INTERNATIONAL FOUNDATION FOR SCIENCE

IFS Strategy 2011 – 2020

WORKING • TOGETHER

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Executive Summary

The International Foundation for Science (IFS) was established in the early 1970s 'to address the stultifying conditions under which younger faculty members in the universities of developing countries were attempting to do research'. Since then, IFS has awarded almost 7,000 small grants, in over 100 countries, building capability of tens of thousands of young developing world researchers.

The key priority areas within the action agenda for achieving the Millennium Development Goals drawn up at the end of 2010 by 192 Heads of State and Government gathered at United Nations Headquarters, underscore the contemporary relevance of IFS: they include 'promoting the strategic role of science and technology', 'enhancing technological innovation in developing countries, through strengthened national innovation, research and development capacity' and 'improving opportunities for young people through the creation of enabling environments to address the special needs of least developed countries'.

Given the world's commitment to accelerating progress in order to achieve the eradication of extreme poverty and hunger, the crises in food, water and energy that confront humanity today, and the spectre of climate change, biodiversity loss and environmental degradation, planners and funders have to invest in the potential of science to address the legacy left by the recent stewardship of the world's biological and water resources. In this context, it is more crucial now, than ever before that IFS plays its role in granting and building the capability of those developing country scientists embarking on a research career. The scientists of tomorrow must contribute to securing affordable food, water and energy to a rising population, where their scope for action is constrained by the urgent challenge of environmental sustainability.

A global conversation amongst IFS stakeholders lasting four months engaged with 4,400 people in different ways and provided the opportunity to listen and reflect before setting out this ten-year strategy. The revised mission and the new programme structure reflect today's changing circumstances and opportunities, especially, the role that science plays in society, and the ways in which science and development landscapes are navigated and linked.

In the next decade IFS aims to support excellent individual and collaborative research, to build capability of early career scientists in the developing world, and to contribute innovation to the sustainable management of biological and water resources. In particular, to enable young scientists to contribute to a global research community that is reducing poverty and supporting sustainable development. The primary focus will be the promotion of excellent science through early career research grants and capability enhancing support to researchers in developing countries. However, the interlinked development challenges that face humanity increasingly require scientists to work with each other, as well as with other professions and specialists. Therefore, the 2011-2020 Strategy, Working Together, will, through the phased introduction of a collaborative research programme, also provide support for interdisciplinary research teams, which combine researchers' strengths, expertise, and experience, to address a larger topic or a research issue where more than one discipline is required. A major change in our agenda is, not only to aspire to strengthen the capability of those embarking on a research career in the developing world, but also to support young scientists in the actions they undertake to bring about change, in terms of their values and objectives. In other words, to promote the individual agency of men and women scientists, early in their career in developing countries, to put their science into use.

Resumé

La Fondation Internationale pour la Science (IFS) a été créée afin d'améliorer les conditions peu favorables dans lesquelles les jeunes membres du corps professoral des universités des pays en développement ont tenté de faire de la recherche. Depuis lors, IFS a octroyé près de 7000 petites subventions, dans plus de 100 pays et accru les capacités de recherche de dizaines de milliers de jeunes chercheurs dans le monde en développement.

Les domaines prioritaires dans le programme d'action pour atteindre les objectifs du Millénaire pour le développement établis par les 192 Chefs d'État et de gouvernement réunis au Siège de l'ONU en 2010 soulignent la pertinence contemporaine de l'IFS : elle comprend la «promotion du rôle stratégique de la science et la technologie», «promotion de l'innovation technologique dans les pays en développement, en renforçant l'innovation, la recherche et des capacités nationales de développement» et «l'amélioration des possibilités pour les jeunes par la création d'environnements favorables à répondre aux besoins particuliers des pays les moins développés.

Compte tenu de l'engagement du monde à accélérer les progrès en vue de parvenir à l'éradication de la pauvreté extrême et la faim, les crises dans l'alimentaire, l'eau et l'énergie qui se posent à l'humanité d'aujourd'hui, et le spectre du changement climatique, la perte de biodiversité et de dégradation de l'environnement, les planificateurs et les bailleurs de fonds doivent investir dans le potentiel de la science pour transformer radicalement l'héritage laissé par les générations récentes dans l'intendance des ressources biologiques et de l'eau dans le monde. Dans ce contexte, il est plus important maintenant que jamais auparavant qu'IFS joue son rôle dans l'octroi et le renforcement de la capacité de ceux qui se lancent dans une carrière de recherche. Les scientifiques de demain doivent contribuer à l'accès pérenne à la nourriture abordable, à l'eau et à l'énergie pour une population croissante dont le champ d'action est limité par le problème urgent de la durabilité de l'environnement.

Une concertation mondiale d'une durée de quatre mois entre les parties prenantes IFS avec 4.400 personnes dans différents axes a été l'occasion d'écouter et de réfléchir avant de définir cette stratégie pour les 10 prochaines années. La nouvelle structure du programme résultant de la mission révisée reflète l'évolution du contexte actuel et des opportunités en particulier le rôle que joue la science dans la société actuelle, et la façon dont les paysages science et le développement sont appréhendés et liés.

Dans la prochaine décennie, nous visons à soutenir d'excellentes recherches individuelles et collectives, pour développer les capacités des scientifiques en début de carrière dans le monde en développement, l'innovation et la contribution à la gestion durable des ressources biologiques et l'eau. Pour permettre aux jeunes scientifiques de contribuer à une communauté de recherche mondiale visant à réduire la pauvreté et soutenir le développement durable. L'objectif principal sera la promotion de l'excellence scientifique grâce à des subventions de recherche au début de carrière et le renforcement de la capacité de soutien aux chercheurs des pays en développement. Cependant, les défis de développement auxquels l'humanité doit faire face nécessitent de plus en plus que les scientifiques travaillent ensemble ainsi qu'avec d'autres professions et spécialistes. Par conséquent, grâce à l'introduction progressive d'un programme de recherche collaborative, la stratégie 2011-2020, apportera également son soutien aux chercheurs afin de combiner les forces, les compétences et l'expérience, pour répondre à un sujet plus vaste ou une question de recherche où plus d'une discipline est nécessaire. Un changement majeur dans notre approche est, non seulement d'aspirer à renforcer la capacité de ceux qui se lancent dans une carrière de recherche dans le monde en développement, mais aussi soutenir les jeunes scientifiques dans les actions qu'ils engagent à apporter des changements en termes de valeurs et d'objectifs. En d'autres termes, pour promouvoir le pouvoir des hommes et des femmes scientifiques, au début de leur carrière dans les pays en développement, à mettre leur science en service.

Acronyms

AWARD	African Women in Agricultural Research and Development
BCDD	Broadband Commission for Digital Development
BOT	Board of Trustees
CES	Capability enhancing support
CGIAR	Consultative Group on International Agricultural Research
CTA	Technical Centre for Agricultural and Rural Cooperation
EU	European Union
GEF	Global Environment Facility
GDP	Gross Domestic Product
GNI	Gross National Income
ICT	Information and Communication Technologies
IEA	International Energy Agency
IFPRI	International Food Policy Research Institute
LDC	Least Developed Countries
LIC	Low Income Countries
MDG	Millennium Development Goals
M and E	Monitoring and Evaluation
MELP	Monitoring, evaluation, learning and planning
MESIA	Monitoring and Evaluation System for Impact Assessment
MIC	Middle Income Countries
MSC	Most Significant Change
Norad	Norwegian Agency for Development Cooperation
OECD	Organization for Economic Cooperation and Development
RBM	Results-Based Management
RUFORUM	The Regional Universities Forum for Capacity Building in Agriculture
SAC	Scientific Advisory Committee
SMART indicators	Indicators that are: Specific, Measurable, Achievable, Relevant and Time-bound
UAE	United Arab Emirates
UMIC	Upper Middle Income Countries
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
VLIR	Vlaamse Interuniversitaire Raad
Web 2.0	A second generation of the World Wide Web that is focused on the ability for people to collaborate and share information online
WIOMSA	Western Indian Ocean Marine Science Association

Chapter 1:
The Contemporary Global Context for the Work of the International Foundation for Science

1.1 A mighty challenge

The General Assembly of the United Nations, High-level Plenary Meeting on the Millennium Development Goals (MDG) met in October 2010. The Member States committed to an action agenda for achieving the MDG, including accelerating progress in order to achieve Millennium Development Goal 1 – the eradication of extreme poverty and hunger. This is a mighty challenge that now confronts humanity and one which also directly impacts the achievement of all the MDG.

Three key priority areas within the action agenda, drawn up by 192 Heads of State and Government gathered at United Nations Headquarters[1] relate very directly to the mandate of the International Foundation for Science (IFS) and underscore its contemporary relevance. These are:

- **The strategic role of science and technology promoted,** including information technology and innovation in areas relevant for the achievement of the MDG, in particular agricultural productivity, water management and sanitation, energy security and public health.
- **The capacity for technological innovation in developing countries greatly enhanced through strengthened national innovation, research and development capacity,** and facilitating the availability of environmentally sound technologies and corresponding know-how by promoting the development and dissemination of appropriate, affordable and sustainable technology; and
- **Opportunities for young people improved through the creation of enabling environments including to address the special needs of least developed countries.**

These priorities from the 2010 MDG Summit underline the contemporary relevance of the approach set by IFS in the early 1970s, to strengthen the capacity of developing countries to conduct relevant and high quality scientific research, through support to promising young local scientists.

1.2 Interlinked crises, entitlements and climate change

We live today in a world that faces many interlinked crises. The challenge before us is not only to provide sufficient food, water and energy (to a population that will peak at around 9 billion people by 2050) but also to ensure security of supply, at affordable cost and within acceptable limits of environmental change.

Regarding food – Millennium Development Target 1c is to halve, between 1990 and 2015, the proportion of people who suffer from hunger. However, progress to end hunger has been stymied in most regions. Despite some progress, one in four children in the developing world is

[1] United Nations A/RES/65/1 (2010) Keeping the promise: united to achieve the Millennium Development Goals.

still underweight, children in rural areas are nearly twice as likely to be underweight as those in urban areas and of course, the prevalence of underweight children is dramatically higher among the poor. For those who survive, their susceptibility to chronic diseases, such as heart disease, type 2 diabetes, high blood pressure and cancer later in life is also increased.

Some examples of the role for developing country research in this context include:

- Improving agricultural yields. (In many countries, available farm *land is exhausted.* The current *slow growth in yields* of staple plant crops is well below the *growth of population* and the additional yield required by the *rising demand for meat*).
- Addressing issues that impact available land. (Informing, through evidence, government policies around cropping, biofuels and so-called 'land grabbing').
- Assessing options and efficiency of fertilization. (The financial cost of bringing concentrated nitrogen and phosphorus into soils rises with the oil price – which, due to demand and conflict is now at record levels; the *cost of fertilizer peaked even more dramatically than food prices in 2007-8*).
- Addressing issues that impact availability and quality of foodstuffs. (Today, food prices have reached record levels, whilst supply and contamination radically impact globalizing food chains).
- Addressing post-harvest losses. (In both rich – due to habit and law, and poor countries – due to losses from pests and spoilage, a staggering *30-50% of all food that is produced is never consumed*).

Regarding water – Millennium Development Target 7c is to halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation, however, the world is increasingly constrained by the availability and quality of water.

Some examples of the role for developing country research in this context include:

- Identifying innovative and targeted efforts to bring safe drinking water to rural households (whilst the world is on track to meet the drinking water target, much still remains to be done in some regions).
- Identifying improvements in sanitation without bypassing the poor (with half the population of developing regions without sanitation, the 2015 target appears critical).
- Investigating efficient and multiple use of water (70% of our water use is for irrigation, and there is increasing competition from fast growing cities. *Water tables are plummeting*; the waters that irrigate the world's bread and rice, such as the Colorado, Murray-Darling and Indus *rivers no longer reach the sea*, whilst others like the Mekong, the centre of rice production in Vietnam which is the second largest exporter of rice to the world, have deltas that are becoming increasingly saline).

Regarding energy – The World Energy Council in 2007 estimated that global energy use was increasing by about 2% per year. According to the International Energy Agency (IEA), notwithstanding the financial and economic crisis, world primary energy demand is expected to be 36% higher in 2035 than 2008. Non-OECD countries, led by China (where energy use is expected to surge by 75%) and India, are expected to account for 93% of this increase, with their share rising from 52% to 63%. During this period, global demand for electricity is projected to also grow by 76%.

Also in the energy demand picture is the need for energy to supply water; it is estimated that pumping systems account for 20% of world's electrical demand.

Some examples of the role for developing country research in this context include:

- Investigating *greater energy efficiency and alternative energy sources.* (The world's people would be healthier and its climate less prone to change if it *used a lot less coal*; that requires *greater energy efficiency*, and other energy options).
- Improving *renewable power* and its role in *greater energy security.* (Whilst IFS is less likely to be called upon to support research investigating better grids, carbon capture technology or the direct consequences of the Fukushima Dai-ichi nuclear plant damage following the 2011 tsunami, it may play a role, for example, in off-grid supplies such as micro- and pico-hydro solutions, which are often small-scale and village-based approaches where small research programmes have a role to play).

In addition, overlaying all of the issues outlined above are two further fundamentals:

Securing entitlements – It is not enough to increase availability of food, water and energy. Starvation, as well as water and energy deprivation is not addressed by increasing availability alone, but by securing entitlements to food, water and energy for 9 billion people.

Some examples of the role for developing country research in this context include:

- Characterizing legal, political and economic entitlement arrangements within a social structure.
- Understanding formal ownership rights and informally accepted legitimacy.
- Policy impacts on *the entitlements of different social groups to the means of subsistence* (see for example cropping, biofuels and so-called land grabbing, under 'Regarding food').

The spectre of climate change – To put this threat into perspective, in 2010 the UN Environment Programme estimated that for the world to have a reasonable chance of limiting global warming to less than 2°C, and thus avoiding the more apocalyptic globally destructive scenarios, carbon dioxide emissions should be reduced to 44 billion tonnes by 2020. With *business as usual*, emissions would be between 54 billion and 60 billion tonnes. If countries take the most ambitious of the courses of action that they have outlined to the UN, the figure still only comes down to about 49 billion tonnes.

Some examples of the role for developing country research in this context include:

- Characterizing local climate change impacts from weather-related disasters, sea-level rise, and reduced agricultural productivity.
- Developing cost-effective, practical, actionable *recommendations to assist climate adaptation*.
- *Gender analysis* to improve development and delivery of *relevant and responsive adaptation* programmes.
- How to link indigenous based climate change adaptation knowledge and contemporary scientific strategies.

The topics above ***do not*** prescribe what recipients of IFS grants should research; they serve only to characterize some of the mighty challenges that exist. In the past 40 years, scientists, planners, farmers and funders enabled an increase in world food supply of 150%. In the coming 40 years, the challenge is to increase food supply by 70%. Yet this challenge is more complex, and inter-related with the crises in water and energy, conservation and biodiversity loss and a changing climate.

In this context, the original need identified for the International Foundation for Science remains crucial today, that 'Scientific research provides an important input for sustainable management of biological and water resources. Scientific knowledge is central for rural, urban, industrial, and policy development, which will lead to improvement of people's livelihoods'.

The most recent independent review of IFS[2] acknowledged its bespoke support, as an unparalleled global network of researchers, technical advisers and partnerships in developing countries dedicated to building the capability of young developing country scientists. It represents an important mechanism for science academies and development organisations to contribute to international research development cooperation, the key objectives of which are to support excellent science and equitable and sustainable development towards the attainment of the MDG.

[2] Muraguri-Mwololo, Schertenleib and Svensson (2010) External Evaluation of the International Foundation for Science.

Chapter 2:
The International Foundation for Science Contribution

2. 1 The original concept

One of the principal recommendations of the Pugwash Conference in Venice[3] in 1965 was to establish *the International Foundation for Science* 'in order to address the stultifying conditions under which younger faculty members in the universities of developing countries were attempting to do research'[4]. The original concept proposed that 'individual grants to developing country scientists will greatly enhance opportunities for original research and scientific growth' and the concept has been strongly endorsed by every subsequent independent review of the organisation.

Whilst small grant schemes are notoriously expensive to administer compared to larger scale projects, they play a special and vital role in the early career path of scientists. Applications to IFS have always been rigorously assessed by international specialists, with detailed feedback to all applicants. Unsuccessful applicants have received valued counselling early in their research careers, whilst those that succeeded have gained confidence from the international recognition of their ideas and from the opportunity to manage whole research projects and associated budgets. More strategically, the provision of grants has been complemented by capability enhancing support. This has included equipment purchasing support and thematic workshops, commonly with partner organisations, such as Proposal Writing, Science Writing and Science Communication, and travel grants to share research results.

Between 2006 and 2010 IFS organized 127 thematic and research skills capability building events in collaboration with its partner organizations, with 3,154 participants in over 30 countries. In the period 1974-2010, IFS has awarded 6,835 small grants, in 102 countries; 17,500 scientists in the developing world have benefited from scientific counselling, and more than 65,000 from using equipment purchased by IFS.

Nearly forty years on, the International Foundation for Science is seeking to renew cooperative solutions around today's global problems, and to contribute to building in the developing world the potential of science to address the mighty challenges that now confront humanity.

[3] The Pugwash Conferences take their name from the location of the first meeting, which was held in 1957 in the village of Pugwash, Nova Scotia, Canada. The stimulus for that gathering was a manifesto issued in 1955 by Bertrand Russell and Albert Einstein -- and signed also by Max Born, Percy Bridgman, Leopold Infeld, Frederic Joliot-Curie, Herman Muller, Linus Pauling, Cecil Powell, Joseph Rotblat, and Hideki Yukawa -- which called upon scientists of all political persuasions to assemble to discuss the threat posed to civilization by the advent of thermonuclear weapons. Since then the Nobel Prize winning conference series of scientists meeting in private as individuals, rather than as representatives of governments or institutions has expanded its remit to seeking cooperative solutions for global problems. The 1965 meeting first proposed the creation of IFS.

[4] The idea was refined at the Pugwash Conference in Sochi in 1969, and presented to the Advisory Committee for Application of Science and Technology to Development in New York by Roger Revelle (Professor of Science and Public Policy at the University of California). Sven Brohult, president of the Royal Swedish Academy of Engineering Sciences became an enthusiastic convert to the idea and a persuasive strong-willed soul of the enterprise. Backed by 16 national academies of science the International Foundation for Science was established in Stockholm in 1972.

2.2 Listening and reflecting ahead of making change

Following the decision by the Board of Trustees in October 2010, IFS consulted widely in the process of envisioning the future direction of IFS support, which is presented in this strategy.

A global conversation amongst IFS stakeholders lasting four months engaged with 4,400 people in different ways. Colleagues that provided inputs into the discussions about the future IFS strategy included potential, successful, as well as failed IFS applicants, active and former grantees, advisers[5] and scientific specialists, as well as academics and educationists – some of whom were not earlier connected to IFS, and representatives of donors, partner organizations, government officials and others. The envisioning process involved reflection and review of the main components of the past IFS programme, i.e. research grants to individual scientists who are at the beginning of their research career, and capability enhancing support. The envisioning began with scientists from the developed and developing world hosted by Norad together with IFS at a seminar considering the merits of 'Science for Science and/or for Social Relevance: Is there a Contradiction?' in Oslo in 2010.

During the process Regional Consultation Meetings were hosted in Latin America in Merida, Mexico, Asia Pacific in Bangkok, Thailand and Africa in Kampala, Uganda. Sessions also took place at scheduled meetings[6] across Africa and Asia. A digital questionnaire survey was sent out to 20,000 IFS stakeholders, and to which over 4,000 persons responded.

A key emphasis of the envisioning process was on proposed new elements that have been suggested for the future programme, building on the recommendations of four external evaluations of IFS including the latest (2010) and the vision statement of the new director.

With support from Norad, and in association with the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM), IFS investigated the specific regional needs with regard to empowering African women scientists, mechanisms IFS could use to promote empowerment of women scientists, and value which might be added to associated on-going regional initiatives and strategies.

2. 3 A revised mission

Given the world's commitment to accelerating progress in order to achieve the eradication of extreme poverty and hunger, the crises in food, water and energy that confront humanity today, and the spectre of climate change, biodiversity loss and environmental degradation, planners and funders have to invest in the potential of science to dramatically transform the legacy left by the poor recent stewardship of the world's biological and water resources. In this context, it is more crucial now, than ever before that the International Foundation for Science plays its role in granting and building the capability of those embarking on a research career. The scientists of tomorrow must contribute to securing affordable food, water and energy to a rising population, where their scope for action is constrained by the urgent challenge of environmental sustainability.

[5] Advisers are the network of established and senior international scientists at IFS who contribute to the peer review process of research grant applications and act as ambassadors for our programmes.

[6] The Nairobi/Carnegie meeting 'Developing and Retaining the Next Generation of African Academics', the 'Ministerial Conference on Higher Education in Agriculture', Kampala, Uganda, the IFS/VLIR 'Scientific Writing Course', Can Tho, Viet Nam, the IFS/WIOMSA 'Sida Marine Annual Review Meeting', Zanzibar, Tanzania, the 'Scientific Methodology and Proposal Writing Workshop', Njala, Sierra Leone, the 'International Pesticide Conference', Ouagadougou, Burkina Faso, and the AWARD 'Proposal Writing Workshop', Mombasa, Kenya.

In order to adequately respond to this challenge, the 2011-2020 strategy of IFS, 'Working Together', is built around a revised mission. The new mission of IFS is:

> **'To contribute towards strengthening the capability of young men and women scientists in developing countries to conduct relevant and high quality research and their individual agency to put it into use'.**

In maintaining the original objective of supporting science in ways that promote a decline in the 'brain drain', whereby talented scientists are distracted away from the developing world and the problems extant there, the revised mission also aims to reflect today's changing circumstances and opportunities, especially the role that science plays in society today, and the ways in which science and development landscapes are navigated and linked. In this regard, IFS attaches particular importance to the transformational nature of emerging Information and Communication Technologies[7] for bringing early career developing country scientists into the global research community.

A major change in our agenda is therefore not only to strengthen the *capability* of those embarking on a research career in the developing world, but also to support young scientists in their actions to bring about change, in terms of their values and objectives and to put *their* science into use. Capability in this context denotes a scientist's opportunity and ability to generate valuable research outcomes. Agency in this context is what a scientist is able to do and to achieve in applying his/her research in pursuit of whatever goals or values he or she regards as important[8].

An important argument for focusing on the individual agency of developing country scientists is the role that such agency can play in removing inequality in the respect and regard accorded to such scientists. IFS believes that respect and regard is strongly influenced not only by publishing, but also by participating in decisions on policy and influencing the understanding, processes, products and services that derive from scientific enquiry.

2.4 Our approach

In the next decade we aim to support excellent individual and collaborative research, to build capability of early career scientists in the developing world, and to contribute innovation to sustainable management of biological and water resources. In particular, IFS wants to enable those scientists to contribute to a global research community that is reducing poverty and supporting sustainable development.

To deliver the IFS mission, we will provide three distinct strands of support: (i) grants and capability enhancing support early in the research career of individual scientists from least

[7] Information and Communication Technologies (ICT), particularly mobile technologies, have made tremendous inroads in almost every country and every sector in the developing world -The Broadband Commission for Digital Development (BCDD), 19 September 2010, side event to the High-level Plenary Meeting on the Millennium Development Goals. The commitment of BCDD is: Broadband Inclusion for All. To ensure that more than half of all the world's people have access to broadband networks by 2015, and make access to high-speed networks a basic civil right.

[8] The use of the term *agency* here is best understood via Amartya Sen's description of an agent, defining an agent as someone who acts and brings about change, whose achievement can be evaluated in terms of his or her own values and objectives. This differs from the more common use of the expression "agent" sometimes used in the literature of economics and game theory to signify a person who is acting on someone else's behalf. Furthermore, agency focuses on the ability to personally choose the *functionings* (the beings and doings) that one values (Sen, A. (1999) Development As Freedom. New York: Knopf).

developed countries; (ii) grants and capability enhancing support for collaborative research; and (iii) support to contribute innovation and to put research into use (see Figure 1).

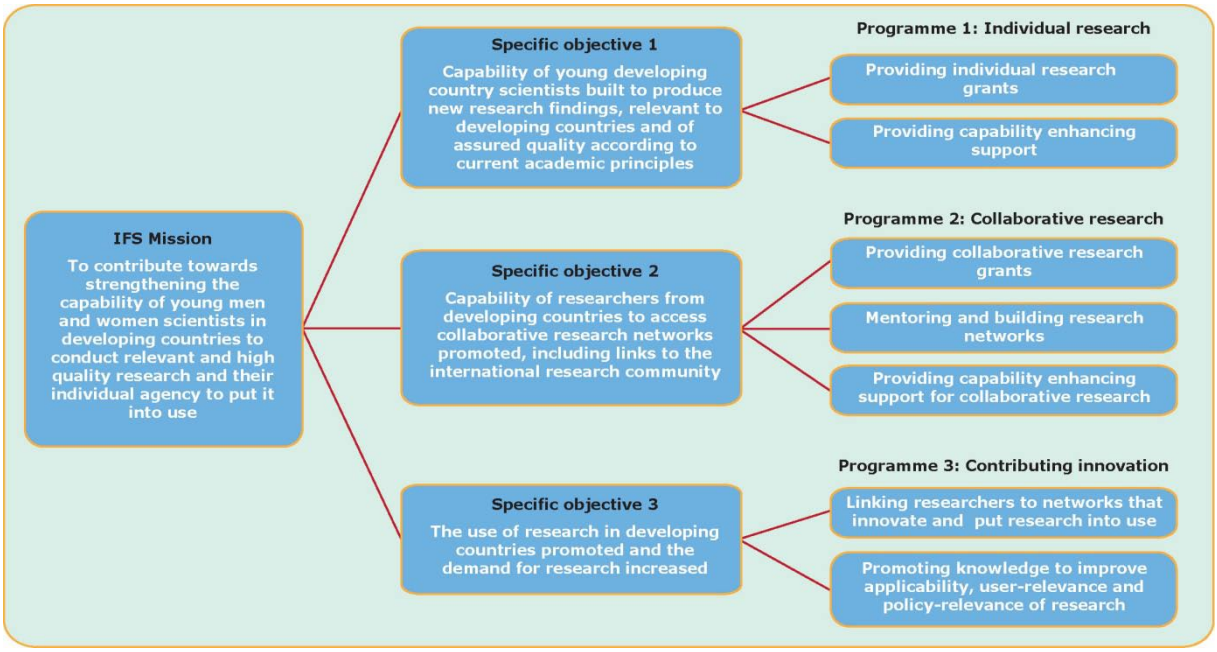

Figure 1: IFS approach to empowering early career scientists

Programme 1: Individual research

Throughout the coming decade the primary focus of the International Foundation for Science will be the **promotion of excellent science through early career research grants and capability enhancing support to researchers in developing countries.** We anticipate that the rigorous assessment of research proposals by Specialists will continue to provide international recognition to successful applicants and enhance opportunities for original research and scientific growth.

Specific Objective # 1:

Capability of young developing country scientists built to produce new research findings, relevant to developing countries and of assured quality according to current academic principles

Research capability built

A body of quality scientific research delivered

A 'multiplier effect' that impacts more young scientists than just IFS grantees

IFS believes that science holds the potential to transform the contemporary global challenge, not only to provide sufficient food, water and energy but also to ensure security of supply, at affordable cost and within acceptable limits of environmental change. IFS is aware that starvation, as well as water and energy deprivation is not addressed by increasing availability alone, but by securing entitlement to those commodities for 9 billion people. In the face of such a task there is a vital and powerful role for many creative, analytical minds across a broad array of research fields.

IFS recognises that the sustainable and equitable stewardship of global resources and the provision of services from them will draw on many technical and social fields of research, relating to: agriculture, energy, fisheries, food security, forestry, health and nutrition, natural products, water and sanitation. However, IFS believes it is vital that young researchers have the opportunity to propose research which *they* identify can address problems in their country of origin, relevant to the needs of the country, supported through a demand-led, long-term,

predictable research granting and capability enhancing support programme across a broad spectrum of biological and water resources.

Specific Objective # 2:

Capability of researchers from developing countries to access collaborative research networks promoted, including links to the international research community

Interdisciplinary collaborative research that tackles development issues

Collaborative research links between scientists in the developed and the developing world built

Programme 2: Collaborative research

IFS has recognized the importance of support to individual researchers for nearly four decades and will continue to provide renewable individual grants. However, the interlinked development challenges that face humanity increasingly require scientists to work with each other, uniting different disciplines, different countries and regions, as well as to work with other professions and specialists. Therefore, through the phased introduction of a new programme within the 2011-2020 Strategy IFS will also provide support for researchers to combine strengths, expertise, and experience, to address a larger topic or a research issue where more than one discipline is required. IFS believes that through interdisciplinary **collaborative research**, early career scientists can learn new insights from each other, can develop new skills and gain access to different funding sources. Through support and mentoring we aim to reduce possible barriers including: difficulties in finding appropriate working partners, reaching consensus and team building, clarification of intellectual property rights, ownership of data, credit for work, differences (amongst disciplines) in the nature and scope of knowledge, different methodologies or analytical frameworks, inaccurate preconceptions about other disciplines, or difficulty in learning the 'languages' of other disciplines.

It is anticipated that collaborative research could be across departments in a single institution (e.g. nutritionists, social economists, technical specialists – able to take an holistic approach and tackle a bigger development problem than any may tackle alone), across a country (e.g. where a common issue such as cyanide toxicity of tube well water might be spatially investigated), or across regions (e.g. where climate change resilience being investigated amongst communities in similarly affected places in say East, West or Southern Africa might be shared and compared).

We see a vital role for IFS as a platform for linking early career scientists from developed and developing countries in research collaboration.

Specific Objective # 3:

The use of research in developing countries promoted and the demand for research increased

Scientific research findings made accessible to users, entrepreneurs and policy and decision makers

Improved knowledge and networks leads to the production of more research results that are applicable, user-relevant and policy-relevant

Programme 3: Contributing innovation

IFS operates at the interface of science and sustainable development. We contribute to, and are supported by, science academies and development organisations. IFS believes that science holds the potential to transform the contemporary global challenge and it can provide the evidence for policy change and the basis for international development impact.

Recognising that research products are just a starting point in the broader process of **putting research into use and enabling innovation**, there are two key challenges to be addressed in this context over the course of the ten-year strategy. The first is to begin to build capabilities and

competencies at an early stage in science careers that help to put research into use in developing countries. A key capability requirement for researchers in this context is the understanding of the political and incentive context for the uptake of research by entrepreneurs, industry, and medicine, and in policy and decision-making. Within the ten-year strategy IFS aims to introduce courses on *Understanding of the political and incentive context for science use* to better prepare researchers for engaging with others to put research into use.

Related to this, on a very practical level is capability in *Science communication for impact,* through support in science writing as well as media development (drama, film, mobile phone and internet, web 2.0 applications) to influence policy and practice.

However, to put research into use often requires a champion who is able to navigate complex business, political and institutional landscapes, building networks of practitioners and policy actors willing to advocate and promote the approach – and this is unlikely to be the originator of the research. Therefore the second challenge is that of building links and brokering networks and alliances that support demand for and use of research. This will include working with partners towards establishing more supportive policy and institutional environments that can create effective demand for appropriate research products, and building links to society at large, and the business community, including networks, science fairs and conferences.

A graduation strategy from IFS support as a component part of the early career path of a developing country scientist will necessarily involve building collaborative links amongst the IFS research community and linking successful grantees with other research programmes. The core support of IFS remains that first competitive grant to post graduate degree holders, perhaps followed by success with further individual or collaborative research through IFS. After this stage through collaborations and partnerships negotiated by IFS, promising young scientists are facilitated to bring their skills into larger arenas of opportunity (i.e. EU frameworks, GEF, CGIAR, AU/NEPAD plans for science and technology, or bilateral grant provision e.g. BioInnovate Africa).

Chapter 3:
Priority and Eligibility for IFS Support

3.1 Country eligibility

We live in a complex world of both unprecedented opulence and remarkable deprivation, and the development priorities of the IFS ten-year Strategy go beyond economic developments alone. The strategic development priorities of IFS include the processes for: overcoming poverty, hunger and all forms of malnutrition, the sustainable management of resources, improving living conditions, expanding the interests and individual agency of people in least developed countries, the human rights of those who suffer deprivation, especially women, and of expanding freedoms as the primary end and principal means of development.

IFS aims to provide research grants, build capability in scientific research and individual agency in science and technology innovation in the service of expanding freedoms, and seek to preferentially support countries with weak and volatile scientific infrastructure.

Therefore, applications for individual IFS grant support (Programme 1) will be selected on merit, but are only eligible for consideration if they come from developing country scientists who are attached to institutions in the world's Least Developed Countries (LDCs), which are adjudged to provide them with a reasonable academic environment that will enable them to conduct research. Countries with a GNI per capita, Atlas method (current US$)[9] at or below the average for Middle Income Countries[10] (MIC) will be considered eligible for IFS Programme 1 support and as principal investigators within IFS Programme 2.

In order for scientists from countries with weak and volatile scientific infrastructure to work together with scientists in other countries (which have reached the threshold in national development that graduates them from IFS eligibility for Programme 1), country eligibility for Programmes 2 and 3 will be unrestricted, provided that principal investigators are from

[9] GNI per capita (formerly GNP per capita) is the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI, calculated in national currency, is usually converted to U.S. dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank. This applies a conversion factor that averages the exchange rate for a given year and the two preceding years, adjusted for differences in rates of inflation between the country, and through 2000, the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States). From 2001, these countries include the Euro area, Japan, the United Kingdom, and the United States. Source: World Bank national accounts data, and OECD National Accounts data files.

[10] Previously 'Least Developed Countries' status has been defined at IFS by the same proxy indicator of Gross National Income (GNI/capita), but eligibility for IFS support has been restricted to the Low Income Countries, the Lower Middle Income Countries and the countries with a GNI/capita that is below the average of the Upper Middle Income Countries. Since 2002, priority has been given to researchers who are from, and based in, Lower Middle Income Countries with weak and vulnerable scientific research infrastructure and lacking national funding mechanisms for young scientists. These have included most of the countries in the Sub-Saharan African region as well as some countries in Central America and Andean South America, as well as many countries in Asia. 70% of new grants were allocated annually, on an individual competitive basis, to applicants based in countries having an income (GNI/capita) below the average for the Upper Middle Income Countries (UMIC) group of the World Bank's annual list.

countries at or below the average for MIC, and that MIC are always beneficiaries. Therefore Collaborative Research (Programme 2) will be led by researchers from countries where GNI/capita is equal to or below the average for MIC countries but may include scientists from other countries. For Contributing Innovation (Programme 3), networks and partnerships will be considered based on the benefit they bring to scientists from countries where GNI/capita is equal to or below the average for MIC countries.

IFS has significant experience of brokering research links between scientists in the developing and developed world. Expanding and supporting productive links between young researchers from countries with different levels of economic development will be a priority of Programmes 2 and 3.

IFS also has a large alumni constituency that are often strategically placed in scientific and policy positions, in many countries with less developed neighbours, but that themselves are above the average for MIC countries. Experience has shown they can play an important role in helping IFS to reach early career scientists of less developed neighbours. They have both an understanding of and relevant research experience in the research priorities of young scientists in neighbouring LICs and can be key players in implementing the expanded programmes of capability enhancing support that are envisioned in both individual and collaborative research programmes. Alumni can also play a major role in collaborative research and in contributing innovation, including supporting grantees in different country and regional circumstances in understanding of the varied political and incentive contexts for science use.

3.2 Gender balance and ways of empowering women scientists

It is a priority for IFS to support women within developing world science, especially African research, and to enrich the scientific enterprise with the added diverse themes and perspectives that can be derived from a more balanced gender representation within science.

Global statistics indicate that women are not only unequally represented in science but also less likely than men to be involved in the planning, research, development or application of science. The underrepresentation of senior women scientists limits the role models, mentors and professional networks available to girls.

The priority and the approach to empowering women in science, in the IFS strategy 2011-2020, builds on the learning from the 2009 IFS initiative 'Developing Africa through Science, Technology, and Innovation in Agriculture: Women as key drivers', undertaken with the Technical Centre for Agricultural and Rural Cooperation (CTA) and RUFORUM, and from the IFS contribution to the CGIAR project 'African Women in Agricultural Research and Development' (AWARD). The approach aligns with the Norwegian Committee for Mainstreaming Women in Science, and contributes to the global agenda for gender equality and women's empowerment implied by MDG 3. The focus on Africa reflects the identified needs, that are found to be most prevalent in Sub-Saharan Africa and supports the African Union declaration of 2010-2020 as the African Women's Decade, which includes a thematic focus on the promotion of women in science and technology.

IFS believes that mainstreaming a gender perspective in Science, Technology and Innovation (STI) could enrich innovative problem-solving and decision-making, enhance social equity, women's rights and contribute to the more effective achievement of the Millennium Development Goals and the attainment of sustainable development. This priority within the IFS strategy is based on the premise that to strive for gender equity in science is not only an international obligation, but a wise approach to science management and governance.

3.3 Age eligibility criteria in IFS programmes

IFS will continue to target its support to those at the beginning of their research careers through early career research grants and capability enhancing support to researchers in developing countries. Based on the recommendations of its recent independent review and the results of consultations with many stakeholders across the regions where the organisation operates, IFS will adjust its age eligibility criteria to better reflect the changing gender disaggregated regional research demographics (see Table 1).

Table 1: Age eligibility in IFS programmes (all eligible countries)

IFS Programme	Upper age limit of first time applicants	
	Men	Women
1 - Individual Grants	35	40
2 - Collaborative Grants	35	40
3 - Contributing Innovation	35	40

These age eligibility criteria relate to first time applicants. There is no age limit for renewal applicants.

IFS will pilot Programme 2: Collaborative Research early within the ten-year strategy. The aim of this pilot will be to understand how IFS can best enhance the capability of young researchers to learn "how to conduct collaborative research". The age limit in Table 1 refers to the age of the principal investigator. As the programme develops, different models of collaborative research may be applied and different age criteria may be used. Whilst supporting several ways of conducting collaborations, calls for collaborative research will sometimes target researchers by gender, region, nationality or thematic area.

Chapter 4:
Monitoring, Evaluating, Learning and Planning at IFS

IFS recognises that effective management and monitoring requires sound and authoritative data and clear results chains and causal relationships linking activity, output and outcome.

4.1 Integration of planning, measurement and management

Strategic planning, performance measurement and Results-Based Management are integrated at IFS (see Figure 2) to support flexible and responsive management and accountability to all stakeholders including donors.

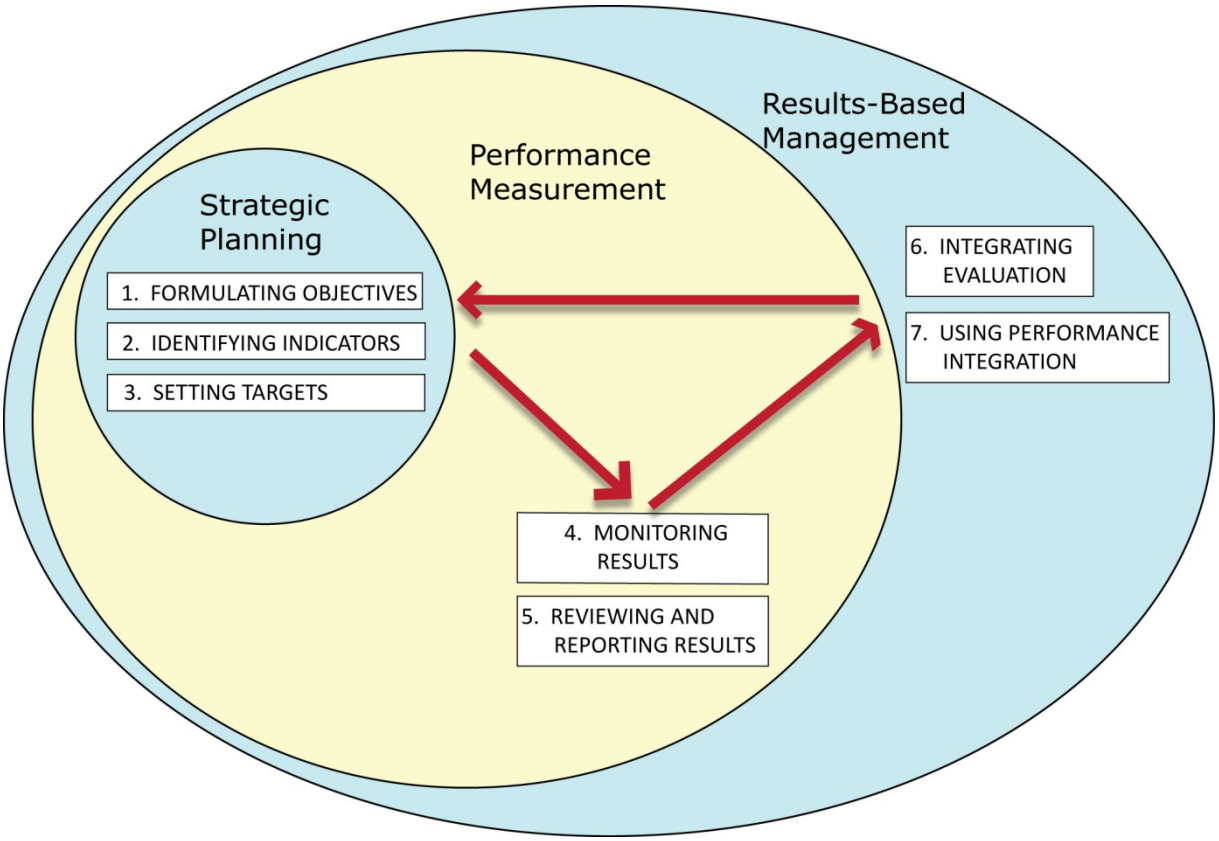

Figure 2: The relationship between strategic planning, performance measurement and Results-Based Management at IFS

IFS introduced the **Monitoring and Evaluation System for Impact Assessment** (MESIA) in 2000 under the guidance of Dr Jacques Gaillard (seconded from the French Institut de recherche pour le développement, IRD). The system draws on the IFS database and produces and analyses data on grantees and undertakes surveys of the conditions under which young scientists work and the impact of IFS. MESIA reports provide a long term oversight of the impact of IFS support and can for example focus on a geographic area or an area of science. To date, nine impact studies (MESIA Reports) have been published.

In 2010, staff received training in **Results-Based Management** (RBM) conducted by Professor John Mathiason. In 2011 IFS introduced RBM to deal with analytical issues of attributing impacts and aggregating results, to ensure a distinct yet complementary role for evaluation, and to establish organizational incentives and processes that will stimulate the use of performance information in management decision-making.

In 2012 IFS will introduce the 'routinized', non-indicator based system of reporting by grantees and recipients of capability enhancing support that is complementary to the RBM logic model approach, to capture unanticipated changes, through **Most Significant Change** (MSC) reporting.

Beginning in 2012, and every second year of the ten year time horizon of the strategy, IFS action plans will be drawn from the rolling monitoring, evaluation, learning and planning process shown in Figure 3.

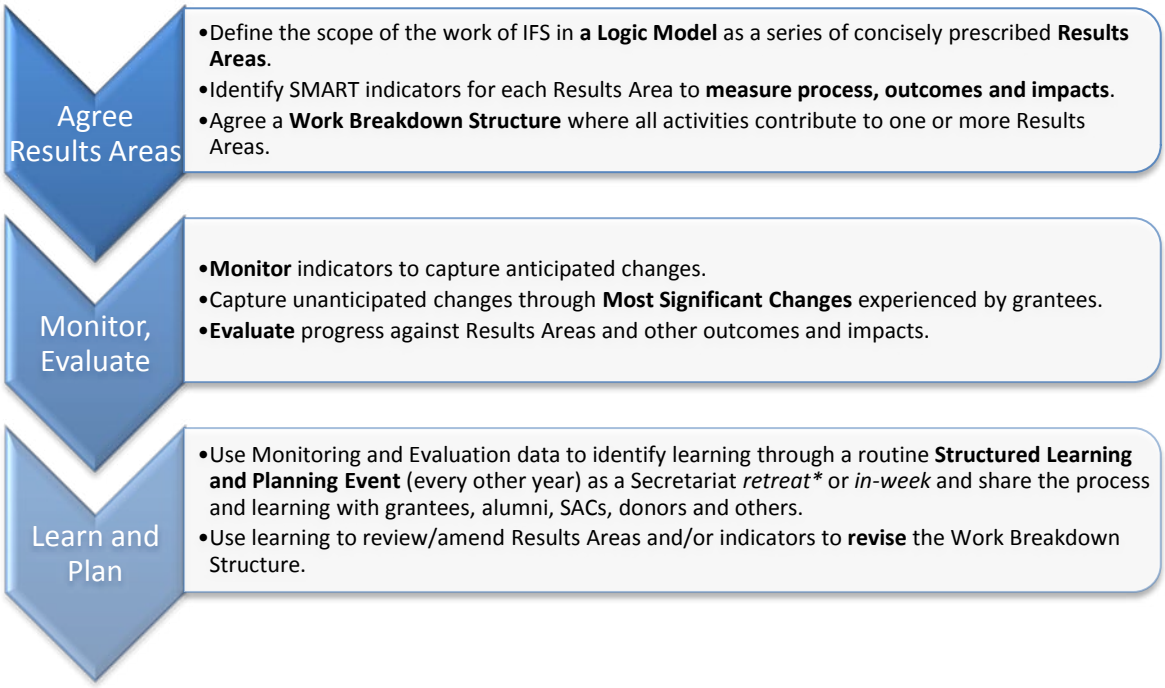

Figure 3: The integration of monitoring, evaluation, learning and planning at IFS

* *a definite time (several days to one week) spent away from one's normal work for the purpose of evaluating, learning and planning from monitoring*

4.2 Three components of monitoring and evaluation

The IFS strategy therefore operates through **Results-Based Management** (RBM) with action plans drawn from a rolling monitoring, evaluation, learning and planning process on a two year cycle. Biannual Learning Points will draw on evaluations against logic model indicators of Outcomes, as well as **Most Significant Change** (MSC) reporting by young scientists (to capture unanticipated changes), and commissioned reports of longer term **Impact Assessments** (MESIA).

The process will be one of monitoring, evaluating, learning and planning, as follows:

- **Monitoring** what we expect to happen – using evaluations against Logic Model Indicators of Outcomes, and capturing unanticipated changes – using a participatory non-indicator-based system involving MSC experienced by grantees.
- **Evaluating** medium and longer term impact through commissioned MESIA reporting.
- **Learning** from, and sharing, our monitoring and evaluation at Strategic Learning and Planning Events.
- **Planning** future approaches based on our learning.

Appendix 1:

The IFS Strategy 2011-2020 Logic Model

Mission: **'To contribute towards strengthening the capability of young men and women scientists in developing countries to conduct relevant and high quality research and their individual agency to put it into use'.**

Specific Objective # 1: **Capability of young developing country scientists built, to produce new research findings, relevant to developing countries and of assured quality according to current academic principles.**

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy (method/who/when)	Assumptions
Opportunities provided for young scientists to proposed research in least developed countries which is rigorously assessed by c. 1,000 IFS international specialists. Local research training courses delivered through a long-term, predictable research capability enhancing support programme.	1.1 Capability built in science proposal writing amongst young scientists in least developed countries.	-Number of applications and rate of approval per partner country, gender and year (IFS database). -Impact on capability in science proposal writing by partner country, gender and year (Most Significant Change follow up with participants).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. ASTI statistics. UNESCO statistics.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually. -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and disciplinary impact studies. -Assessing long term trends from gender disaggregated international science and technology and agriculture statistics.	Applicants continue to value grant and capability enhancing support as well as comprehensive and constructive advice.
Quality research in scientist's country of origin relevant to the needs of the country supported through a long-term, predictable research granting and capability enhancing support programme.	1.2 A body of quality scientific research in biological and water resources relevant to least developed countries.	-Number of financed and published research projects, per partner country and year (IFS database, MESIA, MSC reporting). -Patents, awards, national and international recognition of IFS supported scientists (IFS database, MESIA, MSC reporting).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Science Citation Indices.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually. -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and disciplinary impact studies. -Assessing long term trends from gender disaggregated Science Citation Indices.	Small grants and capability enhancing support provides a platform for quality research in least developed countries.
IFS-supported scientists have the possibility to work in their own country and tackle research related to local needs - plugging the so-called 'Brain Drain'.	1.3 Talented scientists conduct their research in developing countries to innovate in ways that address problems in least developed countries and that positively impact their home institutions.	-Outline of relevant IFS supported research results, by country, institution and year (IFS database). -Assessment of reporting of Most Significant Changes by scientists. -Number of IFS supported scientists that stay in their country and continue to be active in research/research management 5-10 years after IFS grant (MESIA).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Partner institutions records and reporting.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually. -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and disciplinary impact studies. -Assessing long term trends from gender disaggregated data of funding sources and functions from partner institutions.	Research support provides sufficient incentive for scientists to work in their own country and tackle research related to local needs.

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy (method/who/when)	Assumptions
IFS-supported scientists encourage and build capability of other young peers.	1.4 A 'multiplier effect' whereby grantees help others impacts more young scientists than just IFS grantees.	-Effectiveness of mentorship by IFS Alumni Associations (MSC and alumni reporting) -Number of IFS supported scientists in research groups and scientific networks supported by others e.g. the International Science Programme (ISP).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. International and national partner institutions records and reporting. International Science Programme reporting, ISP Uppsala University.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually. -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and disciplinary impact studies.	Recipients of IFS support choose to share the knowledge and opportunity they have gained with other scientists.
Capability in regional and national research administration built, with IFS support, in Africa, Asia and Latin America. Of these regions, Africa is to be given precedence.	1.5 IFS staff supplies expertise for reform and quality assurance work in research administration and capability enhancement.	-Quantity and quality of research administration and capability enhancement services provided by IFS (IFS database, MSC).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Partner institutions records and reporting.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually. -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and disciplinary impact studies.	National and regional research administration and capability enhancement able to learn from IFS experience.

Specific Objective # 2: **Capability of researchers from developing countries to access collaborative research networks promoted, including links to the international research community.**

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy (method/who/when)	Assumptions
IFS provides international fora, digital and mentoring functions that facilitate exchange of information between members of extended research communities through IFS Community and Internet-based platform.	2.1 Opportunity for utilising research as a tool of development enhanced by support for forums and functions, including Internet-based platforms that facilitate international exchanges of information between members of the research community.	-Number of facilitated and supported research community members, per partner country and year (IFS database). -Quality and impact of the 'IFS Community' and Internet-based platform (digital survey, MESIA).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Partner institutions records and reporting.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually. -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and disciplinary impact studies.	Internet access continues to increase across the developed and developing world.
IFS pilots and launches new Collaborative Research Programme which builds capability for inter-disciplinary working.	2.2 Small consortia of young researchers in least developed countries facilitated and supported to conceive and conduct inter-disciplinary collaborative research that tackles development issues.	-Number of facilitated and supported collaborative research projects, per partner country and year (IFS database). -Quality and impact of the IFS collaborative research (MSC, MESIA).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Partner institutions records and reporting. Collaborat-ive research reports.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and interdisciplinary impact studies.	A community of young scientists can combine in useful consortia to research at a local, national or regional level.
IFS in partnership with donors and academic partners in both developed and the developing countries, builds and enhances productive collaborative research links.	2.3 Productive collaborative research links between scientists in the developed and the developing world built.	-Number of facilitated and supported collaborative research projects, amongst compatible developed and developing country partners each year (IFS database, MESIA). -Quality and impact of the IFS collaborative research between developed and the developing countries (MSC, MESIA).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Partner institutions records and reporting. Collaborat-ive research reports.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional, national and interdisciplinary impact studies.	A community of young scientists from developed and the developing countries can combine in useful consortia to research at a local, national or regional level.

Specific Objective # 3: **The use of research in developing countries promoted and the demand for research increased.**

Types of Outputs	Outcome	Performance Indicator of Outcome	Data Source	Data Collection Strategy (method/who/when)	Assumptions
Capability built to undertake and maximise the impact of research promoted through increased *understanding of the political and incentive context* for policy and decision making. Working with partners to build capability in *science communication for impact,* through support in science writing and media development (drama, film, mobile phone and internet, web 2.0 applications) to influence policy and practice.	3.1 Scientific research findings made accessible to users, and policy and decision makers.	-Number of entrepreneurial initiatives and/or policies traceable to or directly linked to research provided and made accessible (IFS database, MESIA). -Quality and impact of the IFS capability building on accessibility and use of scientific research (MSC, MESIA).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Partner institutions records and reporting.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually -IFS Secretariat Reporting against Results-Based Management system baseline and indicators. -Commissioned regional and national impact studies.	To undertake and maximise the impact of research depends on human capability, the availability of resources for research and the political and incentive context for policy and decision making. Better internet access (cables from the UAE to East Africa), mobile phone connectivity, improved satellite coverage.
IFS pilot and launch new Programme which builds links amongst the research community, other research programmes, the business community and society at large, e.g. networks, conferences, links.	3.2 Improved knowledge and networks leads to the production of more research results that are applicable, user-relevant and policy-relevant.	-Number of facilitated and supported links to other research programmes, private sector and society at large (IFS database, MESIA). -Quality and impact of the 'IFS Programme 3: Contributing Innovation' (MSC, MESIA).	IFS database. IFS 'MELP' M and E system. IFS MESIA Reports. Partner institutions records and reporting.	-Most Significant Change reporting within IFS Participatory Monitoring and Evaluation Systems annually. -IFS Secretariat reporting against Results-Based Management system baseline and indicators. -Commissioned regional and national impact studies.	Demand can be generated amongst a wider and broader research community, business and society for both IFS research and young researchers that have received IFS grant and capability enhancing support.

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