

Functioning Advanced Scientific Equipment (FAST)

The concept



By Assoc. Prof. Cecilia ÖMAN (2009), Human Rights and Science (RandS), www.rands.se.

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Author: Assoc Prof Cecilia ÖMAN

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Summary

The FAST (Functioning advanced scientific equipment) Concept focuses on the Target partners, thus the scientific institution stakeholders and the suppliers. The Institution stakeholders are provided with Operational plan and Financial plans Guideline. These two documents aim at providing a structure regarding all aspects of equipment management, both concerning operational and financial aspects. The role of the Program partner is to address any constraint that the Target partner may experience and to coordinate stakeholders and activities. The services are compiled in the FAST Support program. The Program partner has the responsibility to ensure face to face Target partner meetings where knowledge is shared and constraints and in-efficiencies are sorted out. The Program partner also maintains the Technologist forum to facilitate collaboration between technicians from different institutions and countries. The Program partner is further responsible for selecting, monitoring and evaluating Agreed suppliers. The Agreed suppliers shall be high quality, reliable suppliers of scientific equipment and related services. Stakeholders with similar mandates may sign a Memorandum of Understanding with the FAST Program partners and thus become Strategic partners. A solid and well organised training program addressing every aspect of concern is managed by the Program partners. Besides the training the program builds and maintains a network of trainers and service staff. The Outcome evaluation planning tool measures whether the support provided by the Program partner enabled the Target partners to procure and manage the equipment. A possible expansion of FAST is to scientific capacity support.

Related documents

1. FAST Operational plan - Guidelines
2. FAST Financial plan - Guidelines
3. FAST Support Program

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1. Background

It is generally agreed that the larger portion of the scientific research performed today, addresses issues that concerns only a minor part of the world's population. It is also obvious that researchers who do not have access to sophisticated scientific equipment cannot compete with those who have, no matter how intelligent, ambitious and hard working. Despite the overwhelming importance of scientific research in the quest for the sustainable development of modern societies, universities and research institutions in many lower income countries continue to suffer from inadequate scientific equipment. At the same time it seems to be a willingness among donor agencies as well as national governments to provide the funding for the procurement, what seems to be lacking is the long-term planning and the coordination around the management of equipment.

Previous study - PRISM

The development of the FAST program has benefitted from the output from the PRISM (Procurement, Installation, Service, Maintenance and Use of Scientific Equipment) pilot project. The PRISM was managed by the International Foundation for Science (IFS) and funded by the MacArthur Foundation. It began with a stakeholder meeting in 2002 in Cameroon, which was followed up by and auditing during 2007 - 2008, and a pilot-project during 2008- 2011, and small follow-up activity in Nigeria in February 2015.

The stakeholder meeting was held in 2002 in Buea Cameroon (Öman and Lidholm, 2002; Öman et al., 2006). The event brought together 50 delegates from universities in eight Western African countries (Benin, Burkina Faso, Cameroon, Ghana, Mali, Nigeria, Senegal, and Togo), four networks (NUSESA, NITUB, SPALNA, and NABSA), two equipment companies (Bruker Biospin SA and DNA Global Projects), and three international development organisations (International Foundation for Science, Organization for the Prohibition of Chemical Weapons and International Science Programme). Yet another five international development organisations were supporting the event financially (Organization of the Islamic Conference Standing Committee on Scientific and Technological Cooperation, Wellcome Trust, Third World Academy of Science, International Center for Theoretical Physics and International Organization for Chemical Sciences in Development). The university delegates represented three different categories of stakeholders; the university management, the researchers, the technologists and technicians. The purpose with the event was to bring the relevant stakeholders together to address the issue of having access to functioning sophisticated scientific equipment in all scientific laboratories all over the world. The stakeholders agreed that the lack of sophisticated scientific equipment constitutes a severe threat to scientific research and that the issue needs large-scale attention. It was also the opinion of the meeting that positive changes will depend on a committed participation of all relevant stakeholders, on strong backing from national authorities, and on international cooperation. The meeting was hosted by the Buea University and managed by the International Foundation for Science.

As a follow-up to the stakeholder meeting in Buea 2002 an audit of the equipment status at 15 universities in Africa was performed during 2007 – 2008. The purpose was to identify the actual reasons for the lack of functioning scientific equipment at university laboratories. It was concluded that a large portion of the equipment that had been procured could not be

used. In total 563 pieces of equipment were audited, of which 42 % were not functioning (Öman et al. 2008). For the more sophisticated equipment, the FTIRs, GCs, HPLCs and microscopes more than 50% of the items could not be used. The main reasons for the equipment not being used was they were; not installed, broken down or obsolete. The broken down equipment could not be repaired due to; lack of spare parts, lack of technician with the appropriate training, or lack of contact with a professional service unit. The survey also showed that there was no firm policy in place for long-term equipment service and maintenance at any of the audited universities. The 15 universities had good records of scientific achievements and had skilled researchers and research students with strong ambitions to perform high quality research. It seemed that the levels of scientific achievements were directly related to the standard of the scientific physical infrastructure in combination with the scientific tradition in the countries where the universities were located. The constraints were compiled, describe in detail and analysed. Relevant and important scientific projects were on-going and it was concluded that all the 15 universities would have the potential to enhance their scientific capacity and make effective use of a scaled-up scientific equipment base. It was thus concluded that the scientific capacity would be strengthened if efforts were made to increase the access to functioning scientific instrument in the audited countries. It was assumed that the same conclusion could be drawn also for other countries with less strong scientific physical infrastructure.

It was agreed to develop an equipment management strategy addressing the constraints that had been compiled during the auditing. It was further agreed to implement the strategy in actual practice at seven scientific institutions in Africa. The purpose was to develop procedures that addressed all the identified constraints. The pilot project was run during 2009 – 2011 and the seven scientific institutions were the Ahmadu Bello University (ABU), the Bayero University (BUK), the University of Ibadan (UI), the University of Port Harcourt (UNIPORT), the National Institute for Pharmaceutical Research and Development (NIPRID) in Nigeria and the University of Antananarivo (UA) and the Institut Malgache de Recherches Appliquées (IMRA) at Madagascar. Real-time evaluation planning was performed according to the Outcome mapping method (Earl, S., et al., 2001). It was concluded from the pilot project that the PRISM strategy was very useful, and the laboratories experienced progress as compared to before PRISM. To support the new equipment strategy, the Nigerian stakeholders registered an association in Nigeria in 2013; the PRISM Scientists Association of Nigeria (PSAN). PSAN was hosted by NIPRID which provide an office and a desk officer. An advocacy meeting was held the same year to share information about the PRISM Program in Nigeria. The registration of PSAN and the advocacy meeting in Nigeria was managed and funded by the National Institute for Pharmaceutical Research and Development (NIPRID) in Nigeria. In 2015 a new stakeholder meeting was held in Nigeria. The purpose was to survey the outcome of the PRISM project at the five Nigerian Institutions and to provide additional support in case the equipment was not functioning as planned. It was found that additional constraints had been experienced in terms of delivery, installation and servicing. The Strategy was thus again, revised and improved and a report compiling the experiences from the five institutions compiled.

Objectives

Thus, objective with the FAST program is to propose and coordinate procedures that facilitate for scientific institutions to have access to functioning advanced scientific equipment. The overall objective is to strengthening the scientific capacity and the implementation of scientific results in and from countries with weak scientific infrastructure.

2. The FAST Concept components

The FAST concept addresses selection, laboratory preparation, procurement, transportation, custom clearance, delivery, installation, calibration, quality assurance, training, use, maintenance, servicing, decommissioning and evaluation planning of advanced scientific equipment.

The partner categories

Three different types of Partner have been defined for the FAST Program; the Target partners, the Program partners and the Strategic partners.

The Target partners

The Target partners are the stakeholders who are responsible for implementing the operations and who thus have the ownership of the program. The Target partner Institutions are responsible for the implementation of the Operational and Financial plan.

The Target partners within the FAST program are the:

- i) Scientific institution management
- ii) Researchers
- iii) Technicians /technologists
- iv) Suppliers.

The Program partner

The Program partners shall address any constraint that the Target partner may experience, as well as stream-line activities that are preferably addressed in a coordinated manner. In the FAST program the Program partners provides facilitation services to the Target partners according to the FAST Support program.

The Strategic partners

The strategic partners represent stakeholders with similar objectives as the FAST program objectives and with whom the program develops a partnership.



Figure 1. The FAST Concept: the Target partners are provided different types of support from the Program partners.

Target partner meetings

The Program partner has the responsibility to ensure face to face Target partner meetings where knowledge is shared and constraints and in-efficiencies are sorted out. One of these occasions are the, Annual FAST Conferences are arranged for all members where program and financial reports and plans are discussed and agreed on. Sessions are arranged where the target partners meet. The PP maintains the Technologist forum to ensure close contact between technologist from different institutions and countries.

The Technologist (in Nigeria) /Technician Forum is a formal network of Technologists / Technicians. The Program Partner shall facilitate (but is not responsible for) the T-Forum meetings, lab visits, IT communication, promoting career paths and trainings.

The Operational and Financial plans (O&F) plans

The constraints identified during the auditing was operationally compiled and translated into two documents the FAST Operational plan Guideline and the FAST Financial plan Guideline, the O&F plans. The plans consist of a sequence of operations that should guide the institution through all aspects of equipment management as well as the related financial consequences both in terms of costs and financial revenue. The plans were composed in a way to be useful for the scientific Institution stakeholders. Thus the O&F plans are meant to be a tool that can facilitate the procedures and the coordination at the Institutions. Thus implementation of the O&F plans is the responsibility of the Institutions when it comes to FAST operations. The Institutions also monitor and evaluate the equipment performance and

compiles the results. The Operational and Financial plan Guidelines are distributed broadly and freely.

Agreed supplier

A primary task of the Program partner is to advise members on high quality, reliable suppliers of scientific equipment and related services. For this purpose, the Program partner has established a processes and criteria for the selection of qualified suppliers – so called Agreed suppliers. In order to ensure a safe and efficient procurement of scientific equipment, members are advised by the Program partner to select their final supplier among the Agreed suppliers. The operational task for assessing and selecting the Agreed suppliers is delegated to the FAST National Office.

Training program

A solid and well organised training program addressing every aspect of concern is managed by the Program partner. Besides the training the program builds and maintains a network of trainers and service staff. The trainings addresses equipment and laboratory oriented issues including; i) maintenance, ii) service, iii) general operation, iv) advanced applications and v) quality assurance. The trainings can be arranged on-site and at national training centers or abroad and be provided by the manufacturers, the suppliers, equipment experts and trained trainers. Training and coaching is also offered on the O&F plans. FAST generally supports visibility, knowledge sharing and networking.

Strategic partners

The program shall support National development programs in the country of operation. To address this it is necessary to partner up with national authorities. Stakeholders who sign a Memorandum of Understanding with the FAST National office will become Strategic partners to FAST. Other strategic partners are manufacturers, donor organisations and stakeholders with similar programs.

Outcome evaluation planning

The ownership and operational responsibility is with the Target partners. It is the Institutions that perform equipment performance monitoring and evaluation. The responsibility of the Program partner is to provide the mean necessary for the Target partner to manage the operations according to the intentions and the agreement between the partners. The Outcome evaluation planning tool measures whether the support provided by the Program partner enabled the Target partners to procure and manage the equipment well. The evaluation planning is managed by the Program partner and includes aspects as:

- Compilation of outcome challenges.
- Development of progress markers and scoring.
- Development of strategy map and activity plan.
- Monitor, evaluate and adjust the FAST program according to lessons learnt.

Details can be found in the FAST Support Services document.

Support programs

Complementary to the O&F plans another concept was developed, the FAST Support programs. The program represents a set of facilitation activities that the Institutions can buy into if they themselves consider that they would benefit from an external facilitation of the O&F plans.

3. Science for development

A possible expansion of FAST would be to include also general scientific capacity support as well as support with the implementation of scientific results. The scientific capacity strengthening program can address; grant seeking, scientific method and publishing training and coaching. The implementation of scientific results support can include round table before and after research with policy makers, private sector, public and media as well as the facilitate is starting and managing business.

4. Acknowledgement

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The development of the FAST program has benefitted from the output from a pilot project PRISM (Procurement, Installation, Service, Maintenance and Use of Scientific Equipment) managed by the International Foundation for Science (IFS) and co-managed by seven universities in Africa; Ahmadu Bello University (ABU), Bayero University (BUK), University of Ibadan (UI), University of Port Harcourt (UNIPORT), National Institute for Pharmaceutical Research and Development (NIPRID) in Nigeria, together with the University of Antananarivo (UA) and Institut Malgache de Recherches Appliquées (IMRA) at Madagascar. The PRISM pilot project was funded by the MacArthur Foundation with a minor supplementary funding from TETFund and the National Institute for Pharmaceutical Research and Development (NIPRID) in Nigeria. The seven scientific institutions that were part of the pilot study are especially appreciated for having stretching beyond expectations to make the pilot project successful.

Appendix

Abbreviations and expressions

GLP	Good Laboratory Practices
O&F Plans	Operational and Financial plans
PP	Program partner
Program partner	The FAST National partnerships and their executive units
FAST	Functioning Advanced Scientific Equipment
Target partner	The program has four target partners; the Institutional management, Researchers and students, Technologists and technicians; and the Agreed suppliers
SOP	Standard Operational Practices
Technologists	Operates in Nigeria
T-Forum	Technologist / Technician Forum
TP	Target partner

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