v.1.02

Ensuring access to Functioning Advanced Scientific Equipment (FAST)

The concept

By Assoc. Prof. Cecilia ÖMAN
CEO/Founder Human Rights and Science (HR&S)
www.humanrightsandscience.se.

Summary

The FAST (Functioning advanced scientific equipment) programme addresses the access to advanced scientific equipment at scientific institutions in lower income countries. The HR&S offers coaching in the management of the equipment including; selection, laboratory preparation, transportations, installation, training, quality assurance, use, good laboratory practice, maintenance, repair, decommissioning, institutional capacity, sustainable economy, outcome evaluation planning, cross-cultural partnership, ethics, expectations, long-term planning and core values. The coaching focuses on the scientific institution stakeholders; the management, the researchers and the technicians, as well as the equipment suppliers, the Target partners. 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 Programme partners (HR&S with partners) is to address any constraint that the Target partner may experience, to coach stakeholders and coordinate activities. The services offered by HR&S are compiled in the FAST Support programme. The Programme partners have the responsibility to ensure face-to-face Target partner meetings where knowledge is shared and constraints and in-efficiencies are sorted out. The Programme partner also maintains the Technologist forum to facilitate collaboration between technicians from different institutions and countries. The Programme 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 Programme partners and thus become Strategic partners. A solid and well organised training programme addressing every aspect of concern is also managed by the Programme partners. Besides the training the programme builds and maintains a network of trainers and service staff. The Outcome evaluation planning tool measures whether the support provided by the Programme partner enabled the Target partners to procure and manage the equipment. The FAST programme can be extended to also include other scientific capacity strengthening activities (www.humanrightsandscience.se).

The expected output from FAST is the development of a Central laboratory that; i) provides the required equipment to achieve quality research output for the university, ii) offers a platform for high quality collaboration with other universities, iii) generates income to the university, and iv) acts as a Centre of excellence for the government and the private sector. The support packages can be tailor-made to address any constraint experienced by any University. HR&S operates in Target countries at a cost of 15,000 € per week for 1st week and 10,000 € for consecutive weeks per person. Each visit is prepared by HR&S country advisers at a cost of 2,000 € per adviser.

Related documents

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

Table of content

1. Introduction

It is a common knowledge that the larger portion of the scientific research performed today, addresses issues that concerns only a minor part of the world´s population. 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. It is also common knowledge that researchers who do not have access to advanced scientific equipment cannot compete with those who have, no matter how intelligent, ambitions and hard working. According to the HR&S Founder, there seems to be a willingness among donor agencies, development banks and national governments to provide the required funding for the procurement of scientific equipment for lower income country scientific institutions, what seems to be lacking is the firm management of the equipment.

Thus, the specific objective with the Functioning Advanced Scientific Equipment (FAST) programme is to offer support with arranging a structure that facilitates for scientific institutions with weak scientific infrastructure 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 lower income countries.

2. The FAST Concept components

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

The partner categories

Three different types of Partner have been defined for the FAST Programme; the Target partners, the Programme 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 programme. The Target partner Institutions are responsible for the implementation of the Operational and Financial plan.

The Target partners within the FAST programme are the:
- Institution top management,
- Researchers requesting access to advanced scientific equipment,
- Technicians managing that equipment,
- Agreed suppliers, thus the suppliers that have been assigned by the manufacturer to represent them and who in addition prove quality performance.

The Programme partners

The Programme partners are the Human Rights and Science and collaborating institutions in

the Target country. The Programme 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 programme the Programme partners provides facilitation services to the Target partners according to the FAST Support programme.

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

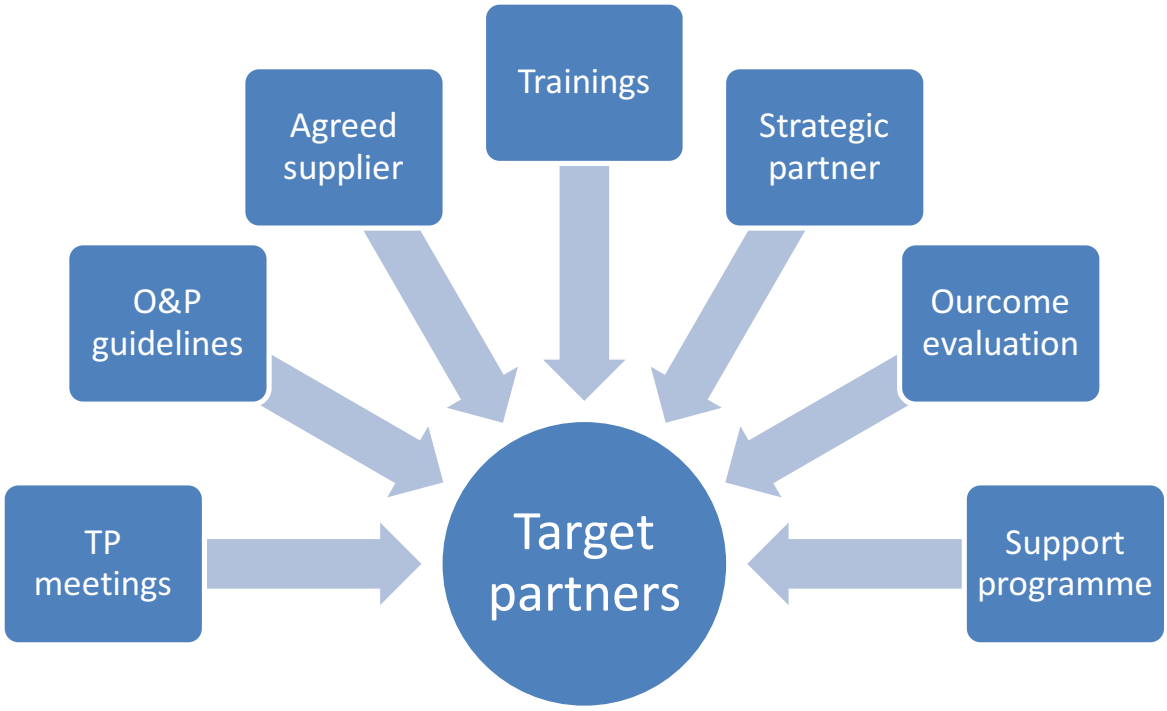

Figure 1. The FAST Concept: the Target partners are provided different types of support from the Programme partners.

Target partner meetings

The Programme partners have 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 is the Annual FAST Conferences, that are arranged for all members and where programme and financial reports and plans are discussed and agreed on. Side conference sessions are arranged where the Target partners meet and reflect over special issues of relevance. The Programme partners also maintain the Technologist forum to ensure close contact between technologist from different institutions and countries.

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

The Operational and Financial plans (O&F) plans

The constraints identified with equipment management during an auditing of fifteen universities in Africa, were compiled and translated into the FAST Operational plan Guideline and the FAST Financial plan Guideline, the O&F plans. The plans consist of a sequence of operations that shall guide the scientific institution stakeholders through all aspects of equipment management as well as the related financial matters. The implementation of the O&F plans is the responsibility of the Institutions, and the procedures can be coached by the Programme partner HR&S. The Institutions also monitor and evaluate the equipment performance and compiles the results.

Agreed supplier

A primary task of the Programme partner is to advise FAST Institutional members on reliable and professional suppliers of scientific equipment and services. For this purpose, the Programme 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 Programme 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 programme

A solid and well organised training programme addressing every aspect of concern is managed by the Programme partner. Besides the training the programme 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 centres 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 programme shall support National development programmes 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 programmes.

Modes of management

The successful implementation of the FAST programme at scientific institutions is dependent on the commitment of the Institution top management. According to the FAST programme the Institution top management is one of four Target partners. Thus, the Institution top management shall appoint representatives to be part of the Institution FAST committee. The Institution FAST committee will meet during a few days a few times a year, and tasks will be assigned by the Target partners to all Target partners during the meetings. The FAST

program uses the “flat management” model, where all stakeholders meet regularly, share openly, and agree on ways forward together. The HR&S facilitates the meetings.

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 Programme 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 Programme partner enabled the Target partners to procure and manage the equipment well. The evaluation planning is managed by the Programme partner and includes aspects like:

- Compilation of outcome challenges.
- Development of progress markers and scoring.
- Development of output maps and activity plans.
- Monitor, evaluate and adjust the FAST programme according to lessons learnt.

Support programmes

Complementary to the O&F plans are the FAST Support programmes. The FAST Support programme is a set of coaching and facilitation activities that the Institutions can buy into if they themselves consider that they would benefit from an external coaching of putting an equipment management structure in place. The support packages can be tailor-made to address any constraint experienced by any University. The expected output from the FAST support programmes are the development of a Central laboratory that; i) provides the required equipment to achieve quality research output for the university, ii) offers a platform for high quality collaboration with other universities, iii) generates income to the university, and iv) acts as a Centre of excellence for the government and the private sector. HR&S operates in Target countries at a pre-agreed cost per week and per person and provides a quotation upon request. Each visit is prepared by the HR&S country advisers.

3. Acknowledgement

The FAST programme was developed by Assoc. Prof. Cecilia Öman, CEO / Founder of Human Rights and Science. She is grateful for the support provided by friends and colleagues all over the world, especially Prof. Karniyus Gamaniel, Dr. Sune Eriksson, Dr. Amah Klutsé, Prof. Charles Aworh, Prof. Ado Dan-Issa, and Prof. Thomas Roswall. Cecilia also wants to acknowledge the extraordinarily support by stakeholders at the Ahmadu Bello University (ABU), Bayero University (BUK), University of Ibadan (UI), University of Port Harcourt (UNIPORT), and National Institute for Pharmaceutical Research and Development (NIPRID) in Nigeria, as well as the University of Antananarivo (UA) and Institut Malgache de Recherches Appliquées (IMRA) at Madagascar. These seven scientific institutions are appreciated for having stretching beyond expectations to develop and implement the FAST programme.

Appendices

Appendix 1.
Abbreviations and expressions

GLP	Good Laboratory Practices
O&F Plans	Operational and Financial plans
PP	Programme partner
Programme partner	The FAST National partnerships and their executive units
FAST	Functioning Advanced Scientific Equipment
Target partner	The programme 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

Appendix 2.
The pilot project

The development of the FAST programme has benefitted from the output from the PRISM (Procurement, Installation, Service, Maintenance and Use of Scientific Equipment) pilot project. The PRISM pilot project was initiated, designed and managed by Assoc. Prof. Cecilia ÖMAN, hosted by the International Foundation for Science (IFS) and funded by the MacArthur Foundation with supplementary funding from TETFund in Nigeria and the National Institute for Pharmaceutical Research and Development (NIPRID) in Nigeria. The pilot project was initiated by a stakeholder meeting in 2002 in Cameroon, was continued with an equipment audit during 2007 - 2008, an implementation project during 2008- 2011, and stakeholder meeting in Nigeria in 2015.

The first stakeholder meeting was held in 2002 at the Buea University in Cameroon (Öman and Lidholm, 2002; Öman et al., 2006), an event which 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 meeting was hosted by the Buea University. The university delegates represented three different categories of stakeholders; the university management, the researchers, and the technologists/technicians. The purpose with the event was to bring the relevant stakeholders together to reflect over the issue with having access to functioning advanced scientific equipment in all scientific laboratories in all countries. The meeting concluded that lack of advanced scientific equipment constitutes a sever threat to scientific research and that the issue needs large-scale attention. It was also stated by the meeting that any positive change would depend on a committed participation by all relevant stakeholders, on strong backing from national authorities, and on international collaboration.

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 were 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 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 form the pilot project that the strategy was very useful, and the laboratories experienced progress as compared to prior to the pilot project.

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 equipment pilot project 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 stakeholder meeting was held in Nigeria, with the purpose of surveying the outcome of the pilot 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 FAST programme was thus again, revised and improved.

References

Brundin, C., (2014) Ownership and Equal Partnership, A study of donor-receiver relationships in two development programmes in rural Togo. Independent Research Project in Political Science, International Master's Programme in Political Science, Department of Political Science, Stockholm University.

Earl, S., et al. (2001) Outcome Mapping; Building Learning and Reflection into Development Programmes. I. D. R. C. (IDRC). Ottawa, Canada.

ITAD Ltd (2010) Evaluation of the Sida institutional support to the Stockholm Environment Institute (SEI) as member of the evaluation team. Report. www.itad.com

ITAD Ltd (2012) Evaluation of the FAST (Procurement, Installation, Service, Maintenance and Use of Scientific Equipment) project in Nigeria. Report, ITAD Ltd, East Sussex, UK. http://www.ifs.se/IFS/Documents/Publications/Evaluations/2012%20IFS-FAST%20Evaluation%20Report.pdf

McKinsey. (2001) Effective Capacity Building in Nonprofit Organizations. Prepared for Venture Philanthropy Partners.

Öman, C. and Lidholm, J. (2002) Eds. Purchasing, servicing and maintenance of scientific equipment in Western Africa. International Foundation for Science, Stockholm, Sweden, info@ifs.se.

Öman, C. B., K. S. Gamaniel, et al. (2006). Properly functioning scientific equipment in developing countries. Anal Chem 78(15): 5273-6.

Öman, B. C., Edward, R., Gamaniel, K.S., Klutsé, A., Eriksson, S., Hovmöller, H., Feresu, S., Gurib-Fakim, A. (2008) Procurement, Installation, Service and Maintenance Commitments for Scientific Equipment in Developing Countries – PRISM, Phase One, Inventory of the current status of equipment and scientific infrastructure at selected universities in Africa and specification of what additional resources would be instrumental in strengthening scientific capacity. International Foundation for Science, Stockholm, Sweden, info@ifs.se

Öman, C. B. (2009 a). The Ten Actions (Tact). Report. Action10, Stockholm, Sweden. www.Action10.org. HR&S, Stockholm, Sweden, www.humanrightsandscience.se.

Öman, C. B. (2009 b). Real-time Outcome Planning and Evaluation (ROPE) Programme Journal DESIGN. Template with Guidelines, Action10, Stockholm, Sweden. www.Action10.org. HR&S, Stockholm, Sweden, www.humanrightsandscience.se.

Öman, C. B. (2009 c). Real-time Outcome Planning and Evaluation (ROPE) Programme Journal EVALUATION. Template with Guidelines, Action10, Stockholm, Sweden. www.Action10.org. HR&S, Stockholm, Sweden, www.humanrightsandscience.se.

Öman, C. B. (2015a). The FAST Concept. Report. HR&S, Stockholm, Sweden, www.humanrightsandscience.se

Öman, C. B. (2015b). FAST Financial plan, Guidelines. HR&S, Stockholm, Sweden, www.humanrightsandscience.se.

Öman, C. B. (2015c). FAST Operation Plan, Guidelines, HR&S, Stockholm, Sweden, www.humanrightsandscience.se.

Öman, C. B. (2015d). FAST Support programmes, Guidelines. HR&S, Stockholm, Sweden, www.humanrightsandscience.se.