises. However, the working group continued to develop the IFS statutes and finally, in 1972, the Charter was signed and IFS was officially in business.

At its inception, much of IFS's decision-making power lay with the member organisations and the general assemblies. However, as IFS was still finding funding and donors, for the first three years no general assembly could be held to formally elect a Board of Trustees or a grants commission. Instead, IFS was run by an Interim Board and an Interim Grants Commission. Nevertheless, in 1974 IFS awarded its first-ever grants – 50 of them. Finally, in 1975 the first General Assembly was held, electing the Interim Board and Chair to be the Board of Trustees proper.

In the following years IFS followed an upwards trend, with more funding rolling in and more grants being given out. In 1978 IFS hosted its first workshop, and soon capacity-enhancing support such as workshops, mentoring opportunities and travel grants became almost as big a part of the IFS modus operandi as the small grants system itself. IFS was also gaining outside recognition, receiving the King Baudouin Foundation's International Development Prize in 1986 and the Princess Chulaborn of Thailand Gold Medal in 1988. Because of the increasing streams of revenue, IFS was also able to set up its own awards for grantees of special merit, starting with the Sven Brohult Award in 1982, followed by the IFS/King Baudouin Award and the IFS/Danida Award in 1987 and 1996 respectively.

As IFS continued to grow and gained financial donors, it also began several collaborative projects. After considerable deliberation, IFS began accepting restricted funds earmarked for specific issues, which led to the SPAAR Programme commencing in 1985. Funded by the World Bank, SPAAR supported Sub-Saharan African scientists. Other projects

soon followed: in 1997 a collaborative effort with Mistra (Foundation for Environmental Science) was begun, establishing links between Mistra-supported Swedish research projects and scientists from the Global South, to promote global solutions and networking. In 2008 the Procurement, Installation, Service and Maintenance of Scientific Equipment project (PRISM), sponsored by the MacArthur Foundation, was introduced. IFS also began to allow donor organisations to co-fund grants, and using money bequeathed to IFS by Carolina MacGillavry, two fellowships, and later the Carolina MacGillavry Award, were funded.

IFS continued to evolve as it approached the new millennium, introducing the first long-term strategy ("IFS Beyond 2000") in 1997. This was followed by a medium-term plan for 2002-2004, a five-year plan for the period 2006-2010, followed by two ten-year plans for the periods 2011-2020 and 2021-2030. The new strategies changed the structure of IFS significantly. One of the initial changes was the discontinuation of the General Assemblies, which had originally been an important part of IFS's decision-making body. The 8th and final Assembly was held in Rio de Janeiro, Brazil, in 1997.

Further changes included rules regarding country eligibility, which were based on the UN's classification of developing/lower-income countries and led to the phase-out of IFS's support for Argentina and Uruguay in 1999 and Mexico in 2005. Special rules regarding age and education level of Chinese applicants were also introduced in 1995 to balance the geographic spread of applicants. From 2003 onwards, IFS adopted a 70/30 rule, to ensure 70% of funding went to the poorest areas, reserving 30% for grantees from the remaining eligible countries. Specifications of eligibility also changed as the types of grants IFS offered began to change.

Originally IFS awarded individual, renewable grants in six fields of applied biology only: Animal Science, Aquaculture, Food Crops, Food Fermentation, Forestry, and Natural Products. The field of Rural Technology was introduced in 1977, but later phased out in 1992. In 2002, Water and Social Sciences were introduced as eligible fields. In 2013, the eight research areas were again restructured into three clusters entitled Biological Resources in Terrestrial Systems; Water and Aquatic Resources; and Food Security, Dietary Diversity and Healthy Livelihoods.

While remaining faithful to its founding mandate, IFS's priorities evolved over time in response to global interests, such as the UN Strategic Development Goals, as well as changes in funding. There were a lot of changes in funding. Towards the end of the 00's, like many organisations, IFS began facing economic troubles due to the global recession. Governments were less generous with their support and IFS had to cut down on the number of grants awarded. In 2009 IFS had launched a prestigious hub project, creating a secondary base for IFS at RUFORUM in Uganda, but this project was unfortunately ended after running for barely two years.

Yet IFS continued to look for renewed ways of operating to adapt along with the times, and in 2011 IFS's perhaps most transformative ten-year strategy "For Togetherness" was launched. It was based on three scientific programmes, or "pillars". The first pillar was the individual grant, continuing the small grants programme. The second pillar was the collaborative grant, a new project that IFS began with partners to encourage cross-border collaboration for scientists in the Global South. The third pillar was contributing innovation, with the goal to facilitate and advise grantees on the implementation of their research results, by building networks, disseminating information and facilitating self-advocacy.

IFS continued to award grants throughout the 2010's despite the economic difficulties, but then the Covid pandemic hit in 2020. Another global recession followed, which led to many governments withdrawing their funding from IFS. Nevertheless, in 2021 IFS launched a new ten-year strategic plan titled "Investing in Future Scientists". This plan focused on improving science literacy and enhancing research capacity, driven by changes in the contemporary context. A major part of this was the removal of the age restriction, making the grants scheme more accessible to those with an unconventional career path. The new strategy also involved the switch from individual, renewable grants to Basic and Advanced Grants to further the development of young scientists.

Unfortunately, the new strategy and the many increasingly creative attempts at securing funding were not enough, and the Foundation finally had to make a disappointing decision. In 2024, IFS announced that it was closing all operations in 2025. Despite the struggles, IFS continued financing grants all the way through 2023 and sponsored grantees with travel and supplementary support through 2025. Therefore, it is with a sad but light heart that IFS now bids goodbye and good luck to all young aspiring scientists out there, knowing that we made the most of the time, resources and especially the money generously donated to IFS's cause up to the very end.

Thank you from

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SUPPORTING YOUNG RESEARCHERS

The International Foundation for Science (IFS) supports early career scientists in Low- and Lower-Middle-Income Countries through grants and capacity-enhancing activities.

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