

Emerging Issues in Developing Countries

This series seeks to inform readers, explore new ideas, and promote discussion on themes related to developing countries and emerging analytical communities. To contribute to this series, contact Series Coordinator Jan-Åke Jönsson <jan_ake.jonsson@analykem.lu.se>. Articles in this series are available from <www.iupac.org/publications/ci/indexes/emerging-issues.html>.

Maintenance of Scientific and Technical Equipment—Challenges Faced by African Institutions

by Dzenko Mzengeza

Scientific equipment is essential for performing research, education, and quality assurance services, as well as for allowing sustainable development and output to take place. Equipment should be functional and well maintained, and users should be trained on how to operate and care for it.

A survey* carried out by the International Foundation for Science in 2002 revealed that a major constraint on the output of research in Africa has to do with equipment problems. This paper analyzes the present situation and suggests some strategies that can be adopted to improve it.

Situation Analysis

Problems related to equipment are varied and may include procurement and purchasing procedures, installation, servicing and repair, spare parts, new technology, training, users, researchers, administra-

tors, donated equipment, suppliers, agents, custom duties, and institutional policies.

- **Procurement and purchasing procedures**

Procurement and purchasing of equipment in many institutions is not properly coordinated, often resulting in equipment being bought that cannot be used because of a lack of space or incorrect specifications. In addition, individuals with appropriate expertise are not always available to use, support, or service the equipment. The situation is further compounded by difficult bureaucratic procedures that often hamper efficient procurement.

- **Researchers**

Some researchers lack basic information concerning the best type of equipment to use—but often don't want to admit their ignorance. Catalogs may be unavailable or outdated, and “prestige pieces” are sometimes chosen rather than those that are most appropriate to an institution's scientific and educational needs.

- **Technical personnel**

Many institutions have technical personnel who are responsible for the operation and maintenance of scientific equipment and who support the academics and researchers. Technicians tend to be less qualified today than they were in the past, resulting in substandard performance. To make matters worse, after joining an institution, new technicians often receive little organized training and, perhaps as a result, often seem poorly motivated.

- **Administrators**

Institution administrators have the prime responsibility for decision making. They approve budgets, allocate funds for new equipment, and are responsible for paying for it. However, equipment problems seem to fall low on the priority list, as seen by a lack of institutional policies guiding the procurement and

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* Gaillard, J., M. Hassan, and R. Waast in collaboration with D. Schaffer. “Africa: Status of Science.” In *UNESCO Science Report 2005*, UNESCO, Paris, France, 2005, pp. 182-194.

use of equipment, an absence of staff training on the equipment, and an absence of any systems for replacing, retiring, or donating obsolete equipment. There is need for institutional planning related to the allocation of equipment resources that can take into account the short- and long-term needs of the institution.

- **Donors and donated equipment**

The majority of the equipment in educational and research institutions in the developing world has been donated. Unfortunately, a lack of coordination at the institutional level regarding donated equipment means that some equipment is underutilized—even though a need for it exists. In many instances, donors do not even involve local staff in selecting the specifications for equipment, instead giving the responsibility to overseas procurement agencies.

- **Equipment manufacturers, suppliers, and agents**

Local suppliers and agents usually charge more than overseas suppliers do, but yet may not be adequately equipped to give good back-up service. Some local agents act as agents for different equipment and therefore tend to neglect the equipment from which they are getting the least income. In addition, many local suppliers are inadequately staffed and cannot meet all of their customers' demands, prioritizing the needs of their regular customers and ignoring the rest.

Overseas suppliers often neglect the market in developing countries because it is considered to be very small. Accordingly, they rarely design equipment suited to the hot and humid conditions typical of developing countries. What's more, overseas suppliers rarely give local suppliers the training that would allow them to adequately maintain equipment. As a result, local agents and suppliers struggle to find and retain skilled maintenance and service employees.

Conclusion and Recommendations

There is an urgent need to address equipment problems if we are to see improvement in research and education in developing countries. There are no easy solutions; some of the problems discussed here are



deeply rooted in the cultures of people and organizations, and many organizations seem to have priorities that don't include equipment problems. Nonetheless, here are some recommendations for improvement.

- **Acknowledge the problem**

These problems must be recognized, and those in power—including donors, institutions, and government representatives—must be willing to address them.

- **Develop and implement equipment policies**

Policies should be put in place to facilitate the efficient, effective procurement and use of equipment.

- **Encourage and support thematic networks and centers of excellence**

Doing so will encourage the sharing of ideas and strategies for solving common problems.

- **Encourage and support training programs**

Educational and research institution should learn from industry and invest in regular training programs for their laboratory staff related to lab management and the use, maintenance, and repair of equipment.

Dzengo Mzengeza <mzengeza@nusesa.org> is secretary general for the Network of Users of Scientific Equipment in Eastern and Southern Africa (NUSESA), P.O. Box 255, Kasselsvlei 7533, Cape Town, South Africa. Tel: +27 21 959 3327; fax: (27) 21 959 3311