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INTERNATIONAL  
FOUNDATION FOR  
SCIENCE

**IFS-AAS Project on  
Developing an Enabling Scientific Equipment Policy in Africa**

**Kenya National Scientific Equipment Policy Workshop**

**African Academy of Sciences  
Nairobi, Kenya  
28-29 March 2014**

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## Acronyms

AAS	African Academy of Sciences
AAS	Atomic Absorption Spectroscope
ADB	African Development Bank
AMCOST	African Ministerial Council on Science and Technology
AUC	African Union Commission
BecA	Biosciences Eastern and Central Africa
CEMASTEA	Centre for Mathematics, Science and Technology Education in Africa
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
EU	European Union
GC	Gas Chromatography
ICIPE	International Center for Insect Physiology and Ecology
ICT	Information and communication technology
IFS	International Foundation for Science
ILRI	International Livestock Research Institute
JICA	Japan International Cooperation Agency
KARI	Kenya Agricultural Research Institute
KEBS	Kenya Bureau of Standards
KEFRI	Kenya Forest Research Institute
KEMRI	Kenya Medical Research Institute
KEMFRI	Kenya Marine and Fisheries Research Institute
KENIA	Kenya National Innovation Agency
KICD	Kenya Institute of Curriculum Development
KNAS	Kenya National Academy of Sciences
MDG	Millennium Development Goals
MKU	Mount Kenya University
NACOSTI	National Commission for Science, Technology and Innovation
NCST	National Council of Science and Technology
NEPAD	New Partnership for Africa's Development
NRF	National Research Foundation
PAU	Pan African University
SADAC	Southern Africa Development Community
SEPU	School Equipment Production Unit
TWAS	The World Academy of Sciences
UoN	University of Nairobi
UNESCO	United Nations Educational, Scientific and Cultural Organisation

## Background

In follow-up from the “Conference on Getting and Using Equipment for Scientific Research in Africa”, held in Nairobi in May 2012, the International Foundation for Science (IFS) and the African Academy of Sciences (AAS) are continuing their collaboration through the implementation of the MacArthur Foundation-funded project on scientific equipment policy development and change, along with partner organizations in Ethiopia, Ghana and Kenya.

A description of the background to this year-long project can be read in the IFS Briefing Document 1/2012: *Addressing Equipment Challenges in Development-related Scientific Research in Africa*<sup>1</sup>.

## Project Process

Informed by the discussions and outcomes of the Inception Workshop held in Nairobi on 4-5 November 2013, these project activities are following (with tentative timings indicated):

- Country studies with national co-facilitators in Ethiopia, Ghana and Kenya to review the effectiveness of science equipment policies<sup>2</sup> of key organizations in relation to organizational structures and systems; and to map the national and regional research and policy landscape (January – March 2014)
- National Scientific Equipment Policy Workshops in Kenya (schedule in Appendix 1), Ethiopia and Ghana (one-and-a-half days each, back-to-back, March-April 2014)
- Preparation of briefing and recommendations document (April – June 2014)
- Share project outcomes (by July 2014)

## Workshop Participants

Invited participants (Appendix 2) to the workshop include:

- Representatives from partner organizations in Kenya
- Representatives of policy-making entities in Kenya
- Representatives from interested academies, associations, commissions, institutes, networks and universities in Kenya and across Africa

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<sup>1</sup><http://ifs.modx.kaigan.se/IFS/Documents/Publications/Briefing%20Documents/IFS%20Briefing%20Document%201-2012.pdf>

<sup>2</sup>or practices, procedures and guidelines, where policies do not exist

## Opening Session

The workshop opened with welcome remarks from Prof Jacob Midiwo of the University of Nairobi and leader of the Kenya Country Study team, Dr Graham Haylor, Director of IFS, Prof Berhanu Abegaz, Director of AAS, and Prof Kenneth Mavuti, Kenya National Academy of Sciences.

Prof Midiwo reminded the participants that the Kenya workshop is one of three taking place in the pilot countries that also include Ethiopia and Ghana. The outcomes will lay the ground for achieving the theme of developing an enabling scientific equipment policy in Africa. He thanked the AAS and IFS organizers, and especially the MacArthur-funded IFS project for starting the process of developing policy in Africa, and including Kenya.

Dr Graham Haylor reminded the gathering that although IFS is based in Stockholm, it has worked for many years in Africa, in particular on equipment policy issues as it has provided research grants to early-career scientists across the continent. In March 2013, discussions with MacArthur Foundation affirmed that the provision of scientific equipment is a significant hurdle to accomplishing science aims. Thus this project in Kenya, Ghana and Ethiopia, in association with Pan-African organizations, was envisaged and born. Graham was not able to join the Inception Workshop so he was pleased to be meeting many colleagues here for the first time.

Prof Berhanu Abegaz spoke about how AAS owns its campus and buildings and thus has independence in its operations. Although it is Pan-African, it is based in Nairobi, funded by such generous support as Nigeria's \$5 million contribution to AAS's endowment fund. In the next month in Congo, the 9<sup>th</sup> AAS Congress will announce AAS's first Innovation Award. AAS has Memoranda of Understanding with the academies of science in several African countries, including Kenya, Ghana and Ethiopia, the three pilot countries in this project.

Prof Berhanu's IFS relationship is also personal as he was first a grantee and then a reviewer and now AAS and IFS are collaborating on projects like this one. The problem with scientific equipment is basic and justified in its focus. There are many aspects of equipment to look into, including how we get our recommendations into policy, the role of researchers as policy-makers, how to implement various visions such as the MDGs and Kenya 2030, and the importance of micro-science in the thousands of high schools across Africa. He stressed that academies of sciences must be independent enough to give evidence-based recommendations.

Expressing his gratitude for being invited to the workshop, Prof Kenneth Mavuti commented that he had been involved with KNAS since 1983, at which time he was a student member. KNAS supports research, and does not have a policy on equipment, as all institutions should have. He encouraged the participants to speak freely so that the workshop outcomes would contribute to improvements in the situation of scientific equipment in Kenya and Africa.

## Background of the Project

Dr Nighisty Ghezae, IFS Head of Programme, presented the project background.

IFS has been committed to addressing the equipment challenge since its establishment in the early 1970s. It has already supported over 7,600 early-career scientists in 105 countries throughout Africa, Asia-Pacific and Latin America, with research grants and capability-enhancing support, including training on good laboratory practices. More than 80,000 scientists have benefited from using IFS-funded equipment.

In May 2012, IFS and AAS organized a conference on “Getting and Using Equipment for Scientific Research in Africa”. Its specific objectives were to:

- Learn lessons about and from implementation of the MacArthur Foundation-funded project on equipment procurement
- Consider two other approaches to scientific equipment provision from:
  - IFS, with particular reference to early-career scientists and collaborative teams
  - Biosciences Eastern and Central Africa (BecA), which provides opportunities in Africa for scientists to utilize well-equipped laboratory facilities
- Discuss and make recommendations on how to effectively provide scientific equipment for universities and research institutions in Africa

The conference resulted in a deeper and broader understanding of the efficacy of various approaches to scientific equipment provision. The resulting Briefing Document (see footnote 1) was shared with other research institutions and funding organizations.

Nine key learning points arose when taking equipment issues seriously:

- There is no “one size fits all” in equipment provision.
- Participatory planning of procurement, use and maintenance is highly beneficial.
- Developing a strategy for equipment procurement is vital.
- Use proper clearing and forwarding agents and lobby for simplified procedures for importing and forwarding scientific equipment.
- Face-to-face meetings are best to understand long-term needs and equipment upgrade paths.
- Develop standard procedures for efficient use, since burdensome paperwork and regulation in institutions and universities can limit the use of installed equipment.
- Centralization enables pooling of resources, efficient management, adequate security, infrastructure and utilities.
- Negotiate collaboration around expensive equipment within a country or region.
- Discourage personalization of equipment (the opposite of collaboration).

Additional learning with Pan-African significance included addressing the problem of scientific equipment with the urgent development and implementation of sound policy, and concrete actions that are necessary to influence it.

IFS and AAS are continuing their collaboration with partner organisations in Ethiopia, Ghana and Kenya. An Inception Workshop took place on 6-7 November 2013 on the AAS campus in Nairobi, with intended outcomes of familiarization of participants with scientific equipment and policy issues, the project and each other; contribution of participants to the project design and process; and a project work plan.

The overall purpose of the project is to understand how science equipment policy changes that benefit the scientific endeavor might be accomplished across Africa. To this end, country studies will be carried out in the three pilot countries of Ethiopia, Ghana and Kenya, to get national understanding about the policy environment that affects how scientists get and use scientific equipment. The specific objectives are to review the effectiveness of science equipment policies of key organizations in relation to organizational structures and systems; and to map the national and regional research and policy landscape.

The studies should review:

- Existing national frameworks as entry points for scientific equipment policy development and change
- Current research priorities
- Status of current policies, guidelines and legislation concerning scientific equipment
- Scientific equipment policy precedents in other sectors
- Presence or absence of policies and procedures that, among other issues:
  - Provide ways of lifting or minimizing duty on research equipment, particularly donated items
  - Simplify the acquisition and clearance of equipment
  - Accelerate procurement of urgently needed and perishable equipment and supplies
  - Include provisions for sharing, standardizing and calibrating equipment
  - Promote the manufacture and production of equipment, especially for schools

The studies should consider:

- Institutional, national and regional levels
- Case institutions, in terms of their scientific equipment management, budgeting, manpower, maintenance
- The relevant ministries with which to engage in discussions about scientific equipment policy, including the Ministry of Finance
- Regional equipment facilities and services
- The role of the private sector

The studies should map (or identify):

- Formal and informal links and channels among users, champions, influencers and policy-makers
- The potential of the media to influence policy change
- The level of national awareness and access to regional policy influences, e.g., African Union Commission

The draft country study report was presented and discussed in the two days of this national workshop. In addition, results of an IFS Kenya Alumni Association study on scientific equipment was presented and discussed.

## **Kenya Country Study – Presentation and Discussion**

The report of the Kenya Country Study (conducted under the auspices of KNAS) was presented by Prof Jacob Midiwo of the University of Nairobi.

The study started from the conference on “Getting and Using Equipment for Scientific Research” which was held in May 2012, followed by the Inception Workshop on “Developing an Enabling Scientific Equipment Policy in Africa” which was held in November 2013, where the study groups were established. Both events took place at the AAS campus in Nairobi.

Members of the study group were:

- Jacob Midiwo, Dept of Chemistry, UoN, group leader
- Kerubo Omosa, Dept of Chemistry, UoN
- James Kanya, School of Biological Sciences, UoN
- Luna Kamau, Kenya Medical Research Institute
- Ursulla Okoth, Kikuyu Campus, UoN
- Noel Abuodha, Kenya National Academy of Sciences
- Perpetua Wanaswa, SEPU
- Daniel Nyaamba, Dept of Physics, UoN
- Justus Inyega, Kenya Science Campus, UoN
- Ibrahim Khatete, Kikuyu Campus, UoN

Objectives of the study were to:

- Review the effectiveness of science equipment policies of key organizations in relation to organizational structures and systems in Kenya
- Map the national and regional research and policy landscape in Kenya

The study's terms of reference were:

- The report of the Inception Workshop was to be reviewed as it related to the two objectives.
- Identification of institutions to be surveyed through key informant semi-structured interviews and involving collection and summarizing of

documents against the required information for the study, on the status of science equipment and research policy.

- Determine through the interviews how these policies influence the conduct and output of research projects in these institutions.
- Write a report on the collection of policy documents, information and their effectiveness.

The study also intended to explore:

- Formal and informal links and channels among users, champions, influencers and policy-makers
- The potential of the media to influence policy change
- The level of national awareness and access to regional policy influences, e.g., African Union Commission

The study group set these milestones:

- Team built, coordinator identified as link person with IFS and members agree
- Team read the Inception Workshop report
- Study developed to capture in a report a comprehensive national understanding of the issues in Kenya regarding existing national frameworks as entry points for scientific equipment policy development and change
- Current research priorities
- Status of current policies
- Guidelines and legislation concerning scientific equipment
- Scientific equipment policy precedents in other sectors

These institutions and organisations were identified to be surveyed:

- Universities: University of Nairobi, Egerton University, Mount Kenya University, Kenya Methodist University, and Strathmore University, representing two public and two private universities
- Research institutes: International Center for Insect Physiology and Ecology (ICIPE), Kenya Agricultural Research Institute (KARI), Kenya Marine and Fisheries Research Institute (KEMFRI), Kenya Forest Research Institute (KEFRI), Kenya Medical Research Institute (KEMRI) and International Livestock Research Institute (ILRI).
- Public laboratories: Government Chemist Division and Kenya Bureau of Standards (KEBS).
- Education institutions: School Equipment Production Unit (SEPU), CEMASTEAM, KICD, Directorate of Secondary Education in the Ministry of Education, Lenana School, Precious Blood High School, Sunshine School and Makini School.
- Industry: Unilever, Kenya Breweries
- Government institutions: Ministry of Finance, Kenyatta National Hospital Laboratory, Kenya National Academy of Sciences (KNAS), and the National Council of Science and Technology (NCST).

In brief, of the universities visited, the University of Nairobi had a research policy available but no equipment policy. Egerton University had a research policy available but no equipment policy and no regulations. Mount Kenya University's research and equipment policies were available. Even though Kenya Methodist University has a research policy, it was not available. Strathmore University's research and equipment policies were not available but there are regulations.

Highlight of the University of Nairobi's research policy include:

- As the national context, the policy is anchored on freedom of expression as expressed in the Kenyan constitution and the country's Vision 2030.
- It enunciates the virtues embodied in the policy.
- The policy says that it will help the institution to fully contribute to development of the nation and the world by providing a framework to facilitate research policy development, review, planning and implementation of research activities within the University.
- It is to make sure that all research has a clear purpose.
- It underpins all educational activities and therefore helps in development of sufficient numbers of highly skilled human capital.
- Facilitates sharing of information through conferences, workshops, seminars, and other modes of international exposure.
- Creates an enabling environment.
- Defines a research governance structure.
- Directs academic policies such as academic freedom and research.
- Demands objectivity of research.
- Sets rules for research approval process.
- Defines ethical practice (protecting human research subjects, experimental animals and sponsored research services).
- States what and how consultancies can be carried out.
- Describes research by undergraduate and post-graduate students.
- Gives guidelines on how research supervision is to be carried out.
- Describes incubation of product prototypes.
- Considers how research is to be done with environmental health and safety measures.
- Describes the Dean's Committee Research Development Fund.
- Describes research quality and research assessment, intellectual property rights, incubation, fabrication and mentoring labs, Science Park, plagiarism, and utilization of research results.
- Enhances research through the University Research Fund, training human capital and linkages.

In terms of research productivity at the UoN, there is reasonable research output due to execution of the research policy. The University is rated quite highly in Africa; the latest webometrics ranking shows that the University is 9<sup>th</sup> on the continent in web presence which is a reflection of paper productivity and posting. The University is ranked 1,100<sup>th</sup> out of 22,000 in the world. This position can still be improved on by higher research productivity.

The research policies available from other universities more or less cover similar areas. Mount Kenya University has an addition in the preamble where the policy also

states the research priority areas and groups them according to their thematic areas of health, water and sanitation, building and planning, infrastructure, agriculture and food, environmental science, biotechnology, mathematics, information and communication technology (ICT) research, and socioeconomic research. MKU is attempts to identify topics of research for its members. In fact the policy document concentrates on management issues of research rather than the philosophy of research.

There are no explicit equipment policies at the universities visited except at MKU, which is commendable. However, it requires to be 'beefed up' a bit more. In other universities, there is no formal involvement of the administration and equipment is brought in through research grants or the money provided may not give appreciable equipment. Maintenance is also not controlled and is usually done by the slow procurement process which encourages them to be left to waste.

The available equipment is sometimes heavily used when functional, for example, the Atomic Absorption Spectroscope at Egerton University Department of Chemistry which serves many departments and Laikipia University departments. Some universities such as Egerton have disposal committees which consider what to do in enforcing the Act of Parliament on procurement and disposal.

If there is any reason that came up as causing the low productivity of research in the technical departments of the universities it was lack of state-of-the-art equipment. Whereas there is availability of small grants to cover expendables, there are hardly any organizations ready to sponsor purchase of capital equipment at the public universities visited. It would be most useful if the universities had an equipment policy to acquire these regularly.

The other problem brought up is the maintenance of the available equipment. Equipment brought in by donors can lie in waste without attention, with some not ever being commissioned. Repairs are not done in any proper order so researchers are discouraged from consistent work on their projects. The procedures that are available for clearance of equipment from outside are weak at public universities so that equipment ends up being auctioned because they cannot satisfy customs conditions.

Kenya has research institutes which are involved in different economic areas nationally and regionally. Of the institutes visited, only KMFRI could give an explicit research policy. They said that since formulation of the research policy, harmony has been brought in their activities. The policy guides research formulation, conduct, collaboration, publication and patenting. KMFRI research is concentrated in Mombasa and Kisumu but they have small stations at other major water bodies. They have advanced equipment in Mombasa and Kisumu.

The most valuable equipment is the 55 m vessel RV Mtafiti in Mombasa which is capable of cruising in the deep seas and therefore mapping natural resources in our 200 nautical mile EEZ. The ship is a KShs 3.1 billion donation from the Belgian government. They have a slightly smaller vessel, RV Ovumbuzi, in Kisumu which is capable of cruising the whole lake, again with valuable economic effect.

KMFRI have highly equipped laboratories at their headquarters in Mombasa. For port of entry clearance, they identify two types of equipment: for large and small projects. There is usually no problem clearing equipment for large projects because they get duty exemption through NACOSTI. For small projects, there is insistence on payment of duty or a letter is written that the collaborator will carry away equipment at the end of the project.

KMFRI is ISO-certified and there is strict adherence to maintenance schedules according to the requirements of the ISO 90001/2005. Instruments are inspected monthly and this is registered in a log book which is kept near the machine for all users to register. Calibration is sourced once a year from Kenya Bureau of Standards (KEBS). Disposal of old equipment is a challenge though. At the moment they have old AAS and GC machines which they are challenged to dispose of.

KMFRI has highly qualified staff with 58 project leaders having PhDs and MScs. Technicians have higher national diplomas. The good equipment has enhanced research at the Institute such that they were declared a Center of Excellence in Marine and Fisheries Research by the East African Heads of State Summit in Kampala in November 2013.

KEMRI has the mandate to carry out health research in the country. Current research priorities are biotechnology; traditional medicine and drug development; infectious and parasitic diseases; public health and health systems; non-communicable diseases; and sexual, reproductive, adolescent and child health. It has a *Guidelines on the Conduct of Research* which covers who should conduct research, writing proposals, procedures for submission of proposals for institutional review, and intellectual property issues.

Equipment sharing issues at KEMRI are not ideal since equipment is acquired per project but this is changing since thematic areas are being identified for reorganization. Equipment maintenance is charged to the project principal investigator officer. Acquisition of equipment is done on payment of duty even though the institution may apply for exemption through the Principal Secretary of the Ministry of Health who makes an application to the Cabinet Secretary of the Ministry of Finance. Personalization of equipment has served the institute relatively well but is not optimal due to duplications that occur from one end to the other. KEMRI is a reasonably productive medical research institute.

Not much information was obtained from the other institutes even though at KEFRI they are making efforts to write some guidelines. During an interview at ILRI no response was recorded on whether they have a research or equipment policy. ILRI is a duty-exempt institution as per the hosting agreement with the Kenya government. The equipment at ILRI is freely shared with other researchers on request.

The Government Chemist Division provides laboratory services in the fields of public and environmental health and in administration of justice. It has an analytical wing and a forensic wing. The analytical wing has three sections: food and drug; clinical toxicological; and water and environmental. The forensic wing has sections for forensic DNA and serology; criminalistics; forensic toxicology; and bhanghi. They

have had a challenge in acquiring equipment due to under-funding from the exchequer. This year the situation has improved a little bit.

The Government Chemist Division does not have an equipment policy though they have an operation norm that ensures management of equipment in the two wings. Instrument acquisition is done through open tendering methods and the lowest bidder who meets all the listed specifications is awarded the tender to supply. There is a serious challenge in receiving donated equipment because the duration of getting duty waiver is long and tedious.

KEBS said they have both research and equipment policies but these were not provided.

CEMASTEIA is a center for in-service training of mathematics and science educators and administrators with emphasis on small-scale school experiments. CEMASTEIA scientific equipment is available to science educators in Kenya and 34 other African countries. The laboratories are built and equipped by JICA. The center applies in time through the Ministry of Education, Science and Technology for duty exemption and other privileges on educational and scientific research equipment to avoid any delays in clearance of goods through the port of entry. They do not seem to have clearance problems due to this.

The School Equipment Production Unit (SEPU) applies in time through the Ministry of Education, Science and Technology for duty exemption and other privileges on educational and scientific research equipment to avoid any delays in clearance of goods through the port of entry. They have machines that were donated by JICA but have never been commissioned for several years since their arrival.

Secondary schools like Sunshine, Makini, Lenana, and Precious Blood that were visited all do not have equipment policies or regulations.

## **Conclusions**

The policy landscape for research and equipment is almost as varied as the type of institution surveyed. Most have no policies even though it is clear that their availability would be quite useful to their operations. Some institutions have strong research policies but there are no accompanying equipment policies. It is clear that, in most cases, the equipment policies and regulations that are there are at best weak and need to be strengthened. A few of the institutions have reasonable research success stories, though their productivity can be enhanced with well thought out equipment policies as is the case for model institutes like KMFRI.

## **Recommendations**

We recommend that following our findings, a model scientific equipment policy for Kenya be written to guide such documents for individual institutions. It should cover the acquisition, installation, maintenance, calibration and disposal of equipment in research laboratories.

## Questions and Comments

- Whilst different institutions have different guidelines for the acquisition and disposal of scientific equipment, all are and must be guided by the 2005 Public Procurement Act of the Government of Kenya. Does the Act include donations? *We do not know at this point.* What are existing national frameworks, e.g., the 2005 Act? *The Act stipulates what to do or not do. Then you can draft a procurement manual based on the Act.*
- All our actions are dictated by many policies in our working environment. Parastatal organisations have boards and are a little more independent but the issue is to harmonize our approach. The 2005 Act requires the CEO to establish four committees: procurement, tender, inspection, and disposal. An important issue is to have scientists on these committees.
- We met with the Ministry of Finance. They said that all public institutions can apply for VAT to be waived, that institutions for the blind and certain agricultural equipment is tax exempt.
- KMFRI's duty exemption comes through NACOSTI. KEMRI applies for duty exemption. ILRI's duty exemption comes through the hosting agreement with the Kenya government. CEMESTEA does not have problems in clearance and exemption.
- ISO certifications are managed through the Kenya Bureau of Standards.
- You found almost no equipment policies but did you find the ingredients of an equipment policy? *We actually recommend the development of a model equipment policy, and the workshop can brainstorm also on this issue.*
- Most institutions had research policies but not an equipment policy, only Mount Kenya University had both, though there may be some at an early stage.
- The presentation was good. There is no national policy and guidance is needed at the national level.
- Guidelines and regulations are referenced in the report. What were these? *They are here but they don't take care of the whole process.*
- KEFRI did not understand well the study when it was visited. KEFRI does have an equipment policy and has no issues with procurement. But our documents are not shared with anyone and this requires the director's permission.
- At KEMRI the board agreed that policy documents should be shared.
- Bureaucracy is a big issue in Kenya and process is important.

- At ILRI there was no formal request ahead of meeting for documents but it should be known that ILRI has a research and procurement policy and a policy on donated equipment.
- We had time constraints; please be reassured we will include your comments from this meeting.
- The process has been to assess the general case by conducting the three country studies, followed by detailed engagement at the institutional level and sharing this with the wider environment at the national policy level. We have heard issues so far about the process of how we engage with each other and we have heard how a model research equipment policy could be helpful.
- I especially appreciate that the study includes universities and schools, though not all research is undertaken in universities. I was at the IFS-AAS conference on this subject in 2012 and I think the IFS Policy Brief on this issue could be helpful.

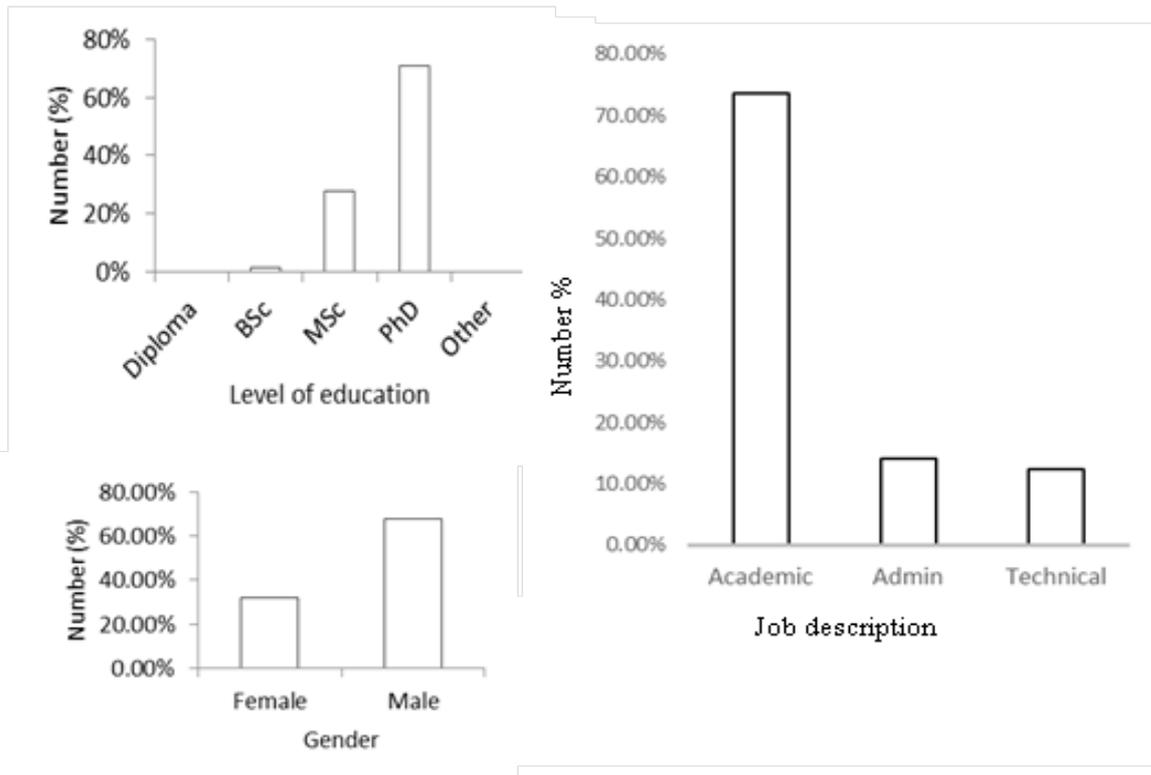
## IFS Alumni Study on Scientific Equipment

The presentation was a collaboration among David Chiawo, Dorice Situma, Harrison Charo and Nighisty Ghezae.

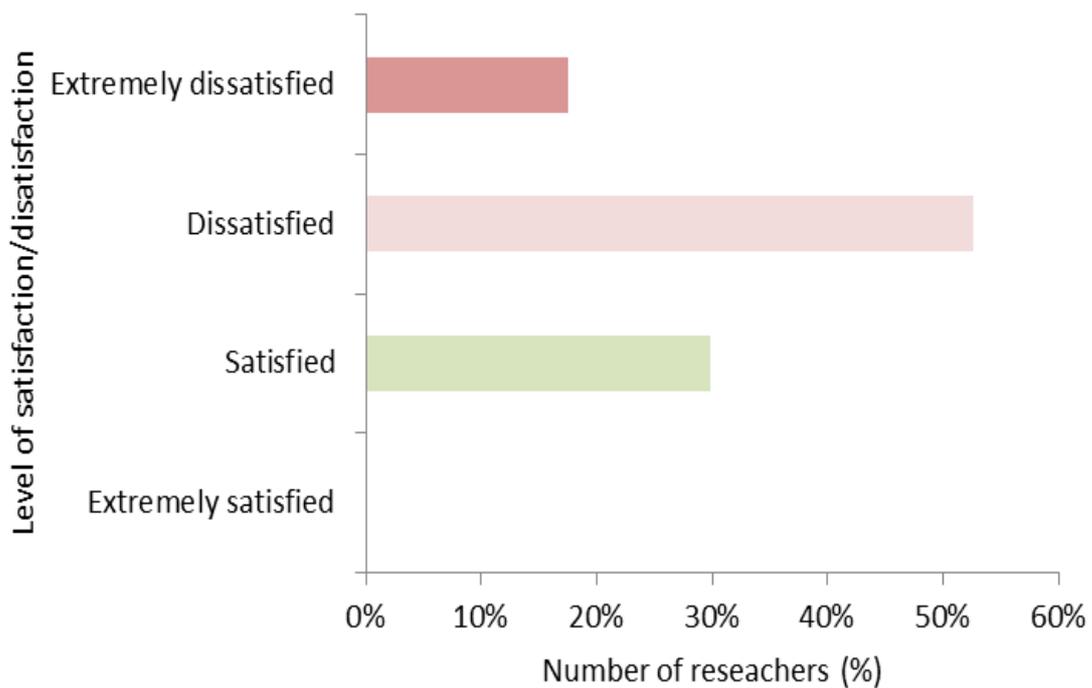
Equipment status in Kenya could be characterized by this diagram:



The study methods were workshops, group discussions and an online survey. Most of the participants in the study (see figure below) were researchers with higher academic qualifications, over 70% with PhDs. However, fewer respondents were women at 32.08% as compared to men at 67.92%. Over 90% were involved in research across the three job categories of academic, administration and technical.



Over 70.17% were dissatisfied with the current state of equipment procurement, maintenance and disposal (see below).



The study asked the question: What describes the current state of science equipment in our institutions? The responses are below.

#### Procurement

- Bureaucratic, slow and cumbersome; much research time lost
- Poor/no liaison for imported equipment
- Researchers hardly involved
- Affordability through procurement procedure
- “Procurement is a serious problem”

#### Use

- Guidelines are scattered, not institutionalized
- No realignment or pooling of equipment for efficient use
- Some equipment are not up to date
- Low expertise for new equipment that needs special attention

#### Maintenance

- Limited/no workshops on equipment maintenance
- Poor and unplanned
- No service contracts or policy
- Limited funds and support from administration

#### Disposal

- Determination of equipment for disposal is not clear
- No policy on disposal
- “Disposal highly wanting; process can only discourage you from ever dreaming of getting any grant for research”

Are researchers involved in policy formulation? Only 5% indicated involvement in the formulation process, which is mostly done by administrators and technical staff. “Researchers are left out even if the equipment concerned is for their research activities.”

With regard to institutional performance on equipment use, maintenance and sharing:

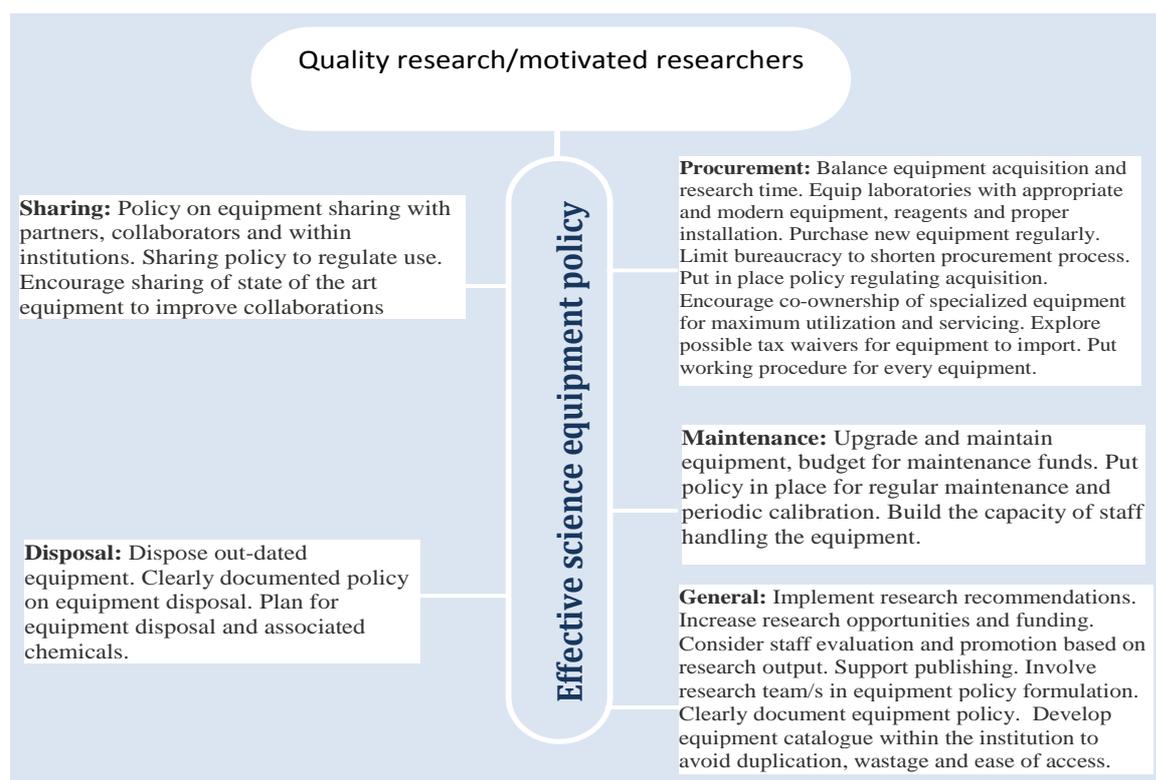
<b>Performance category</b>	<b>Inappropriate use, poor maintenance, no sharing</b>	<b>Appropriate use, poor maintenance, no sharing</b>	<b>Appropriate use, good maintenance, limited sharing</b>	<b>Appropriate use, good maintenance and good sharing</b>
<b>Rating (%)</b>	<b>15.38%</b>	<b>53.85%</b>	<b>21.15%</b>	<b>9.62%</b>

## Why the low rating?

Use (a+ in many institutions)	Appropriate, No emphasis on user training before use. Some old and spares not available. Some got through donation are obsolete and may require a lot of resources to revive. Laboratory environment?
Maintenance	Poor and lack of schedule for maintenance. Limited/weak/no funds for maintenance. No maintenance policy. Limited/no trained personnel to maintain some equipment. "MAITENANCE IS APROBLEM"
Purchase	Duplication; Limited funding for equipment purchase. Procurement process is tedious. Lack of support from administration. <b>Requirements for quality management systems certification has recently improved procurement.</b>
Sharing	No sharing policy/interdepartmental agreements or with other institutions, Fear of misuse. Each department/school protect what is theirs. Some equipment are ONLY used for teaching and learning. Limited equipment hence high level of restriction. Other departments do not know what others have. Any sharing is not well coordinated. Expensive equipment are hardly shared. Research projects are highly isolated. No database within the institution of what is available. High bureaucracy between departments Limited Institutional capacity in operations and monitoring. Fear to share because of security reasons

On the effectiveness of equipment policy influencing research quality, above 90% believe that the influence is medium to high.

What should be the drivers in formulating effective science equipment policy? The motivation that results when a researcher is enabled to carry out quality research (see below).



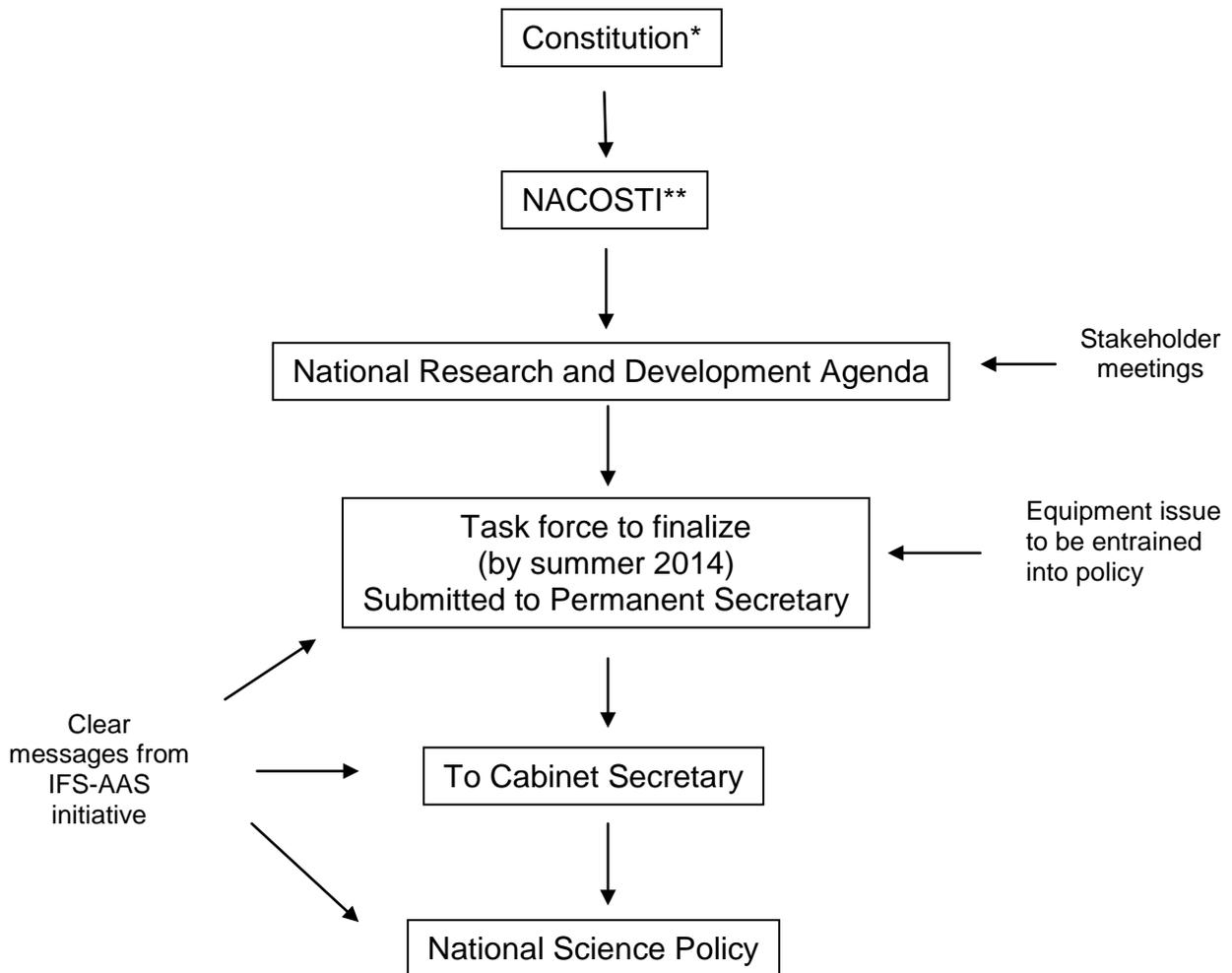
## Further Enrichment to the Country Study

The workshop participants returned to the Country Study Terms of Reference, and collectively added these understandings:

- Existing national frameworks as entry points start with the Constitution of Kenya, and even though it is broad, we need to narrow it down, e.g., to procurement. Kenya's Vision 2020 is another entry point.
- To better understand current national research priorities, review the NACOSTI process and national research and development agenda (documents and CDs were distributed in the workshop).
- Essential guidelines and legislation concerning scientific equipment are to be found in the Procurement Act, though there needs to be attention paid to standardisation and harmonisation. The links among AAS, KNAS and NACOSTI are important.
- It may be helpful to learn about scientific equipment policy precedents in the private education sector.
- Consider case studies of institutions' scientific equipment success stories; embed the costs of, for example, calibration within the ISO budget. In small institutions, participation is easy but how can we empower scientists as a forum of colleagues? We need to be more proactive and ask to be involved.

## Policy Development

Through this project IFS hopes to collaborate with AAS and KNAS, and working within the NACOSTI process, to deliver messages into the following policy process in Kenya:



\* Three agencies (to be) set up under the constitution:

- Kenya National Innovation Agency (KENIA)
- National Commission on Science and Technology (NACOSTI)
- National Research Foundation (NRF)

\*\* Mr Julius Mwangi attended workshop from NACOSTI National Research and Development Agenda 2013-2018

Some headings and key words that could go into a scientific research equipment policy brief are:

- Identification of need: needs assessment process; consultation; justification; policy on sharing approach; budgeting; involvement of scientists; policy on second hand equipment; policy on donations; innovation agenda; inventory of equipment

- Procurement: procurement policy; procurement and/or tender committee; 2005 Procurement Act
- Installation
- Service: budget to include calibration, service contract
- Maintenance
- Use (including sharing): calibration policy; technical competences of technicians; policy on sharing approach; process for logging use; Kenya Bureau of Standards; Kenya National Accreditation Services; accredited calibration companies and bodies; Kenya Technicians and Technologists Board
- Disposal: disposal committee; timing; use of proceeds

In addition, it was noted that there is a need for a “one-stop shop” for identifying and understanding procedures for importing and forwarding scientific equipment.

We will develop a policy brief with a drafting team to include Timothy Njorgde, Julius Mwangi, Perpetua Wanaswa, John Muchiri, David Chiawo, Kenneth Maruti, Jacob Midiwo, Berhanu Abergaz, Samuel Kariuki and Makoba Kizito.

## **Engaging with Regional Policy Makers and Influencers**

Prof Berhanu made these remarks about key project partners and the uptake of equipment policy recommendations at regional levels:

- AAS is a Strategic Partner of the AUC along with UNESCO, ADB, TWAS and the EU and as such is invited to AMCOST meetings. AMCOST is soon to be broadened to include representation from Ministers.
- IFS has a developing relationship with AUC through the Senior Policy Advisor Dr Hambani who is ready to meet IFS next week and to take whatever messages are emerging from the IFS-AAS project.
- The former Consolidated Plan of Action gave rise to NEPAD and the Vision 2063. NEPAD now falls under AUC. The regional economic committees such as SADAC and ECOWAS (there are six in all) are separate but in contact with AUC.
- A key AUC objective is the development of the Pan-African University (PAU) and the creation of its centres of excellence in Kenya, Nigeria, Algeria, Cameroon and southern Africa. AAS is on the council of PAU.

## **Closing Remarks**

Bill: I’m extremely grateful to each and every one of you. I feel humbled. For me this work is about people and relationships starting and growing as we get to know individuals. My joy is to witness that and be a part of it. We live in a funny world and there is not much trust in some places but here we feel free, open and part of a process.

Participant: Something has come out relating to science, that the primary and secondary schools should benefit from.

Perpetua: The primer science kit is a good resource for chemistry, biology and physics.

Timothy: BecA was created in this sector and we are happy to be part of this policy process and happy to provide access to equipment locally in the region.

David: Thanks to this project since it came at a time when IFS alumni were just starting. This is a big voice platform for us. Support us and let's grow.

Renison: Thanks to IFS and AAS for inviting KMRFI as it is the first time we are able to participate and we were motivated by Prof Midiwo's visit. Our water related equipment is unique. We participate with Swedish organizations and trainings have been arranged. We really appreciate grants and support from IFS and appreciate the uniqueness of their help. When you come together in a meeting like this we feel that the world is an interdependent unit.

Nighisty: The positivism that you bring to share is encouraging. IFS shares equipment. We have reviewed this and there is a multiplier effect for so many young researchers.

Berhanu: We appreciate Prof Jacob Midiwo for shouldering a big task in a short time. To the IFS alumni, well done. To Bill and your generosity, timekeeping atmosphere, we thank you. This will give us a stronger footing in Accra and Addis. This is a pilot throughout the continent. In Europe it is not emphasized on what equipment we have but what we did with it. We showed a map of papers produced in collaboration with other countries but there are few lines between African countries. I have known some of you and some are new faces. AAS will be here to stay.

Jacob: We are highly grateful to IFS and AAS. This is a milestone in our evolution. Good science needs good equipment. Thanks to my team and to all who we have invited to this session for your resourcefulness.

## **Workshop Evaluation**

At the end of the workshop, participants were asked to spend a few minutes writing their thoughts on what worked well and what could have been done differently. Their responses are in Appendix 3.

## Appendix 1 Schedule

<b>Day One</b>		
<b>Session</b>		<b>Facilitators</b>
0900-0945	Welcome and introductions by Prof Jacob Midiwo, Dr Graham Haylor and Prof Berhanu Abegaz  Remarks from Kenya National Academy of Sciences	Prof Jacob Midiwo  Prof Kenneth Mavuti, Assistant Secretary of Physics and Biological Sciences, KNAS
0945-1030	Background of the project	Dr Graham Haylor and Dr Nighisty Ghazae
1030-1100	Break	
1100-1230	Presentation and discussion of the Country Study	Prof Jacob Midiwo and members of the Country Study group
1230-1400	Lunch	
1400-1500	Presentation and discussion of survey on scientific equipment policy from user perspectives	Kenya IFS alumni
1500-1530	Discussion of the studies	Mr William Savage
1530-1600	Break	
1600-1700	Discussions on further enrichment to the Country Study	Mr William Savage
Evening	Workshop dinner	

<b>Day Two</b>		
<b>Session</b>		<b>Facilitators</b>
0900-1030	Discussion on policy development	Mr William Savage
1030-1100	Break	
1100-1200	Discussion on engaging with national and regional policy-makers and -influencers	Mr William Savage
1200-1230	Workshop evaluation and closing remarks	Mr William Savage
1230-1400	Lunch	

## Appendix 2 Participants

1.	Prof Berhanu Abegaz	AAS
2.	Noel Abuodha	Kenya National Academy of Sciences
3.	Hosea Akala	KEMRI USAMRU-K
4.	David Chiawo	Strathmore University
5.	Nyaamba Daniel	Kenya National Academy of Sciences
6.	Nighisty Ghezae	IFS
7.	Dr Benjamin Gyampoh	AAS
8.	Graham Haylor	IFS
9.	Dr J O Inyega	Kenya National Academy of Sciences
10.	Luna Kamau	KEMRI
11.	Dr James I Kanya	University of Nairobi
12.	Dr Harrisson C Karisa	NARDTC-MOALF
13.	Samuel Kariuki	Egerton University
14.	KizitoMalaba	CEMASTE A
15.	Prof Kenneth Mavuti	Kenya National Academy of Sciences
16.	Robert Masese	Ministry of Education Science & Technology (MOEST)
17.	Prof Jacob O Midiwo	University of Nairobi
18.	Dr John Muchiri	Kenya Methodist University (KEMU)
19.	Julius Mwangi	National Council for Science & Technology (NACOSTI)
20.	Timothy Njoroge	ILRI
21.	Dr Jane Njuguna	KEFRI
22.	Dr UrsullaOkoth	University of Nairobi
23.	Renison Ruwa	KMFRI
24.	William Savage	IFS
25.	Dorice Situma	KEWI/UON
26.	Perpetua Wanaswa	SEPU

## Appendix 3 Evaluation Responses

[Note: Responses with the same number are from the same person. Dashes ( -- ) signify that this person had no comment.]

### What worked well?

1. Background of the project – information adequate to assist first newcomers to follow through; country study and IFS alumni – stimulated a lot of discussion and was participatory; engaging the process with national and regional agenda – well tackled and led to a consensus on way forward; AAS hospitality commendable; IFS facilitation well done.
2. Facilitated well; off-line discussion led to make better progress; good turnout although many trickled in.
3. The workshop has been conducted excellently with patience, attention and focus. The moderation has been done with efficient body of knowledge that has been commendable. I am satisfied with the way the workshop has been structured to achieve goals.
4. Within the limits of having a workshop, the deliberations were fruitful, insightful, informative and fundamental to the Kenyan situation on scientific equipment policy; friendly and cooperative organizers, facilitators and participants; although time for conducting the scrutiny was short, at least something worthwhile came out of the study.
5. Discussions and responses were healthy and constructive; meeting was flexible and open to floor suggestions; equipment policy inquired from all participants; organization, though short timeframe, was well done, great arrangements; facilitators were informative and informed.
6. Presentations were good and interactive; session well chaired and coordinated; interactive sessions were well coordinated; sessions were on time; representation was good.
7. Focused and well guided discussions; way forward established through task force; relevant participation of individuals and institutions; time managed well, sufficient time for available for discussions; warmth from AAS and IFS team toward the working team; overall good atmosphere.
8. Presentations and discussions of the country study and IFS alumni; discussion and plenary sessions; time keeping; display of names; discussion on policy was good except for the most part; discussion on engaging with policy makers and influencers.
9. Session moderation and wrap up; timekeeping; open discussion and participation; diversity of membership created a good learning opportunity; capturing and immediate consolidation of main points and outcomes of discussions; respect for diverse views.
10. Good flow of program; time management; good meals; facilitator of the program understands his role perfectly well.
11. Venue of meeting and facilities were conducive; facilitation was conducive and well conducted; open participation in the forum was encouraged; wide institutional representation and contributions; meals; clear objectives and desired outcomes.
12. Moderation done well and with no stress; people involved had experience and were involved in national activities; stakeholders well represented; provision of transport and accommodation to participants from outside Nairobi; program adhered to and linked various aspects well; advance preparation by Prof Midiwo's team and IFS alumni teams gave insight into the issues for discussion.
13. –
14. Organization of the workshop; time was well managed; there was a conducive environment for discussions; the workshop was well presented; activities were well managed; in future, more time should be allocated to present the views.

15. Time management; food and meals; relaxed atmosphere.
16. Understanding of equipment issues in Kenya; achieving equipment in sight now; participants' commitment to drive the process.
17. Chairing of the sessions and giving direction of the sessions; keeping to the timetable and the prescribed tasks; organizing how participants from outside Nairobi got to the workshop.
18. Deliberate effort at understanding why there is no equipment policy in national institutions; discussions that will eliminate duplication if equipment is already in the country; the revelation that absence of a maintenance policy could explain they many obsolete but expensive equipment lying idle in institutions.

### **What could have been done differently?**

1. Engagement with institutions – more time should have been allocated to get better responses on institutional policies.
2. Participants list was not provided; on-time starting was not possible.
3. –
4. –
5. Model equipment policy needed to be tabled prior to commencement of the meeting to give the audience clear definition of what they were talking about. This would have guided the thinking; membership – needed to get list of institutions from Nairobi so that all research institutions are gathered timely; at the end of the meeting, an action plan / road map was made. We needed to generate policy to walk alongside the map.
6. Preparation time was short, may be extended next time.
7. Bring KEBS on board; expand working group to include a wider array of institutions, majority from UoN may not represent other universities sufficiently.
8. Policy statements should have been shared before end of meeting instead of leaving them out to committee.
9. Provision for power sockets in meeting room; invitations came late.
10. Daily allowance was low; dinner should have been taken in the neighborhood of AAS to reduce time wastage in Nairobi traffic.
11. Accommodation arrangements – communicate clearly and early, give options to self-arrange accommodation; dinner arrangements within the venue or nearby for easier participation; provide local transport within given zone of the venue to ensure timelines in attendance and start of meetings.
12. Dinner before end of workshop and distant venue – fear of traffic made people not attend; could consider revising for fuel for non-residents, otherwise good effort.
13. Being a well organized environment, perhaps in future you can provide certificates and proper invitation letters; dinner should be organized the last day of the workshop; small work groups should have been presented.
14. –
15. Saturday not a good day for an in-country workshop.
16. Saturday not best day; local transport not covered in per diem; no mention of policy implementation.
17. Nothing I can think of.
18. The group does not seem to have benefitted from practices elsewhere in the world where these policies have worked and how they came into being in the first place.