



INTERNATIONAL
FOUNDATION FOR
SCIENCE



The African
Academy of Sciences

MacArthur
Foundation

AUTHORAID



Institut de recherche
pour le développement

Proceedings

A Week of Events at The African Academy of Sciences

Karen, Nairobi, Kenya
28 May – 1 June 2012

Conference:

Getting and Using Equipment for Scientific Research in Africa

Workshops:

AuthorAID-IFS Workshop on Scientific Writing

IRD-IFS Workshop on Applying for Research Funding



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Introduction

Coinciding with its 40th anniversary, the International Foundation for Science (IFS) hosted a series of events in collaboration with The African Academy of Sciences (AAS) from 28 May through 1 June 2012 in Nairobi. Alongside activities to highlight IFS's work, collaborations and role in Africa, and to strengthen its engagement with African partners, there were three major events organized with AuthorAID – a workshop on science writing; IRD – a workshop on applying for research funding; and the MacArthur Foundation – a conference on scientific equipment. IFS recently launched its new ten-year strategy and each of its three Approaches – Individual Research, Collaborative Research, and Contributing Innovation – were reflected in the three events during the week at AAS:

Getting and Using Equipment for Scientific Research in Africa: A Conference

The purpose of the two-day conference on 30-31 May was to inform the participatory provision of scientific equipment with research institutions in Africa. A wide range of participants from across Africa attended the presentations and also engaged with each other on issues to do with effectively providing equipment.

AuthorAID-IFS Workshop on Scientific Writing

This five-day workshop from 28 May through 1 June supported early-career scientists in building their capability in science writing. As a result of the workshop, it was expected that participants would be better prepared to reach their own goals as scientists who write and publish, and that they would have made significant progress on an actual piece of their own scientific writing.

IRD-IFS Workshop on Applying for Research Funding

This five-day workshop, also from 28 May through 1 June, supported early-career scientists in building their capability to apply for research funding. As a result of the workshop, it was expected that participants would be better able to develop a competitive research proposal, and that they would have made significant progress on the revising or drafting of a proposal for research funding.

The issues of equipment provision, science writing, and applying for research funds are key challenges faced by many early-career scientists in developing countries, and where IFS aims to help. Given the urgency of the task facing today's scientists in Africa and across the developing world, IFS will continue to emphasise its support for the scientists of tomorrow who 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. In the next decade, the new IFS strategy aims to enable early-career scientists to contribute to a global research community that is reducing poverty and supporting sustainable development.

The week's events in Nairobi represented an on-going commitment to support the aspiring young scientists of Africa. Eighty-seven participants from across 13 African attended the conference and the two workshops. The outcomes of the conference and workshop are not only being shared in this proceedings, but also as a widely-circulated CD, which all participants received, containing all presentations and other materials. There is also a carefully constructed IFS Briefing Document for sharing widely in Africa and elsewhere digitally and in hard copies from IFS and AAS.

Getting and Using Equipment for Scientific Research in Africa: A Conference

Context, Purpose and Objectives

Scientific equipment is essential for performing research. Equipment should be functional and well maintained, and users should be trained on how to operate and care for it. Scientific progress in Africa is held back by, among other things, problems associated with the acquisition, use and management of scientific equipment in universities, laboratories and other research institutions. The purpose of this two-day conference (see original programme in Appendix 1) was to inform the participatory provision of scientific equipment with research institutions in Africa.

The specific objectives were to:

1. Learn lessons about and from the International Foundation for Science's (IFS) implementation of the MacArthur Foundation-funded project "Procurement, Installation, Service, Maintenance and Use of Scientific Equipment" [See a description of PRISM from the summary of the draft final report in Appendix 2.]
2. Consider two other approaches to scientific equipment provision, one from IFS, with particular reference to early-career scientists and collaborative teams, and another from BecA (Biosciences Eastern and Central Africa), which provides opportunities in Africa for scientists to utilize well equipped laboratory facilities
3. Discuss and make recommendations on how to effectively provide scientific equipment for universities and research institutions in Africa

Intended Outcomes and Outputs

It was intended that the conference would result in a deeper and broader understanding among participants of the efficacy of various approaches to scientific equipment provision, and that this would be shared more widely through a Briefing Document with other research institutions and funding organizations.

Participants

Representatives (see Appendix 3) at the conference came from:

- The institutions in Nigeria and Madagascar that participated in PRISM
- Other institutions from across Africa
- IFS, implementing agency of the PRISM project, staff and Board member
- The MacArthur Foundation, which funded PRISM
- ITAD, the PRISM evaluating agency
- The African Academy of Sciences
- BecA (Biotechnology east and central Africa)
- RISE (Regional Initiative in Science and Education, Princeton)
- PACN (Pan African Chemistry Network)
- Commercial scientific equipment suppliers
- Policy shapers
- Participants in the concurrent AuthorAID-IFS Writing Workshop and IRD-IFS Workshop on Applying for Research Funding

Welcome and Introductions

A welcome address was delivered by our host Professor Abegaz, Executive Director of The African Academy of Sciences, and a welcome was extended by Graham Haylor, the IFS Director. Participants were then given the opportunity to promenade and mingle, to meet and discuss with one other participant whom they had not yet met. The objective of the short discussion was to identify their “new friends” and find out about a piece of equipment that was important to that person in their research career. Then each one of the pair introduced the other to the group.

Opening Discussion

Once we had got to know each other a little, we then moved into small groups to address the question: *“What is the most important thing you have learned about the provision and use of equipment for scientific research?”*

The groups discussed and presented back to the plenary their thoughts, which are captured as bullets below:

- Initial communications can take place by email, but this becomes tedious. Personal face-to-face meetings are much better to understand long-term needs and equipment upgrade paths. Site inspection is vital, with regard to ensuring suitable infrastructure to accommodate installation.
- Many institutions for research are equipped differently. A platform or network to show what is available where and a mechanism for sharing would be valuable.
- There are challenges in specifying equipment. Public laws cause many delays in provision. Some equipment is expensive, and it is vital to get skilled persons trained to use this.
- Between-country logistics, customs duties, and formalities are time-consuming. Installation and calibration on arrival are important to organize. The use of proper clearing agents is helpful.
- It is vital to have a good relationship with donors and suppliers.
- Much of the installed equipment is poorly used due to universities’ burdensome paperwork and regulation.
- We should categorize equipment into “everyday-use” which we should have and “occasional-use” which we should share.
- Collaboration within the country, even within the region, could be negotiated for equipment that is expensive and this would be helpful.
- It can be important to sensitise issues to departmental heads of sharing and streamline protocols for this.
- The development of standard procedures is important for efficient use.
- Research can actually be more cost effective following capital outlay on equipment, but trained manpower is essential, and understanding of the expense of chemicals and inputs.
- The networking of department heads is critical to collaboration and best use of equipment.
- Scientists need to share their skills as well as their equipment.
- Developing a strategy for equipment procurement is vital.
- “Personalization” of equipment is an issue. This occurs because repair and maintenance tends to be undertaken by individuals for the sake of efficiency and this then acts against sharing.
- Assessment of need for equipment is vital, to serve not only research but also training purposes.
- Costly equipment often comes from the intervention of donors; the important thing is to identify the right equipment.

- It is common that on delivery some small elements are missing and replacement parts may be incompatible.
- There is a need for installation training, along with commissioning and calibration, and operation maintenance, from suppliers.

PRISM

Following the break we moved into a series of presentations regarding different approaches to the provision of equipment for research. The first was about the four-year project funded by the MacArthur Foundation entitled "Procurement, Installation, Service, Maintenance and Use of Scientific Equipment." An overview was presented by Dr Cecilia Öman of IFS.

Madagascar and Nigeria Experiences of PRISM

After lunch, Professor Georgette Ramanantsizehena presented experiences of the University of Antananarivo in Madagascar. She spoke about budgetary constraints to hire technicians, challenges to get the labs up and running, synergy developed and willing to make a joint action plan in PRISM partnership, and the need for funds. Questions from participants included:

Is there a focal point (a position) for lab management? There is no such structure in the university. But the project management of the PRISM team is overseeing this currently.

What is the way forward once the project ends? A joint action plan in a PRISM partnership.

Professor Phillipe Rasoanaivo presented his PRISM experiences from INRA in Madagascar. He talked about seeking sources of money (seed capital, angel investors, strategic alliances and grants; seeking ARIPO patent; and a drug Discovery in an African journal forthcoming publication. Questions from participants included:

Do you have plans to commercialize? Yes, we want to bring products to market and to create a start-up company.

How do you motivate young scientists? There is no secret. All researchers have different goals and different motivations.

Professor Charles Aworh presented his experiences at University of Ibadan in Nigeria. He mentioned:

- This came at a critical time and was able to effect a change in behaviour.
- Due to poor management equipment became broken. The university decided to pool research equipment in one central laboratory with appropriate management committees.
- We came to understand the associated costs of large items of equipment.
- As a central laboratory we were able to get from the university a 10 KVA solar generator to back up the generator and national grid supply and a designated borehole for water.
- Previously power surges caused much expensive damage.
- N, H, O gas generators save a lot compared to bottled gas use.
- A comprehensive programme for installation capacity-building is in place (previously we sent a technician for training; now they come to us and train all).
- The university will itself be repeating the training that PRISM provided.
- Procedures are in place for sharing the labs and recovering costs.

- Technicians collect monitoring data.
- The laboratory is generating funds from outside users, about N5,000,000 (US\$30,000) in 2011, or about 5% of operating costs.
- MacArthur Foundation are not providing grants to researchers, building on their own investment.

Questions from participants included:

Is there a laboratory information management software system? *No, but it is a good idea. Glad to have a recommendation.*

As a central laboratory have you introduced ISO17025 compliance? *Not yet. We are two years into operation but we plan to do so.*

I have been trying to introduce the same but it is difficult to change the mindset; how did you sell this idea? *It's a challenge! People prefer their own empires. PRISM came on board at the right time. Everyone wanted the lab once MacArthur funding came, but we chose a neutral building, the building was a clinic and we had to rehabilitate that building. The vice chancellor is forward looking, and I report directly to him.*

I observe there are institutions acquiring NMR and others in an organized way. Mostly young scientists have to collaborate. How can we share your equipment? *Go to our website and all the opportunities are there.*

Dr Ado Dan Isa presented his PRISM experiences from Bayero University in Nigeria. He covered:

- There was no equipment policy prior to the IFS project. Now there is an equipment policy committee.
- Our climate is harsh next to the Sahara. We need to adapt all equipment.
- The intricacy of the tax waiver process is not well known (you must distribute five copies to the proper bodies yourself, some receive by hand and some will not). The customs tax rate is 22% of the value of imported goods.
- You must know your equipment well; in terms of compliance with national standards and the appropriate clearances you will need (e.g., radioactive materials, electromagnetic radiation, and compliance with national standards).
- The customs clearance letters don't come to the applicant but to the port.
- USE A CLEARING AGENT!

Questions from participants included:

What was the time between purchase and receipt of the equipment? *It is hard to say, but in this case it was over one year. But if you know what to do it can be less.*

The process was learning by doing, so is the lesson, to get a learned agent? *This was discussed but we decided to save the money and this was wrong.*

In some places there is a procurement act, and there are tendering procedures; did you find that? *In Nigeria there is "due process" but these are donated equipment so not applicable to the act. But the procurement act had to be looked through and the essence is equity and fair play.*

All this is valuable; is a standard country-based procedure to be written? ***THIS SHOULD BE WRITTEN AS A NATIONAL MANUAL.***

Prof Karniyus Gamaniel presented his PRISM experiences from NIPRD in Nigeria and as an advisor to the project.

- Nigeria has 120 universities and 70 research institutes. Vision 20:20 describes how Nigeria should be in the top 20 industrialized countries by 2020 so science is a priority. So the PRISM approach is needed.
- NIPRD has benefited from the project although it is not included as an institution. Prof Gamaniel, as an advisor, has learnt from PRISM protocols and has implemented the learning from PRISM in NIPRD. A central lab has been established. During 2011 11 million Naira was generated from cost recovery activities.
- The World Bank Science and Technology Project wants to give money to the university sector but many universities can use it.
- NIPRD had provided an office to the proposed PRISM Scientific Association of Nigeria (PSAN, a network that would be a spin-off of the PRISM project) because it is morally right and after sometime it will be “weaned”. A committee is using the office and planning how to keep the PRISM idea alive. It is free but it will follow all the rules that govern associations. We will soon begin the process towards registration.
- Tertiary Education Trust Fund (TETF) bought the idea of PRISM and PRISM helped TETF to save money in its procurement.

A question from a participant:

Are there results? There are 2-3 requests each day for help. Fault reporting is happening.

Prof Gideon Okpokwasili presented his PRISM experiences from University of Port Harcourt in Nigeria. He touched on:

- There was no clearance support office at Port Harcourt to help the procurement.
- Some boxes were reported missing in customs.
- On some equipment the flame shield, computer and repair kit were missing and a manual was missing.
- There is an awareness of PRISM in Port Harcourt now, and many important protocols have been taken up.

PRISM Evaluation

Prof George Abalu of ITAD presented the PRISM evaluation in Nigeria. A theory of change behind PRISM was constructed, which described how scientific research is currently stymied by equipment provision issues that PRISM is aiming to address:

“The extent and speed with which the erection of the specified PRISM building blocks contribute to reversing and rolling back the above negative trends, the quicker the participating universities and countries will move towards having a network of world-class scientific laboratories that are self-sustaining, are producing R&D results that meet international standards and using scientific equipment of the highest standard, quality and reliability to address the country’s developmental challenges”.

All collaborating universities created committees dedicated to PRISM activities and a process was created to systematically match the research needs with equipment procurement. Functional centralized laboratories based on PRISM principles were developed in three participating universities. There was increased awareness of the need for

cost recovery and the process of cost recovery was started. There were spill-over effects into other universities.

The purpose of the Operation and Management Plans was less well understood by participating universities, and they were changed little by project progress. The approach to the new methodology of Outcome Mapping was not well understood. There was limited monitoring in some universities of the use of the PRISM equipment but little monitoring of the way changes were taking place and what was accomplished by way of behaviour change. There was limited understanding of stakeholder roles within the partnership.

All procurement plans were based on need, procurement processes were initiated, and a preferred supplier system was designed and implemented. There were strong advantages from cost savings and from pre-installation training, but the bureaucracy around importation was not adequately anticipated and caused delays. Some local representatives of suppliers were inadequate and some poor with after-sales follow-up service.

There was improved appreciation of the preparation requirements for new equipment in all the participating universities as a result of PRISM activities and attempts to initiate Good Laboratory Practice in all universities. The capacity-building programmes have been partially successful.

There were new linkages developed between university administrators, researchers, technicians and equipment vendors. PRISM became a hub for information on high quality and reliable scientific equipment and related services. The vice chancellors were engaged and partnerships and networking was clearly initiated.

The PRISM project has involved into a PRISM concept and has a temporary “home” in the NIPRD Institute in Abuga.

Higher-level outcomes were achieved. Researchers were increasingly involved in procurement, the whole supply chain became more collaborative, and universities took positive constructive actions toward equipment provision.

PRISM demonstrated significant benefits from partnerships and information sharing and a reasonable road map and understanding of how to do this was improved even in the tough context of Nigerian bureaucracy.

It is recommended that a constituency be targeted by the emerging PRISM Scientific Association of Nigeria (PSAN). There is interest now from the Association of Vice Chancellors, the National Universities Commission and the Tertiary Educational Trust Fund. The World Bank have stated they are ready to accept a unified approach around the PRISM approach for consideration. PSAN might take this up. Further high-level sensitization of the issues around procurement and the importance of using “cutting edge” equipment are required.

Systematic procurement procedures should now be developed and formalized, and capacity building should be an on-going process.

Some important lessons include:

Money is not the only thing - The relative success of the PRISM project in Nigeria proves that PRISM is not only about the availability of funds to procure much needed equipment in African universities. Creating and supporting an environment where all the key stakeholders (university administrators, researchers, technologists and

technicians, and equipment suppliers) can start talking to themselves is just as important and critical.

But money is still important - To implement a new concept such as PRISM usually requires human and financial resources to be set aside or dedicated to it. In Nigeria, there was no agency or institution specifically committed to funding the project.¹ In an atmosphere of budgetary austerity and great competition for dwindling capital budgets, as is the case in Nigeria, without donor-funded seed money, PRISM-type “seeds” are unlikely to germinate because potential losers might not want to engage. Large organisational changes could be necessary.

Modifications in stakeholder organizations can be tricky - Since the implementation of the PRISM concept involved new tasks and procedures which were different from entrenched procedures and routines, especially with respect to public procurement, expectations for the re-design and modifications of existing institutional arrangements to conform to PRISM principles, will not always be easy. For example, the stakeholders at TET-Fund (one of the major sources of funding for equipment for universities in the country), even though they had embraced the PRISM principles, have been openly reluctant to accommodate PRISM’s requirements for equipment procurement. The vice chancellors of some of the participating universities have had similar reservations, although at a much lower philosophical level. The fact is that since PRISM-compliant actions by one set of stakeholders such as the universities depend on complementary actions by other sets of stakeholders such as TET-Fund and the Ministry of Education, the future of PRISM in Nigeria will depend importantly on reaching agreements to secure resources for funding equipment as well as success in managing the tensions arising from “turf” issues.

PRISM legitimization is essential - AVCNU, TET-Fund, the National University Commission, and the World Bank have all openly affirmed that the PRISM concept is necessary and vital even though there is still no consensus on what roles the different stakeholders will play. The PRISM concept must be viewed as legitimate and necessary by all key stakeholders. Because the PRISM concept represents significant breaks from existing practices and calls for changes in attitudes and behaviours, it is also important for a clear message to come out from the “legitimizers” that PRISM represents the preferred way forward and that everyone should fall in line.

To amplify the legitimization process it is important to have in place an evidence-based system to ascertain the impact that PRISM is making and to map the progress the process is achieving at all times. This requires a credible system for periodic review and evaluation as well as for tracking the changes being brought about by the project over multiple players, multiple agencies, and multiple periods. The Outcome Mapping (OM) methodology used to plan and operate the PRISM project appears to have been suited for this purpose. Its strength is its non-linear approach which focuses on behavioural changes of the Boundary Partners and beneficiaries. Its weakness is that by side-stepping the issue of attribution, it also side-stepped the issue of accountability. What is more, its procedures are quite long and complex and need extensive hands-on nurturing and tedious documentation to create the various

¹ Those individuals who were identified as contact persons were involved in the project in a voluntary and ad-hoc basis since the management structure of the project had not yet been put in place. The intention was to have a PRISM contact person in each of the six zones of the country to coordinate PRISM activities but this has not yet come into being. Hopefully it will when the PRISM Scientific Association of Nigeria comes into existence.

Journals on Outcomes, Strategies, Performance etc. The lesson is that before the OM methodology is used exclusively there should be more practice and sharing of experiences in its application. A preferred compromise might be to use OM as a learning tool but still rely on the orthodox Logical Framework analyses to ensure accountability.

PRISM design and implementation is a process and that is as important as the product - The central lesson that the implementation of PRISM in Nigeria has taught us is that significant behaviour changes called for by PRISM require that many stakeholders adapt and modify to new tasks and ways of doing business. Changes in the operation of public organizations such as those in which the Boundary Partners operate are possible but not always easy. What is more, the changes in behaviour that the PRISM project is trying to introduce are neither linear nor with specific timelines. Instead they are often multi-directional, fragmented, frequently interrupted, unpredictable and long-term. How to sequence the needed actions and what to give priority to can vary significantly. What the Nigerian PRISM experience has taught us here is that behaviour changes in an area such as equipment procurement can only proceed one step at a time, should not be short-circuited or necessarily rushed, and require continued adaptation through dialogue and communication. In this regard, the process is just as important as the product. However, it is also important for there to be consensus on the product that is expected to be produced.

There is a good chance that the PRISM concept could take hold in Nigeria.

Comments from others included:

Dr Öman: Many of the things that you have suggested will be really useful. There is no M&E report and it is needed; LFA could be added to the M&E process but if OM is continued it may work well. We believe the key persons in procurement chains should become PRISM partners. It is true that there is only one supplier in this project as it was a pilot and we have learnt lessons from it. There are ten names on our list and hopefully 5 would become preferred suppliers. The interest kindled from possible donors should be followed up by PSAN. Training and capacity-building continuation is on PSAN's agenda.

Prof Charles: The main benefit at Ibadan was the Operational and Financial (O&F) plan which you stated did not work well. What is new is that we were made to reflect on the O&F and really use it. There was recently a large grant that went to the vice chancellor including equipment provision and this was sent to the committee PRISM was responsible for setting up and we recommended to develop an O&F plan and the project director came to us to learn how to do this to show how the equipment would be procured, funded and sustained.

Prof Abegaz: Perhaps this level of attention to the service centre education has not previously been forthcoming. There is always a tendency to have equipment properly installed and functioning but are we sure that centralized labs are always the best approach?

Prof George Abalu: Kano did not opt for centralized labs; it could work, but the principle that Charles has indicated and others have taken up has many benefits including economies of scale. Ibadan is becoming quite famous for its approach, but this approach may not fit all. Important is to have a champion. The good thing about PRISM in Nigeria is there are champions; perhaps you need to work on the constituency.

Dr Öman: *The PRISM concept did not come with the idea of central laboratories. It is up to on-site committees to make decisions.*

Prof Karniyus Gamaniel: *The issue of a champion is important and in addition we need evidence. One of the PRISM strategies is to use evidence. We should do a study of use of procurement funds over the past five years to support this effort. The politicians and decision makers will need this.*

Rob Skilton: *There is a common theme of central labs and cost recovery. Has PRISM offered support to O&F plans and business plans?*

Dr Öman: *O&F, yes, the business plan, no. We have got this far.*

Prof George Abalu: *Some universities saw this as a prerequisite to getting equipment and the flexibility and re-writability was not there but the behaviour and the culture has changed by the introduction of this.*

IFS Small Grants Programme

Dr Nighisty Ghezae presented another approach to equipment provision: that of small research grants from IFS. Questions from others included:

IFS now serves as a link between grantees and people who will create innovations, how? And are there age limits for grant levels? *Eligibility for individuals is men at 35 years old, and women at 40 years old; for collaborative grants, the same applies for the Principle Investigator.*

I am a mentor to an AWARD grantee who was rejected as her PhD was more than five years ago. Can you advise why this has happened? *We strongly support women in science and we will also look into this case.*

Do I need a PhD to apply to IFS? *No; we don't fund PhD fellowships but if you have an MSc you can apply for research funds.*

Our technologists are limited in their knowledge and we lack collaborators; can you help? *We are piloting collaborative research in underutilized crops in Africa but we will also have north-south collaboration elements.*

For individual grants, can you get three at the same time? *No, only consecutively.*

For travel grants, what is the ceiling? *It's usually the airfare.*

The survey shows the suppliers are limited in Africa; have you asked why this is? *No, it is just a short survey.*

BecA

Dr Rob Skilton delivered a presentation on Biosciences eastern and central Africa (BecA). He spoke about how there may be a possibility to collaborate with co-funding grantees through IFS grants and African Biosciences Challenge Fund grants. (African scientist's placements for 3-6 months from BecA countries; 50 fellowships this year with another call later this year [see website] in food nutritional security or livestock, health, affiliated to university and post-MSc grant funds everything). Questions from participants included:

Do you apply the PRISM process? *Yes, and BecA would like to share the PRISM documentation on procurement.*

Can Nigerians use BecA? *No, 18 countries in east and central Africa only.*

How do you deal with IP? *We do an MOU with collaborative research agreements.*

What is the role of the nodes? *All are laboratories. Some are up and running, e.g., Kawanda, Uganda. Tanzania and Ethiopia are also good. Others are quite basic. The concept is sharing.*

Inputs from Other Participants

Mr Pari Antalis, a representative of equipment supplier Bruker, presented from the perspective of a supplier. He discussed relative shipment costs and approaches, optional items versus required components, the importance of not unpacking without the installer present and the importance of a freight forwarder.

Faith Mabiki from RISE-AFNNET and Sokoine University presented her experience of setting up a small lab in the University in Sokoine. RISE-AFNNET is a natural product network in Tanzania, Uganda and Kenya. At Sokoine they wanted to start their own lab. They were offered an HPLC as a gift but needed a space for it so they used this acquisition to help with getting a lab. In three years there are now four PhDs, five MSc, three national patents, four publications, a lab and instruments. They had to find 5 million shillings to set up the lab. Much of their lab is repaired instruments. This group is now working with labs in Dar Es Salam. Faith got training at York University but not for HPLC. But after much teething trouble and reading of the manual now the equipment works.

Prof George Rading presented about the RISE programme. RISE uses networks and partnerships. Currently five are supported including the one Faith referred to. In total there is \$800 million of funding. The key pillars are that there must be a network at least three universities in different countries, and the issue is sharing equipment. Then any student in the network can use equipment at any university in the network without charge. Equipment and human resources are shared and mentoring is provided. Seed money can also be used to apply for funding. Could the PRISM concept be amended to incorporate this?

Prof Mathew Nindi of UNISA Department of Chemistry presented about purchasing, maintenance and calibration. Many procurement policies exist but they are often not written by scientists or serve their interests. Top tips from someone with 30 years of experience: ensure registration of vendors (with the university) and investigation of their financials and get references, ask in your networks, allow sole suppliers where specification requires this, allow scientists to chair tender committees for their instruments, training of own technicians by supplier, allow about 30% flexibility with budgets, base specification on needs, use one supplier for one item, ensure service and backup is good and local, ensure the on-site training is complete before the commissioner leaves, keep the technician up to date with follow-up training. Scheduled maintenance and ISO 17025 are important; the system will help you even if you do not get registered. You must sub-contract to a 17025 lab. No one is training technicians, but you can get them to come together in a network for effective training. For maintenance colour code "touch and don't touch" areas. There is a need to prepare a country importation handbook.

Issues Arising

The plenary came together, including participants from the two workshops, to consider a series of nine “issue” questions that had arisen during the two days of discussion. The questions and the responses are presented below.

1. How can approaches to equipment provision be sustained by the formation of scientific associations or networks, e.g., PSAN?

A scientific association would enable the various institutions in the network to identify their individual needs. So we then have a pool of needs. That will enable an inventory of equipment for the whole network. It will encourage each institution to identify its areas of strength, making the training needs more relevant and can lead to a restructuring of programmes and courses. It would provide a platform to speak in one voice to influence policy issues or to represent to donors. It would provide a platform for scientists and technologists and for the group to negotiate economies of scale from suppliers. There will be challenges: who funds the “getting together”? There will be other partners than the institutions who should be identified.

2. How can local equipment initiatives influence scientific equipment policy development and change and political will?

Science is important! But implementation is a problem in science; it has to be driven by technology. Knowledge and technology should be united locally. Depending on knowledge transfer alone has been found to be inadequate, so science should advise policy at all levels, e.g., in procurement it is important that biological materials be cleared quickly. Other scientific equipment should also be cleared quickly, so they can be used to move science. This is not a unique realization because military equipment and health equipment are cleared with expedition as a policy. Science should be central; there should be presidential science advisors and parliamentary committees of science advisors and then this should link with regional economic commissions and the African Union.

3. What is necessary to have in place before approaching potential funding partners, e.g., World Bank?

A good research strategy linked to a national research priority. The institution should have a good track record. You must know your donor and develop a good relationship. Find someone who can “sell” the idea, develop a compelling, brief, jargon-free concept note. You should ensure that you explain why you should have the equipment, who the users will be, the outputs, the impacts, and plans for management and sustainability. You need to ensure the infrastructure is in place, or that you have a plan to do so.

4. What do partnerships between equipment manufacturers and suppliers, and users, contribute to well-functioning labs?

Partnerships lead to good communication and this saves time between and among different stakeholders. Good partnership will be helpful when we have equipment repair and training issues, and when we need advice about the equipment. Good partnership helps to have a say in the process of purchasing the equipment. Partnerships with suppliers help in terms of payment if you don't have enough money.

5. What needs to be included in nationally-specific procurement guidelines?

They should include special exemption for research equipment; a review of the procurement bureaucracy should be undertaken and science equipment should be treated with high priority. We recommend that senior scientists should procure what they want; there should be a clear documented process that can stipulate how long the procedures will take so that the user will then take this into account and undertake the procurement sufficiently in advance of need.

6. What are some opportunities and issues with collaborative equipment use within and across institutions, e.g., daily-use vis-a-vis specialized equipment, centralized vs distributed equipment?

Collaborative use of equipment lowers operation maintenance and manpower costs and lowers the cost of purchasing equipment. There is better utilisation of the equipment. Frequency of breakdown is lower as a result of specialised use and technical know-how.

It is easier to repair and upgrade. On the down side, we have issues as we have to clearly define ownership. Some people don't take responsibility so we need to have clear policy in place. For daily use, every lab should have equipment they need. Consider capacity-building issues. It is cheap to have a commercial provider but you can lose the capacity-building part.

7. What are some specific laboratory management and equipment capacity-building needs?

These include overall training goal and there should be refresher courses on installation, maintenance, and use. The users should be trained before use, and also trained on basic maintenance, cleaning, storage, on-off routines and then taken through the equipment manual. For sustainability there should be biannual refreshers for technicians. There is a need for every lab to avail of standard procedures and simple procedures should be displayed alongside the instrument. Technologies are fast evolving, so even if a relevant new instrument that is not at a lab comes out we should allow technologists to get training in the new equipment. The management needs of the lab require that a manager be trained to be in charge of procedures, layout, energy requirement, which items go where in the lab, and any special requirements like temperature needs. Handling and sample preparation should be known to all, there should be documentation of all training, all use logbooks for all instrument and these should be maintained and up to date. Procurement procedures should be available to all users; the management should be trained in lab proficiency and competence testing annually or biannually for quality assurance by ISO procedures. A major challenge in new technology training needs of older technical staff to encourage them to be involved even at planning stage to gain ownership, management of equipment after the project tech staff should "own" the equipment.

Capacity-building needs include: training and refresher courses for users and technicians on installation, repair, maintenance and use of equipment; identification of personnel for specific training needs of routine users and technical staff; signing service contracts with suppliers and manufacturers, e.g., for annual or biannual servicing; exposure of laboratories to new technology including relevant ones not yet in use at the laboratory through country or regional workshops; and active involvement of laboratory technologists in acquisition of modern equipment to motivate them to maintain equipment during and at the end of funded projects.

Laboratory management needs include: designated laboratory manager to ensure procedures are availed to all users and adhered to. Each equipment to have well

displayed standard operation procedures; design laboratory layout to separate equipment for easy and safe access; laboratory manager to advise the institution's administration on special requirements, e.g., air conditioning, stable surfaces for equipment; proper documentation: records on laboratory training and personnel trained; up to date log books for each equipment to track use and record the performance; information on procurement procedures and sources of laboratory equipment, e.g., catalogues and websites for relevant suppliers; laboratories to participate in regular proficiency or competence tests to ensure accuracy of data generated.

8. What's the problem with personalization of equipment?

It slows down scientific process because there is underutilising of the equipment due to limited access. If equipment breaks cannot be repaired by the institution, it is also difficult to detect errors. It compromises scientific quality. In case of termination of employment of the owner of the equipment, it is taken by the person and nothing remains at the institution. It kills the mindset of the research community within that institution. It is a waste of resources, when an individual in the same institution asks for the same equipment. There is limited or no capacity building because young scientists cannot access the equipment. It compromises collaboration with other institutions. Reasons for this problem include lack of institutional policy that guides equipment and personal attitudes that require changes in mindset. It is recommended that policies be strengthened, especially about the use of donated equipment. We need to sensitize the institution, and take note that equipment belongs to the institution.

9. What's involved in the development of a business plan for laboratory cost-recovery?

It needs to look at cost and revenue, identify purchases, equipment utilities, personnel, and then income generation options, training of students to learn and pay for tests to be carried out for universities and the private sector for small bench fees when scientists visit. After cost and revenue we can look at depreciation and come up with a plan for 1, 2 or 3 years and then change the plan according to the equipment we have.

Participant Feedback

Participants reported that among the things they will do differently are: using the PRISM approach, engaging a clearing agent for import, training technicians, being better about equipment maintenance, establishing better relations with suppliers, and setting up equipment committees and associations.

They also said that their expectations for the conference were more than met, and unexpectedly learned much about customs clearance and site preparation. Almost all colleagues had got time off from their home institutions to attend the conference and a few were financially supported.

Of useful topics were the PRISM approach, procurement issues and learning from others' experiences, whether positive or negative. The most useful sessions were the discussions on procurement, and all the presentations on PRISM itself, the experiences of Madagascar and Nigeria participants, and the evaluation of the project in Nigeria. Although all sessions were thought to be useful by most participants, three people mentioned specific sessions or experiences they did not appreciate much.

It was thought that the organizers could have invited more suppliers, project funders, and laboratory managers and technicians. There also could have been more explicit mention of how the PRISM project and the conference would be followed up. Participants would also have appreciated more promotion of the conference and to receive conference materials in a more timely manner. Not directly related to the conference were suggestions that IFS consider giving grants in engineering fields, and that PRISM be widely promoted in other countries through a website and manual.

AuthorAID–IFS Workshop on Scientific Writing

Purpose and Approach

This five-day Workshop on Scientific Writing was jointly organized by AuthorAID and the International Foundation for Science (IFS), in collaboration with its host, The African Academy of Sciences (AAS). The purpose of the workshop (see original schedule in Appendix 4) was for early-career scientists to build their capabilities in scientific writing.

The training focussed on participants' own aspirations for scientific writing. They worked on or initiated a current piece of writing that they intend for a particular audience. Under the guidance of co-facilitators, resource persons and experienced scientists, participants, working in thematic groups where possible, accessed and discussed articles in scientific journals, and they read and offered feedback on each other's writing. Small groups of participants also met to assimilate and apply the lecture content.

Preparation

Participants were expected to bring their writing to the workshop, in whatever stage it was, and if possible, a lap-top computer. They also brought samples of one or two journal articles in their field, and the instructions to authors from a journal in which they hope to publish. Also, if they had prepared poster presentations, they brought copies.

Intended Outcomes and Outputs

As a result of the workshop, it as expected that participants would be better prepared to reach their own goals as scientists who write and publish, and that they would have made significant progress on an actual piece of their own scientific writing.

Participants

The workshop was intended for early-career scientists dealing with various areas related to biological and water resources research. Participants included recent MSc and PhD graduates. (See the list of participants and resource persons in Append 5.)

Participant Feedback

Participants reported that among the things they will do differently are: including scientific writing in staff development and their own teaching of research methods, having a plan for publishing their writing, identifying target journals and reading submission instructions before starting to write, using writing support tools, improving their figures and tables, appreciating peer review and support, giving more presentations and writing more.

They also said that their expectations for the workshop were greatly surpassed, and unexpectedly that they became more confident in their writing abilities, and also learned

about policy briefs, revising their own writing and how to be a responsible author. Almost all participants had got time off from their home institutions to attend the workshop.

All topics were felt to be useful, with the most useful sessions being those on revising and publishing, the sections of a paper, group presentations, and responsible authorship. Two people felt it was not useful to take part in sessions in the scientific equipment conference.

It was thought that the organizers could have included a field trip to a place of interest in Nairobi, that there could have been more breaks, and sessions about online journals and data analysis. Participants would also have appreciated more clarity on how the per diems were determined, handouts from the sessions, and clearer information on logistical arrangements.

IRD-IFS Workshop on Applying for Research Funding

Purpose and Approach

This five-day Workshop on Applying for Research Funding was jointly organized by L'Institut de recherche pour le développement (IRD) and the International Foundation for Science (IFS), in collaboration with its host, The African Academy of Sciences (AAS). The purpose of the workshop (see original schedule in Appendix 6) was for early-career scientists to build their capabilities to apply for research funds from organizations such as IRD, IFS and others.

The training focussed on the principles of scientific investigation, the components of the scientific method and research practices. Under the guidance of senior scientists, participants had the opportunity to apply the scientific method approach with their own research projects and they were advised on the formulation of research proposals to address the funding criteria of IRD and IFS.

Intended Outcomes and Outputs

As a result of the workshop, it was expected that participants would be better able to develop a competitive research proposal, and that they would have made significant progress on the revising or drafting of a proposal for research funding.

Participants

The workshop was intended for early-career scientists dealing with various areas related to biological and water resources research. Participants included recent MSc and PhD graduates. (See the list of participants and resource persons in Appendix 7.)

Preparation and Follow-up

Prior to the workshop, participants were expected to prepare draft proposals for a research project following the IRD or IFS formats, or at least a proposal outline or concept note. The proposals or outlines should have addressed a project that participants intended to develop further during the workshop and subsequently submit for consideration for a competitive research grant. The processes and formats were discussed during the workshop and participants received comments that will be helpful in finalizing their grant proposals.

Participants were requested to bring their laptop computers to the workshop, as some of the sessions required connection to the internet.

Participants were encouraged to submit their proposals to IRD and IFS. They should consult regularly with the IRD and IFS websites to check on the next call for proposals.

Participant Feedback

Participants reported that among the things they will do differently are: networking and working with peers, developing collaborative proposals, (re)submitting their proposals, following instructions and more carefully considering reviewer comments, assisting students, keeping better time in presentations, being more aware of the importance of the literature, and sharing learned skills.

They also said that their expectations for the conference were more than met, and that they were unexpectedly inspired and grateful to get to know about IRD. Almost all participants had got time off from their home institutions to attend the conference.

Although all topics were seen to be useful, the most useful sessions were those on the literature and referencing, group discussions and presentations, and the experiences of successful grantees and researchers. Two people felt it was not useful to take part in the conference on scientific equipment.

It was thought that the organizers could have included more details on methodology and budget, and also could have worked in discussions on cross-cutting issues like HIV and AIDS, experimental design and data analysis.

Participants would also have appreciated earlier web announcements about the workshop, more time for preparation of their proposals, and more consistency in the teaching approaches of the facilitators. There was overall agreement that it was an excellent workshop.

Acronyms

AAS	The African Academy of Sciences
AVCNU	Association of Vice Chancellors of Nigerian Universities
BecA	Biosciences eastern and central Africa
IFS	International Foundation for Science
IRD	L'Institut de recherché pour le développement
ISO17025	An ISO standard developed in 1999 regarding "General Requirements for the Competence of Testing and Calibration Laboratories"
ITAD	company conducting the PRISM project evaluation
INASP	International Network for the Availability of Scientific Publications
N	Naira
NIPRD	National Institute for Pharmaceutical Research and Development
NUSESA	Network of Users of Scientific Equipment in Eastern and Southern Africa
PACN	Pan African Chemistry Network
PRISM	Procurement, Installation, Service, Maintenance and Use of Scientific Equipment
PSAN	PRISM Scientific Association of Nigeria
RISE	Regional Initiative in Science and Education, Institute for Advanced Study, Princeton University
TETF	Tertiary Educational Trust Fund

Appendix 1 Conference Schedule

Day One – Wednesday, 30 May		
0900-1000	Welcome, introductions and conference overview	<ul style="list-style-type: none"> ▪ Prof Berhanu Abegaz, AAS ▪ Dr Graham Haylor, IFS ▪ Mr William Savage, Facilitator
1000-1100	Opening discussion on "how to effectively provide equipment for institutions in Africa"	Groupwork to set the scene for the conference
1100-1130	Break	
1130-1230	Presentation on PRISM	<ul style="list-style-type: none"> ▪ Dr Cecilia Öman, IFS
1230-1330	Lunch	
1330-1530	Presentations on the Madagascar and Nigeria experiences of PRISM	<ul style="list-style-type: none"> ▪ Prof Georgette Ramanantsizehena, University of Antananarivo, Madagascar ▪ Prof Phillipe Rasoanaivo, Institut Malgache de Recherches Appliquées, Madagascar ▪ Prof Charles Aworh, University of Ibadan, Nigeria ▪ Dr Ado Dan Isa, Bayero University, Nigeria ▪ Prof Karniyus Gamaniel, National Institute for Pharmaceutical Research and Development, Nigeria ▪ Prof Gideon Okpokwasili, University of Port Harcourt, Nigeria
1530-1600	Break	
1600-1700	Presentation on the PRISM evaluation	<ul style="list-style-type: none"> ▪ Prof George Abalu, ITAD Consultant
1700-1730	Reflections on the day, looking ahead to Day Two	Facilitated discussion

Day Two – Thursday, 31 May		
0900-0930	Review of Day One, preview of Day Two	▪ Mr William Savage
0930-1000	Questions and issues arising from Day One	▪ Mr William Savage
1000-1100	Presentation on IFS small grants programme	▪ Dr Nighisty Ghezae, IFS
1100-1130	Break	
1130-1230	Presentation on BecA, its research hub, and equipping and maintaining labs in African research institutions	▪ Dr Rob Skilton, BecA
1230-1330	Lunch	
1330-1430	Inputs from other participants	An opportunity for other representatives to share their experiences
1430-1530	Issues arising	Small group work on themes of concern
1530-1600	Break	
1600-1700	Reportback on issues arising	Presentation and consolidation of themes of concern
1700-1730	Conference evaluation, next steps, and concluding remarks	Reflection on participants' conference experiences and how the outcomes can be taken forward

Appendix 2: Summary from the PRISM Project Draft Final Report

The PRISM project was initiated in November 2007 and was managed by Cecilia Öman, Scientific Programme Coordinator of the International Foundation for Science (IFS). The overall purpose was to "Improve the Science Infrastructure Base of African Universities". An initial phase of the project consisted of a process of auditing equipment at 15 universities in Africa. The audit concluded that a large portion of the equipment that had been procured by universities was not installed, broken down or obsolete. In total, 563 pieces of equipment were found in the laboratories during the audit, of which 42% were not functioning. Of the more sophisticated equipment, including FTIRs, GCs, HPLCs and microscopes, more than 50% of the items could not be used. The audit also showed that there was no firm policy in place for long-term equipment servicing and maintenance at any of the universities.

The second phase of the project addressed issues of selection, procurement, transportation and installation of scientific equipment and training in actual practice. Selected scientific institutions committed to arrange necessary infrastructure improvements as well as to provide the support of technicians and technologists. An Advisory Committee consisting of Prof Karniyus Gamaniel from Nigeria, Dr Amah Klutsé from Togo and Dr Sune Eriksson from Sweden, with extensive expertise in experimental research from various disciplines and of laboratory scientific equipment, was established for phase two of the project. Six scientific institutions took part in the second phase of the project: Ahmadu Bello University (ABU), Bayero University (BUK), University of Ibadan (UI), and University of Port Harcourt (UNIPORT) in Nigeria, and University of Antananarivo (UA) and the Institut Malgache de Recherches Appliquées (IMRA) in Madagascar.

The project design was agreed between the IFS and the MacArthur Foundation, whereas the strategy project plan was developed jointly with the African beneficiaries. The design included the use of Outcome Mapping (OM) and was based on national and local ownership, aspirations to equal partnership, and knowledge sharing. In meetings with thirty PRISM project beneficiaries from the six institutions, including policy-makers, technicians, technologists and researchers, the Outcome Mapping tool was used in developing a Vision and Mission, and in identifying Boundary Partners, Outcome Challenges, Progress Markers and a Strategy Map. To nurture local ownership and efficient procedures, 65 face-to-face meetings were held with PRISM project beneficiaries as well as with partner organisations.

The constraints identified during the audit were compiled and translated into an Operational and Financial (O&F) Plan template. The Strategy Map developed through Outcome Mapping was used to formulate a Support Package and was further used to improve the O&F Plan template. The support package at each of the six universities described a set of procedures to coordinate the scientific equipment management including: the selection, procurement, transportation, installation, servicing, maintenance and use of equipment. The package also included the O&F Plan, the infrastructural demands, as well as training in use, maintenance, service, analytical applications and quality assurance. It also addressed planning, monitoring and evaluation. From the lessons learnt the implementation, O&F Planning template and the support package template was further improved. To facilitate the implementation of the PRISM concept at other institutions and to maintain it at the six institutions selected for the second phase of the project, an institutional framework for a PRISM Partnership was developed, a PRISM Nigeria office was opened and a PRISM Madagascar office was prepared for.

Planning, monitoring and evaluation were continuous activities throughout the project. The O&F Plan, the Support Packages as well as the Partnership Framework were continuously revised, as lessons were learnt through the operations of the project. A Baseline Outcome Journal was identified by each of the institutions in August 2010, and an Operational Journal was developed by each institution in November and December 2011. A PME Work Committee was installed in order to generate the Outcome Journal annually from 2012. The two Outcome Journals showed that the technicians and technologists as well as the suppliers scored lowest.

The PRISM project is funded by MacArthur Foundation, coordinated by IFS, and will conclude in July 2012. After this date a PRISM Partnership with its proposed PRISM offices in Nigeria are hopeful they can maintain and improve what has been initiated.

Appendix 3: Conference Participants

Name	Institution/Country	Email
Dr Hamdy Ahmed	African Union Commission	HAMDYA@africa-union.org
Prof. Stephen Gitahi Kiama	University of Nairobi	kiama123@yahoo.com
Prof. George Rading	University of Nairobi	gorading@mail.uonbi.ac.ke , gorading@hotmail.com
Prof. Shem Wandiga	AAS Fellow and Chairman of PACN. University of Nairobi, Kenya	sowandiga@iconnect.co.ke
Prof. Jacob Midiwo	Executive Secretary of NAPRECA, University of Nairobi	jmidiwo@uonbi.ac.ke
Dr Skilton, Rob	ILRI-BecA	R.SKILTON@CGIAR.ORG
Prof. Charles W. Mirikau	University of Nairobi, Chemistry Department	cmirikau@uonbi.ac.ke
Mr Vincent Odongo Madadi	University of Nairobi, Chemistry Department	vmadadi@uobi.ac.ke OR madadivin2002@yahoo.com
Prof. Georgette Ramanantsizehena	Coordinator of PRISM Project, Water Platform, University of Antananarivo	georamanan@moov.mg
Prof. Rasoanaivo Philippe	Institut Malgache de Recherches Appliquées (IMRA) Madagascar	rafita@moov.mg
Prof. Karniyus Gamaniel	National Institute for Pharmaceutical Research and Development (NIPRD), Nigeria	ksgama@yahoo.com
Prof. Gideon Okpokwasili,	Professor of Microbiology & Chairman, PRISM Management Committee, Nigeria	gidsilman@yahoo.com
Dr Ado Dan Isa	Bayero University in Nigeria	ado_danisa@yahoo.com
Prof Charles Aworh	University of Port Harcourt in Nigeria	ocawo51@yahoo.co.uk
Ms Yvonne Darkwa-Poku	MacArthur Foundation	ydarkwa@macfound.org
Mr Pari Antalis	Representative of Bruker in Africa - located in South Africa - a responsible commercial firm	Pari.Antalis@bruker.co.za
Prof. Mathew Nindi	Department of Chemistry	Nindimm@unisa.ac.za
Dr Faith Mabiki	RISE-AFNNET and project assistant at Sokoine University of Agriculture	fmabiki@yahoo.com ; fmabiki@suanet.ac.tz ; fmabiki@gmail.com
Dr. Quintino Mgani	UDSM	mgani@chem.udsm.ac.tz
Prof. George Abalu	ITAD	abalu@agrosearch.com
J.H. Nyaga Mukiira Kenya	KARI	

Appendix 4: AuthorAID-IFS Workshop Schedule

Day One – Monday, 28 May		
0900-0930	Welcome and Introductions	<ul style="list-style-type: none"> ▪ Prof Berhanu Abegaz, AAS ▪ Dr Graham Haylor, IFS ▪ Dr Barbara Gastel, AuthorAID and Texas A&M University
0930-1030	Lecture: Approaching a Writing Project	Dr Barbara Gastel
1030-1100	Lecture: The Structure of a Scientific Paper	Dr Barbara Gastel
1100-1130	Break	
1130-1200	Lecture: Tables and Figures	IFS colleague
1200-1230	Lecture: The Methods Section	Dr Barbara Gastel
1230-1330	Lunch	
1330-1430	Lecture: Responsible Authorship	Prof Berhanu Abegaz Chaired by William Savage
1430-1530	Small-Group Discussion	Plans to Apply Today's Lectures Revision of Your Methods Section
1530-1600	Break	
1600-1730	Presentations by Small Groups	Highlights of This Afternoon's Work

Day Two – Tuesday, 29 May		
0900-1000	Lecture: Publishing a Journal Article	Dr Barbara Gastel
1000-1100	Lecture: The Results Section	Dr Barbara Gastel
1100-1130	Break	
1130-1230	Small-Group Discussion	Plans to Apply This Morning's Lectures Revision of Your Results Section
1230-1330	Lunch	
1330-1430	Presentations by Small Groups	Highlights of This Morning's Work
1430-1530	Lecture: Poster Presentations and Oral Presentations	Dr Barbara Gastel
1530-1600	Break	
1600-1730	Small-Group Discussion	Plans to Apply This Afternoon's Lecture Refining Poster Presentations by Group Members

Day Three – Wednesday, 30 May		
0900-1000	Scientific Equipment Conference	Welcome, introductions and conference overview
1000-1100	Scientific Equipment Conference	Opening discussion on "how to effectively provide equipment for institutions in Africa": Groupwork to set the scene for the conference
1100-1130	Break	
1130-1230	Presentations by Small Groups	Highlights of Yesterday Afternoon's Work
1230-1330	Lunch	
1330-1430	Lectures: The Discussion Section; Citing References	Dr Barbara Gastel
1430-1530	Small-Group Discussion	Plans to Apply This Afternoon's Lectures Revision of Your Discussion Section
1530-1600	Break	
1600-1730	Presentations by Small Groups	Highlights of This Afternoon's Work

Day Four – Thursday, 31 May		
0900-1000	Lecture: Other Writing Genres – e.g., Curricula Vitae, Proposals, Progress Reports, Non-academic Media, Policy Briefs	Dr Barbara Gastel
1000-1100	Small-Group Discussion	Plans to Apply This Morning's Lecture
1100-1130	Break	
1130-1230	Presentations by Small Groups	Highlights of This Morning's Work
1230-1330	Lunch	
1330-1430	Lectures: The Introduction; The Abstract	Dr Barbara Gastel
1430-1530	Scientific Equipment Conference	Issues arising: Small group work on themes of concern
1530-1600	Break	
1600-1700	Scientific Equipment Conference	Report back on issues arising: Presentation and consolidation of themes of concern

Day Five – Friday, 1 June		
0900-1000	Small-Group Discussion	Plans to Apply Yesterday Afternoon's Lecture Revision of Your Introduction and Abstract
1000-1100	Presentations by Small Groups	Highlights of This Morning's Work
1100-1130	Break	
1130-1230	Lecture / Discussion: Some Aspects of Writing Style and Writing in English about Your Research	Dr Barbara Gastel
1230-1330	Lunch	
1330-1430	Lecture / Discussion: Continuing to Strengthen Your Writing – Resources and Strategies	Dr Barbara Gastel
1430-1530	Wrap-Up Exercise	Dr Barbara Gastel
1530-1600	Break	
1600-1700	Workshop Evaluation	Written and Spoken
1700-1730	Closing Remarks; Presentation of Certificates	<ul style="list-style-type: none"> ▪ Prof Berhanu Abegaz, AAS ▪ Dr Graham Haylor, IFS ▪ Dr Barbara Gastel, AuthorAID and Texas A&M University

Appendix 5: AuthorAID-IFS Workshop Participants and Resource Persons

Name	Country	Email
Dejen Zeleke Agide	Ethiopia	zelekeko@yahoo.com
Yihun Yenesew Mengiste	Ethiopia	yenexmengiste@gmail.com
Adnew Mekonnen	Ethiopia	mekonnenadnew@yahoo.com
Recha Charles S.w	Kenya	cshika@yahoo.co.uk
Situma Dorice Soita	Kenya	dsituma@gmail.com
Elijah kungu Ngumba	Kenya	engumba@yahoo.com
M. Njire Moses	Kenya	momunjir@yahoo.com
Nyangahu David Donald	Kenya	donaldnyangahu@gmail.com
Trizah Koyi Milugo	Kenya	tesskoyi190@yahoo.com
Kebira Nyamache Anthony	Kenya	akibera2000@gmail.com
N. Kinyuru John	Kenya	jkinyuru@gmail.com
Kipyegon Langat Robert	Kenya	rlangat@kaviuon.org
Kimathi George	Kenya	gkimathi@students.uonbi.ac.ke
Waweru Nderu David	Kenya	dnderu@gmail.com
Adhiambo Akombo Rose	Kenya	rakombo2006@yahoo.com
Selle Winifred	Kenya	winiselle@gmail.com
Kayume BIRTHIA Rael	Kenya	rbirthia@gmail.com
Aor Ochungo Pamela	Kenya	pam.ochungo@cgjar.org
Munga Judith	Kenya	munga.judith@yahoo.com
David Tryson Tembo	Malawi	devtembo@gmail.com
Munyandamutsa Sanzira Philippe	Rwanda	sanziraphilippe@yahoo.fr
Suma Kibonde (Mrs)	Tanzania	kibondesuma9@yahoo.com
Katani Josiah Zephania	Tanzania	josiahkatani@yahoo.com
Ester Innocent	Tanzania	minza@talk21.com
Tumwine Jackson	Uganda	jbtumwine@yahoo.com

AuthorAID-IFS Resource Persons

Barbra Gastel	AuthorAID/ Texas A & M	BGastel@cvm.tamu.edu
Cecilia Öman	IFS	cecilia.oman@ifs.se
Berhanu Abergaz	AAS	b.abegaz@aasciences.org
Nighisty Ghezae	IFS	Nighisty.ghezae@ifs.se
Graham Haylor	IFS	Graham.Haylor@ifs.se
Nathalie Persson	IFS	Nathalie.person@ifs.se

Appendix 6: IRD-IFS Workshop Schedule

Day One – Monday, 28 May		
0900-0930	Welcome and introductions	<ul style="list-style-type: none"> ▪ Prof Berhanu Abegaz, AAS ▪ Dr David Williamson, IRD ▪ Dr Graham Haylor, IFS
0930-1015	Presentation on IRD programme on capacity building and funding opportunities	Dr David Williamson, IRD
1015-1100	Presentation of the IFS funding programme	Dr Nighisty Ghezae, IFS
1100-1130	Break	
1130-1200	Workshop objectives and participant expectations	Mrs Nathalie Persson, IFS Dr Daniel Masiga, ICIPE
1200-1230	Lecture: Scientific method and the research proposal	Mrs Nathalie Persson, IFS
1230-1330	Lunch	
1330-1530	Plenary session	Presentation of research projects, problems and objectives by each participant, and grouping into similar themes
1530-1600	Break	
1600-1630	Lecture: Linking research objectives, the literature and hypothesis	Mrs Nathalie Persson, IFS
1630-1730	Lecture: Available resources (e.g., AGORA, HINARI, INASP, OARE)	

Day Two – Tuesday, 29 May		
0900-1000	Lecture: Internet resources for references	Dr Olivier Hamerlynck, IRD
1000-1100	Reference search practice	All resource persons
1100-1130	Break	
1130-1230	Reference search practice (continued)	All resource persons
1230-1330	Lunch	
1330-1400	Lecture: Building an hypothesis	Dr David Williamson, IRD
1400-1530	Group work	Developing objectives and building an hypothesis
1530-1600	Break	
1600-1730	Plenary session	Presentation of revised research objectives and hypothesis

Day Three – Wednesday, 30 May		
0900-1000	Scientific Equipment Conference	Welcome, introductions and conference overview
1000-1100	Scientific Equipment Conference	Opening discussion on "how to effectively provide equipment for institutions in Africa": Groupwork to set the scene for the conference
1100-1130	Break	
1130-1230	Lecture: Conclusion on hypothesis building and experimental design	Dr David Williamson, IRD
1230-1330	Lunch	
1330-1430	Lecture: Developing a workplan, activities, outputs and timeline	Dr Stephanie Duvail, IRD
1430-1530	Group work	Developing a workplan, activities, outputs and timeline
1530-1600	Break	
1600-1730	Plenary session	Developing a workplan, activities, outputs and timeline

Day Four – Thursday, 31 May		
0900-1000	Lecture: Reflections on the budget	Mrs Nathalie Persson, IFS
1000-1100	Lecture: Writing a proposal summary and abstract	Mrs Nathalie Perrson, IFS
1100-1130	Break	
1130-1230	Lecture: Expectations of a reviewer	Dr Jihane Giraud, IRD
1230-1330	Lunch	
1330-1400	Lecture: Expectations of a reviewer	Prof Berhanu Abegaz, AAS Chaired by Mrs Nathalie Persson
1400-1430	Group discussion	Expectations of reviewers
1430-1530	Scientific Equipment Conference	Issues arising: Small group work on themes of concern
1530-1600	Break	
1600-1700	Scientific Equipment Conference	Report back on issues arising: Presentation and consolidation of themes of concern
1700-on	Group work	Preparing final proposals and PowerPoint presentations

Day Five – Friday, 1 June		
0900-1000	IRD tools for capacity support	Dr Jean Albergel, IRD
1000-1030	Lecture: Experience of an IFS grantee	Prof Jackson Ombui, University of Nairobi
1030-1100	Lecture: Experience of an IRD associated young scientist	Dr Wanja Dorothy Nyingi, National Museums of Kenya
1100-1130	Break	
1130-1230	Consultations with resource persons	All
1230-1330	Lunch	
1330-1530	Plenary session	Presentation of the finalized proposals
1530-1600	Break	
1600-1700	Workshop evaluation	Written and spoken
1700-1730	Closing remarks; presentation of certificates	<ul style="list-style-type: none"> ▪ Prof Berhanu Abegaz, AAS ▪ Dr Jean Albergel, IRD ▪ Dr Graham Haylor, IFS

Appendix 7: IRD-IFS Workshop Participants and Resource Persons

Name	Country	Email
Abunna Kurra Fufa	Ethiopia	drfufex@yahoo.com
Tesama Tsegabirhan	Ethiopia	tsegabirhan1@gmail.com
Argaw Anteneh	Ethiopia	antarga@yahoo.com
Demessie Ermias Teferi	Ethiopia	ermias52003@yahoo.com
Kefialew Yonas	Ethiopia	yongraza@yahoo.com
Ngodhe Omari Abongo Steve	Kenya	mcomaristeve26@yahoo.com
Kathuku Angela Ndanu	Kenya	andanus@gmail.com
Ogot Hellen Adhiambo	Kenya	hellenogot@yahoo.com
Okun Daniel O	Kenya	dnlokun@yahoo.com
Fungomeli Maria	Kenya	fungomaria@yahoo.com
Muriuki Salome Wamuyu	Kenya	sallykayumu@yahoo.com
Meshacl Obonyo	Kenya (South Africa)	obonyom@gmail.com
Dennis Ochieno	Kenya	dwochieno@yahoo.com
Mary Kiaye	Kenya	marykiaye@yahoo.com
Nancy Khadioli	Kenya	nkhadioli@icipe.org
Esther Abonyo	Kenya	Esther.ABONYO@iucn.org
Angela Ndanu	Kenya	andanus@gmail.com
Ongamo George Otieno	Kenya	gongamo@icipe.org
Ssanyu Grace Asiyu	Uganda	ssangrace@mail.com
Nampanzira Dorothy	Uganda	dnampanzira@vetmed.mak.ac.ug
Mwesigwa Boss Boaz	Uganda	boazie2005@yahoo.com
Nantumbwe Clare Mutumba	Uganda	claremutumba@gmail.com
Sseremba Owen Emmanuel	Uganda	sserembaowen@gmail.com
Ssebugere Patrick	Uganda	ssebugere@chemistry.mak.ac.ug
Matingi Cornelius	Kenya	cmatingi2001@gmail.com
Gilbert Kosgei	Kenya	2kipscham@gmail.com
Atuhumuze Faith	Uganda	fayth.vell@yahoo.com (256 777583614)
Kipronoh Alexender	Kenya	kkalexender@yahoo.co.uk
Mwondo Joel	Kenya	joelmwondo@yahoo.com
Benard Jumba	Kenya	benjumba@yahoo.com
Marango Sylvia	Kenya	marangosylvia@yahoo.com

IRD-IFS Resource Persons

Nathalie Persson	IFS	Nathalie.person@ifs.se
Berhanu Abergaz	AAS	b.abegaz@aasciences.org
Nighisty Ghezae	IFS	Nighisty.ghezae@ifs.se
Graham Haylor	IFS	Graham.Haylor@ifs.se
Jean Albergel	IRD	jean.Albergel@ird.fr
Prof Jackson Nyarongi Ombui	Former IFS grantee	jnombui@yahoo.com
Dr. Daniel Masiga	ICIPE	dmasiga@icipe.org
Dr David Williamson	IRD	David.Williamson@ird.fr
Dr Olivier Hamerlynck	Consultant	olivier.hamerlynck@gmail.com
Felix Ngetich	Kenyatta University	felixngetich@yahoo.com
Stephanie Duvail	IRD	stephanie.duvail@ird.fr



**INTERNATIONAL
FOUNDATION FOR
SCIENCE**

Karlavägen 108, 5th floor, SE-115 26 Stockholm, Sweden
Tel: +46 (0)8 545 818 00 • Fax: +46 (0)8 545 818 01
e-mail: info@ifs.se • Web: www.ifs.se