

Assessment of Sida's Support to the Basic Sciences in a National Context

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**Department for Research
Cooperation**

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Sida Evaluation 02/10

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Cooperation**

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Evaluation of Sida's Support to the Basic Sciences in a National Context

Subject description: The aim of evaluation is to find out to which extent four Sida-supported programmes (ISP, TWAS, TWOWS and ICTP) have contributed to capacity building in basic sciences in the faculties of science at the University of Dar Es Salaam and Makerere University.

Evaluation methodology: The main information was obtained by study visits to the programmes and the universities. Information was also obtained through answers to questionnaires. In a workshop in Kampala, 29-30 of April 2002 the future development of fundamental sciences at the two universities was discussed by all invited stakeholders.

Major findings: The impact of the programmes in building faculty capacity in fundamental research has been very modest. The programme-financed activities have mostly been directed towards applied research. There is a clear risk that as the ageing staff at the two universities is replaced, the new young staff will not have adequate knowledge in fundamental concepts, methodology and experimentation. This will decrease their possibility to contribute to new technical and scientific innovations, and thus widen the gap to the industrialised countries.

Lessons learned: A new initiative is needed at the two faculties, which makes them the true owners of fundamental as well as applied research. The programmes should assist the faculties in developing the necessary capacity and infrastructure.

1 Findings and Recommendations

In the sections below the main interest will be focussed on the activities of the four programmes at the University of Dar es Salaam and Makerere University. However, all the programmes are active in many other countries, and therefore it is also of interest to mention some of their characteristic features in a more general perspective.

In the first section we will summarise the main findings, but other findings will also be mentioned in the following chapters (2–4). In the text below the abbreviations for the programmes will be used, namely:

- ICTP – the Abdus Salam International Centre for Theoretical Physics
- ISP – International Science Programme
- TWAS – Third World Academy of Sciences
- TWOWS – Third World Organisation for Women in Science
- IPPS – International Programme in Physical Sciences
- IPICS – International Programme in Chemical Sciences

Fundamental, Directed/Motivated and Applied Science have meanings as defined at the Joint Programmes Meeting in Trieste in June 2001. (See Section 2.1.1)

1.1 Main Findings

1.1.1 Findings concerning the activities of the four programmes

Scientific focus of the programmes:

- A major finding of general character is that there is little programme support for fundamental research, which aims at developing the basic scientific areas as such. A large part of the grant application to and support from ISP, TWAS and TWOWS is for directed fundamental research and applied research. For ICTP the support involves new areas of fundamental physics and mathematics, and ICTP has therefore a fair contribution of fundamental science.
- The evaluation team sees a clear risk that the lack of development of fundamental knowledge in developing countries in mathematics, physics, chemistry, biology and geosciences may widen the gap between the developing and the industrialised countries. (See chapter 2.1.2 for motivation and discussion.)
- In order to decrease the risk of depletion of knowledge in fundamental areas of basic sciences in the two universities a co-ordinated effort from donors and the four programmes with special emphasis on support to fundamental science at Makerere University and the University of Dar es Salaam is needed. (See chapter 4)

Impact of the programmes on the two universities:

- The support to and impacts of the programmes on departments in the Faculties of Science at the two universities have been negligible except for the Physics Departments.

- The impacts of IPPS have been greatest on the research groups and on departments with, e.g. the acquisition of equipment and instrumentation and training of staff and students. At the faculty level, however, these achievements have not translated into development of new postgraduate fundamental science courses. The impact on institutional capacity building has been very modest.
- The support and impact of IPICS at the two faculties has been small and consists mainly in network support.
- Very few faculty members and postgraduate students from the two institutions have participated in the ICTP and TWAS programme activities.
- In general, some knowledge of the four programmes was reported in most departments. Yet, very few applications were received from the institutions to advertised programme activities.
- Lack of young staff and postgraduate students who would be motivated to participate in the programmes activities were given as reason for low participation.
- Another reason might be the lack of information and communication between individual researchers and between mature researchers and new prospective postgraduate students.

Gender:

- Female PhD students from the two universities have benefited most from TWOWS fellowship compared to other programmes. Women have in general benefited very little from other programmes activities, e.g. IPPS and ICTP. In an international perspective some of the programmes have had an increased participation from female scientists in recent years, due to an increased awareness of gender issues (See appendices 3b and 3c).
- Biological and chemical sciences attracted most women applicants in TWOWS grants. There is much less interest from female academics in physical sciences. This trend is similar to that in many industrialised countries, although there are differences between different nations (for example between Sweden and Poland).
- There is need for special initiatives from ICTP and IPPS at the two universities to increase the participation from females in their programmes. This could be done through positive action by offering upgrading courses, special programmes by the faculties at selected secondary schools, or combinations of proven gender promotion activities.

Organisation, recruitment and structure:

- ISP gives long-term support to research groups. ISP research projects at the two universities have often been chosen in discussion with the departments, and been approved – but not initiated – by the faculties and university leadership. Research group leaders have been nominated by the departments. On one occasion initial contracts were established between ISP/IPICIS and an individual researcher, followed by discussion with the department. When opening up for new groups, there is no open advertisement but selected departments at selected universities are approached. While ISP expects the university to put in place a selection process for team leaders and fellowship holders, the two Deans of Faculty of Science stated in their response to the questionnaire that the Faculty was not involved in the process. (See also appendices 12 a and b).

- The TWOWS, TWAS and ICTP activities include one-time grants, training courses and workshops where individual researchers are invited to apply. The recruitment process at TWOWS, TWAS and ICTP is open, transparent and democratic, and in accordance with best practise. The number of applications for the three programmes is very large, and there is a considerable competition among the researchers.
- The programmes have not formally assisted the two universities in building capacity to procure equipment, manage and administer research projects. These tasks have mainly been done by the programmes themselves, but the responsibility for this has been gradually transferred from the programmes to the research groups. Purchase of spare parts and/or equipment has often been done by programmes. The present procedure has led, in some instances, to enormous delays in custom clearance of shipped equipment and spare parts since the university had not planned for payment of duty and taxes.
- While necessary in solving national problems, support of institutions outside the universities (as given by ISP) has drawbacks in inability to sustain the same level of quality once the support by the programmes is withdrawn. There is need for a clear understanding with the Ministry of Health, Tanzania and Geological surveys Department in both countries in order to maintain the institutions supported by ISP.
- Lack of local travel funds were given as reason for non-attendance of ICTP activities. Similarly, low daily subsistence allowance (DSA) given to participants de-motivated the researchers. Limitations of photocopy facilities, books and postage allowance were also cited as reasons for non-attendance at programme activities. Lastly, insensitivity to different cultures was also mentioned.
- At no institution did we find a full knowledge of all the ICTP and TWAS activities. There is need for a visit by an official of ICTP and TWAS to the universities to explain their programmes and activities.
- Research groups with very few senior members are highly vulnerable. One person led research groups – as supported by some of ISP activities – should be discouraged. We found one case where after the death of the team leader the project could not function properly.
- Most postgraduate training supported by the programmes has involved periods of training in the Northern Hemisphere institutions under sandwich arrangements. No evidence was given of high brain drain. The presence of the students in the home laboratory has contributed to the development of human and infrastructural capacity and capability in the supported research groups.
- Furthermore, more graduate students with Upper Second Class or better degrees could have been trained by the respective universities, if training had been done in the South with the same amount of funding. Visits to Northern universities cannot be completely avoided. However, consideration should be given to further uplifting education quality and standards of southern universities.
- Sida/SAREC grant contracts give general guidelines on how funds will be used. The responsibility on how and where to use the funds and for what purpose is a decision of the programmes.
- Evidence was given that Sida/SAREC funds have supported scientists from countries that are not considered least developed or developing by UN categories.

1.1.2 Findings concerning the activities at the two universities

- Both universities have established structures for management and administration of postgraduate training and research.
- The faculties of science have postgraduate programmes leading to the award of MSc and PhD degrees.
- The decision making process for selection and research funding of prospective postgraduate students needs improvement in order to enhance efficiency and quick response.
- There is no government support for postgraduate students in either of the two universities. Support to students relies on donor funds or self-sponsorship. This decreases drastically the number of students undertaking postgraduate work, and has severe implications for the fundamental areas of science on which future applications and technology build.
- Very few pure fundamental research projects devoted to development of science are undertaken at the two institutions. Donor and political directed funding has caused most research activities to be in the applied fields.
- Most departments have basic functional equipment to undertake research. Some have connectivity to Internet, while some departments at Makerere University are not connected internally and externally.
- There are needs for specialised research equipment in most departments. The establishment of support service laboratories with expensive equipment used by many needs to be further explored and established as needed at both universities.
- Several departments requested specialised expensive equipment. Consideration should be given to purchase equipment that may be used by a critical mass of staff.
- There is a great potential in doing qualified fundamental research at the two universities. A great number of the academic staff has PhDs and has publications in refereed international journals.
- Staff responsible for managing postgraduate training and research at departmental and faculty levels require further training to improve management quality and efficiency.
- The teaching loads in some departments were reported to be heavy and prevented staff from engagement in research.
- The staff establishment in most departments has been fixed for a long-time. This prevents recruitment of talented young staff.
- Staff remuneration of technical and support staff does not encourage retention of trained and highly skilled personnel.
- Co-operation between the universities and government departments supported by IPPS and IPICS is neither formalised nor always strong, except for one government department in Uganda. The trained PhD staff in the non-university institutions do not contribute to manpower training at the universities supported.
- Information and communication is not fully developed between scientists within the faculty/university. There is also sometimes a lack of communication with external partners, for example in other universities. Communication facilities need to be better developed, and the importance of information needs to be stressed.

1.2 Recommendations

1.2.1 To Sida/SAREC

In accordance with the findings and the contents of this report we would encourage Sida/SAREC to take the opportunity to strengthen fundamental areas of science by initiating a pilot programme which involves academic staff and PhD students at the two universities and the four Sida-supported programmes. Thus Sida/SAREC could do the following:

- Assist the two universities by allocating funds for the establishment of a strong programme in some prioritised areas of fundamental science.
 - The programme should include graduate schools at the two universities and furthermore provide for supervisors and other researchers to conduct fundamental research in the prioritised areas. Development of such a programme should be in phases with the 1st phase involving establishment of Ph.D courses with details of textbooks, library support and identification of lecturers. The 2nd phase should see development of research areas for postgraduates and academic staff.
- Review contracts signed between Sida/SAREC and the programmes in order to provide clear guidelines on the use of programme funds in support of the new pilot programme and in implementation of Sida/SAREC overriding policy.
- Encourage development of capabilities and capacities in the two institutions by making them owners of the pilot programme.
- Assist the universities in establishing a procedure for self-evaluation of the new activities. This self-evaluation should be such that Sida/SAREC can easily follow the progress of the activities.
- In their contacts with ministries in Uganda and Tanzania, and with other donor agencies, Sida/SAREC should point out the need to support the whole chain of activities in science research and education, ranging from fundamental concepts and laws of nature to directed research and applications. The different activities are complementary to each other and are all necessary for bridging the gap between the developing and the industrialised countries.
- Strengthen the Sida/SAREC co-operation with other donors aiming at establishing a sustainable, transparent, open and democratic university structure at the two universities.

1.2.2 To the four programmes

- Intensify co-operation within the priority areas with the two universities through a formalised memorandum of understanding specifying the objectives and activities in the pilot programme.
- Ensure that the recruitment process at all academic levels is open and founded on scientific qualifications. Thus, positions as research leaders, PhD grantees, researchers etc should be openly advertised, within and/or outside the university as appropriate, and evaluated by international experts.
- Find ways to strengthen the university/faculty in its ownership of the research activities funded by Sida/SAREC.
- Provide details of your own programmes and activities to both universities. If possible, send representatives to the two faculties of science to present the programme activities.

- Assist the two universities in improving the education of women through merit grants, specialised courses and other gender attractive programmes.
- Give special considerations to providing visiting lecturers as may be requested by the universities.
- Provide visiting grants for short research periods as part of an exchange programme between the two universities.
- Assist the universities in creating links with experts and institutions of excellence.
- Assist the universities in improving research and postgraduate training (development of curricula, course plans, experimental activities etc).
- Assist the institutions in establishing networks.
- Train the academic staff – in particular group leaders – in proposal writing, evaluation of research projects and mentoring.
- Train university managers and academic staff at the two institutions in research and academic planning, organisation and priority setting.
- Help train the technical and support staff in research fields and research equipment procurement, and servicing.
- Provide programmes for leadership training, evaluation and teamwork.
- Assist the universities in fund raising, research and training, and in infrastructure improvements.
- Assist in improving undergraduate programmes.

1.2.3 To the universities

- Promote dialogue between scientists and technologists on one hand, and the policy makers and society on the other. This would create a win-win environment for government support for basic sciences.
- Develop a procurement, repair and maintenance policy for scientific instrumentation at your university, and make it known to staff and donors.
- Seek donor support or use already existing funds for establishing equipment and maintenance funds at the departments in science. It is not acceptable that research cannot be performed for long periods due to missing or broken parts of equipment.
- Seek assistance of the four programmes, and scientific societies like International Council for Science (ICSU), in establishing new programmes that promote science and technology.
- Establish graduate schools in research priority areas. Invite donor support for the priority areas.
- Establish funds to promote postgraduate training and research from government grants and special grants from donors.
- Improve management and administration of research by reducing delays and increasing efficiency.

- Create strong and super-critical research groups in each priority area of your faculty. The research groups should preferably span competence across the whole range from fundamental science to applications.
- Strengthen the link between undergraduate education and research by creating academic posts in departments that have heavy teaching loads.
- Find ways of retaining trained and skilled technical and support staff.
- Create networks that reduce scientist's isolation and promote exchange of ideas and staff.
- Establish at the Faculty of Science level, preferably in the Dean's office, a structure and mechanism for the co-ordination of the proposed pilot project between the two universities and the four programmes.
- Promote peer review, merit, transparency and accountability in the management of postgraduate training and management of research funds.

2 Background Information

2.1 Purpose of the Study

As seen in Terms of Reference (Appendix 2) the present study concerns essentially two issues. The first issue concerns an evaluation of the impact of the four programmes, ICTP, TWAS, TWOWS and ISP on the two universities of Dar es Salaam and Makerere, respectively, and a status description of the research facilities in basic sciences at the universities. The second issue deals with the possibilities to overcome current obstacles and difficulties in conducting fundamental research in the basic sciences, and improve the conditions for research by making a better use of the total competence contained in the two universities and the four programmes.

Before going into further detail it is, however, important to define the concepts that we use and to motivate why research in basic sciences is necessary.

2.1.1 Concepts

The term “basic sciences” is sometimes used as a common term for physics, geology, biology, chemistry and also mathematics. Each of these subjects is, however, very broad and has been subjected to subdivisions, for example analytical chemistry, atomic physics etc. In the following discussion we will use three concepts, namely:

- fundamental research
- directed (or motivated) research
- applied research

These three kinds of research differ mainly concerning the *goals* of the research. Thus, for *fundamental research* the goal is set within the science itself, which may mean that new physics, chemistry etc is developed, either theoretically or experimentally or by combinations of these. Thus, no immediate application or use of the new scientific results may be in focus.

Directed or motivated research is defined as research that needs to be done in order to achieve a goal within some other branch of science, or even in society. As examples can be given the need to use mathematical, physical or chemical principles to understand biological or economic systems. Thus, for these cases the sciences are used as *tools* to achieve a better understanding of phenomena outside the framework of themselves.

Applied research is similar to directed or motivated research, but has usually a more immediate goal, often of practical interest. As examples can be mentioned development of wind-power systems, solar cells or new sewage systems.

2.1.2 Need for fundamental research in developing countries.

Science in western countries has grown over many hundreds of years and gradually been systematised and organised into the present structure. Western science started in Greece as philosophy over natural phenomena, and has for a long time been important for man’s understanding of himself as part of a larger universe. Only during the last couple of hundred years has science been subdivided into different branches or disciplines. In western countries fundamental science can be seen as the root (or mother) of both directed and applied research. Together the

different kinds of research can be seen as a tree or hierarchy in which the fundamental part is the root and the directed and applied aspects are the branches.

In many developing countries there has been a tendency to work directly with applied or directed research, and this tendency has generally been enhanced by donor communities, who want to see rapid use of scientific knowledge. Thus, it has been difficult to find resources for fundamental sciences in these countries. This poses a risk, however, because applications may become routine or outdated, and if the fundamental scientific base is weak or missing there is little chance that the developing countries will make scientific break-through that will eventually lead to new applications. As examples of traditional subjects in fundamental physics can be mentioned optics, electricity, solid state physics, from which new applications in optical communication, electronics and material sciences have been developed. In chemistry the subject of organic chemistry has found new exciting areas of research in synthesis of new organic materials like fullerenes, pharmaceuticals and deeper understanding of biological functions. Biotechnology, which is the major economic driver today, is but a combination of achievements in chemistry, physics, mathematics, cell and molecular biology, engineering and biochemistry. Furthermore, materials science relies heavily on advances in chemistry, physics, mathematics and engineering. In a similar manner, future new applications will appear, which are not foreseen today.

Neglecting fundamental sciences may result in an increase in the knowledge gap between the developing and the industrialised countries, which may eventually be almost impossible to bridge. In the present evaluation we will try to characterise the activities of the programmes in terms of fundamental, directed and applied research.

Basic sciences in Africa benefited from the open door policy of institutions in the west that trained African scientists at the dawn of independence struggle. Developed countries resources helped establish many of the leading African universities. Good research infrastructures were established in many of these institutions. The support of these institutions by African governments has not sustained the standards established at independence due to several factors. High among them is economic stagnation, high demand for new building areas due to population growth, withdrawal of donor support, to name but a few.

On their part, the African scientists found it impossible to undertake costly fundamental research due to lack of facilities and resources. Change of emphasis by policy makers and donor communities put priority to appropriate or applied research. The consequences of these changes have resulted in the training of most African scientists in applied research.

As the older, west trained scientists retire, we find in Africa a situation in which few locally trained scientists undertake fundamental research, the existing research equipment is archaic and little new knowledge is developed. Therefore, there is need to change the prevailing conditions.

2.2 Brief Information on the Four Programmes

In the information below we will make a brief summary of the activities of the four programmes with major focus on the activities in the faculties of science at the University of Dar es Salaam and Makerere University. This information is mainly built on the material given by the programmes themselves.

2.2.1 International Science Programme, ISP

The International Science Programme (ISP) was started in 1961 at Uppsala University. It initially invited fifteen fellows from fourteen developing countries to spend one academic year in an International Seminar for Research and Education in Physics. From this humble beginning 40 years ago, the programme has grown from a fellowship programme into a programme that supports around 45 research groups in 17 countries in Africa, Asia and Latin America in physics and chemistry. A programme for mathematics is to be introduced this year. ISP collaborates with institutions in developing countries and developed countries mainly in Europe. The programme trains students at MSc and PhD levels and also technical staff. It aims at assisting in building of research infrastructure through purchase of critical research equipment, promotes south-south and south-north exchange of staff and students, supports organisation and attendance to workshops and conferences, promotes individual and group research at institutions in the south and establishment of networks between groups and institutions. It co-operates with other basic sciences supporting programmes like the Abdus Salam International Centre for Theoretical Physics (ICTP), The Third World Academy of Sciences (TWAS), the Third World Organisation for Women in Science (TWOWS) and International Foundation for Science (IFS).

2.2.1.1. IPPS support

The latest ISP Memorandum of Understanding between the University of Dar es Salaam and Uppsala University was signed in 1999. Its cooperation areas cover:

- research
- exchange of undergraduate and postgraduate students,
- exchange of staff and sabbaticals,
- joint research projects carried out by researchers from both universities,
- mutual assistance in the establishment of new programmes,
- exchange of publications and organising conferences and workshops.

Projects supported by ISP – IPPS (International Programme in Physical Sciences) at University of Dar es Salaam and Makerere University include:

- (i) Condensed Matter Physics and Material Science – thin film technology, studies of materials for solar energy conversion (photo-voltaics, selective surfaces, electro- and thermo-chromism, etc), films with special magnetic properties and materials that can be used as gas sensors.
- (ii) Applied Nuclear Physics: X-ray fluorescence, Mössbauer spectroscopy.
- (iii) Atmospheric Physics and Geophysics – study of seismology along the East African Rift.

The IPPS programme believes in supporting physics research in Africa because it is important to:

- a. Only support research in line with the policy of universities/departments;
- b. Identify the key people around whom it is possible to build up research activities;
- c. Establish co-operation based on long-term commitments;
- d. Include MSc and PhD sandwich programmes in the project support.

Brief information on IPPS activities is reported below.

IPPS Networks

The following ISP – IPPS Networks which include researchers from Uganda and Tanzania are supported:

AFR:01 *Eastern and Southern Africa Regional Seismological Working Group (ESARWG)* IPPS supports seismological study and monitoring along the East African Rift started in the 1980's and has resulted in small seismic networks in Tanzania, Uganda, Zambia, Zimbabwe and South Africa. The Network has held two workshops for the analysis of data from the whole region. Ten workshops have been held.

AFR:02: *Applied Atomic and Molecular Physics*. This is a joint Network between Office of External Affairs (OEA) of the Abdus Salam International Centre for Theoretical Physics and IPPS. It aims at introducing experimental activities based on diode lasers at OEA centres at Department of Physics, University of Cape Coast, Ghana. Department of Physics, University Cheikh Anta Diop de Dakar, Senegal, Department of Physics, University of Khartoum, Sudan. Assistance is being given to Department of Physics, University of Nairobi to start one.

Local programme IPPS support

The ISP – IPPS (International Programme in Physical Sciences) is the longest established programme in East Africa. Fellowship programmes at the University of Dar es Salaam date back to 1973/74. It supports three major programmes at the University of Dar es Salaam and Makerere University. The research areas covered are Atmospheric Physics and Geophysics (Seismology), Condensed Matter Physics and Material Science (solar energy, thin films, materials) and Applied Nuclear Physics (x-ray fluorescence) In Appendix 3a, Table 2.2.1 gives the names of grantees, their institutions, titles and gender. Table 2.2.2 gives a summary of ISP grantees in both physical and chemical sciences at the University of Dar es Salaam and Makerere University.

From the tables (Appendix 3a) it is seen that eight and three fellowship holders, respectively, had/or achieved a PhD at the respective universities. Five MSc were supported at Dar es Salaam while nine other technical staff were trained. Only one of the trainees was a woman.

Table 2.2.3 shows that there were five project leaders of IPPS projects. Nine academic staff in the supported groups had Ph.D. Six other academic staff were also supported. None of these grantees was a woman. Among students no female student was trained Among the eleven persons in the technical staff, only one was female.

The IPPS grants allocations to the three projects at Dar es Salaam and Makerere 1999–2000 are given in Table 2.2.4. Except for Tan: 01/3 the other projects received good financial support. The reason for the lower support for Tan: 01/3 project during 1999–2001 was that it also received support from the International Atomic Energy Agency (IAEA) of USD 107,440 (1997–1998) USD 98,025 (1999–2000), USD 100,530 (2001–2002).

2.2.1.2 IPICS support

The ISP – IPICS (The International Programme in Chemical Sciences) support to the University of Dar es Salaam and Makerere University mainly involves Networks and one Group research project with one team leader, one MSc and one PhD student in 2002. The IPICS sponsorship to the Department of Chemistry started three years ago with seed funds to support research on pesticide residue analysis. The emphasis was on training in the use of gas chromatography and extraction methods.

The Natural Products Research Network for Eastern and Central Africa (NAPRECA) is the oldest IPICS project, started in 1988, and has supported extensive staff and students activities in this area. NAPRECA is presently coordinated at the Chemistry Department, University of Dar es Salaam. The department also coordinates the youngest network, the African Network for Analysis of Pesticides (ANCAP). This network was established in 2001. (See Tables 2.2.5 and 2.2.6 in Appendix 3a for detailed information).

2.2.2 Third World Academy of Sciences, TWAS

The Third World Academy of Sciences (TWAS) is an autonomous international organization, founded in Trieste, Italy, in 1983 by a distinguished group of scientists from the South under the leadership of the late Nobel Laureate Abdus Salam of Pakistan. It was officially launched by the then-secretary general of the United Nations in 1985, and granted non-governmental organisation status by the UN Economic and Social Council the same year. The principal aim of TWAS is to promote scientific capacity and excellence for sustainable development in the South.

TWAS membership consists of Fellows and Associate Fellows, who are drawn from the most distinguished scientists. Fellows are elected from citizens of the South; Associate fellows are elected from citizens of the North who either were born in the South or have made significant contributions to the advancement of science in the South. At present, TWAS has 630 members (521 Fellows from 62 countries in the South and 109 Associate Fellows from 15 countries in the North).

A Council, elected by members every three years, is responsible for supervising all Academy affairs. A small secretariat headed by an executive director assists the Council in the administration and co-ordination of the programmes. The secretariat is located on the premises of the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste.

In 1991 UNESCO assumed responsibility for administering TWAS funds and staff, based on an agreement signed by TWAS and UNESCO. In addition to its strong links with UNESCO and the ICTP, the Academy has maintained a close relationship with other international bodies with which it shares common objectives.

Since 1986 TWAS has been supporting research work of scientific merit in more than 100 countries in the South through a variety of programmes. A body of over 2,000 eminent scientists world-wide, including TWAS members, provides a free-of-charge peer review of proposals for research grants, fellowships and awards submitted to the Academy by scientists and institutions from developing countries. In addition, joint activities have been developed with UNESCO, ICTP, ICSU, IFS and ISP.

TWAS also proved instrumental in the establishment in 1988 of the Third World Network of Scientific Organisations (TWNSO), a non-governmental alliance of 151 scientific organisations in the South. TWNSO's goal is to help build political and scientific leadership in the south for science-based economic development through South-South and South-North partnerships in science and technology. TWAS provides the secretariat work for TWNSO and co-sponsors a number of its activities.

In Appendix 3b a summary list of grants awarded from 1993 to 2001 is presented, together with information on number of applications, research fields, regions and gender balance. As seen from the appendix the number of grants to Tanzania and Uganda is very small, 2 and 4 respectively for the whole period. Reasons for this will be discussed further on. – It can be noted already, however, that TWAS has actively promoted a fair number of grants for female scientists.

2.2.3 Third World Organization for Women in Science, TWOWS

TWOWS is a young organisation, which was officially launched in Cairo in 1993 and got its first support from SAREC/Sida in 1997. Through this support a fellowship programme for female students from Sub-Saharan Africa and least developed countries (LDC) has been established for postgraduate training leading to PhD at centres of excellence in the South. The specific aims are to improve access to educational and training opportunities in science and technology for young and talented women from the above-mentioned countries and to empower a new generation of talented women to take on a leadership role in their areas of research. The fellowship provides support for travel, accommodation, living expenses and financial assistance for tuition, registration, bench and visa fees. The host institution in the South is expected to provide facilities such as training, supervision, laboratory supplies etc. The programme is open for competition, and there is a detailed application form including a proposed postgraduate study plan. The number of applications has increased rapidly since TWOWS started (See Appendix 7). However, there are still difficulties of technical and socio-cultural nature for the women in commencing a PhD programme, even if they are awarded a grant. In the year 1998/99 two ladies from the University of Dar es Salaam and two from Makerere University were awarded. In the year 1999/2000 one lady from Ministry of Education in Tanzania and two ladies from Uganda were awarded (one from Makerere University and one from Ministry for Agriculture, Animal Industry and Fisheries). The areas of research are wider than those of TWAS and do not only cover basic sciences, but also other disciplines in for example veterinary sciences, technology, medicine and environmental resources.

TWOWS has currently more than 2000 members from over 80 countries in the South. The secretariat of TWOWS is currently hosted and assisted by TWAS.

2.2.4 The Abdus Salam International Centre for Theoretical Physics, ICTP

The Centre was established in 1964 and is funded mainly by funds from the Italian Government. It is administered by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Atomic Energy Agency (IAEA). Its mission is “To foster, through training and research, the progress of all branches of theoretical physics, paying special attention to the needs of developing countries”. The centre conducts training and research activities in the following areas:

A. OUTREACH TO THE THIRD WORLD.

- The ICTP Training Programmes – 40 training and research activities in all areas of physics and mathematical (both theoretical and practical) conducted each year.
- Associateship and Federation Schemes – Helps scientists from developing countries keep in contact with experts from all over the world and to build their own scientific community.
- Office of External Activities – Helps scientists from developing countries build and maintain their own communities through scientific activities at their National or Regional institutions.
- ICTP/TWAS Donation Programme – Donates physics and mathematics books to libraries in developing institutions that have shortage of funds. Equipment donation provides basic equipment for teaching and research to developing countries institutions.
- The ICTP Diploma course Programme - Established in 1991 to provide advanced level training to improve the teaching and research capabilities of young talented students.

- Joint PhD Programme for students in the Third World countries – A scheme offering a PhD student from a university in a developing country the chance to periodically visit an advanced institute in a developed country during the time he/she is working on the thesis, with the purpose of providing facilities and advice that the student cannot obtain at the home institution.
- Training and Research in Italian Laboratories – Offers scientists from developing countries an advanced experimental counterpart to the theoretical research and lecture based training taking place in Trieste.

B. IN-HOUSE RESEARCH PROGRAMMES

ICTP main research groups include:

- High Energy Physics
- Condensed matter Physics
- Mathematics
- Physics of weather and climate
- Microprocessor Laboratory

C. OTHER RESEARCH PROGRAMMES

In addition, ICTP provides opportunities for participation by developing countries scientists in small research programmes and hosted research activities. Some of the activities and programmes offered include:

- Physics of the living state
- Structure and non-linear dynamics of the earth (sand)
- Aeronomy and radiopropagation laboratory
- Training and systems development on networking and radio communications.

ICTP offers excellent library and scientific computer section as support services to visiting scientists.

In Appendix 3d a list of recently supported grantees from Tanzania and Uganda is shown.

2.3 Short History of Makerere University and University of Dar Es Salaam

University education in East Africa dates back to 1921 when the colonial government established a small technical college in Uganda which eventually became Makerere University. Between 1921 and 1963 the Technical college in Uganda became the University College of East Africa in 1950 awarding degrees of University of London and was the only higher education institution in East Africa.

The University of East Africa was inaugurated in Nairobi on 28th June 1963. It was established as a federal university with three constituent colleges, namely Makerere University College, University College Nairobi and Dar es Salaam University College.

The 1962 University of East Africa Act entrusted the institution with responsibility for university education within East Africa. It was urged to co-operate with governments and other appropriate bodies in the planned development of higher education, and in particular, to examine and approve proposals for new faculties, new departments, new degree courses or new subjects of study

submitted to it by the constituent colleges. The university admitted students to the constituent colleges, examined them and awarded degrees, diplomas, certificates, and other awards to successful candidates.

All degrees of the three constituent colleges were under a special relationship with the University of London. Co-operation in Education is one of the earliest areas of unity between Kenya, Tanzania and Uganda. Makerere's contribution in bringing East Africa's ethnic groups, religious and cultures together remains one of its vital objectives in creating a United East Africa.

The University of East Africa was dissolved in July 1970. This resulted in the establishment of three universities: University of Nairobi, Dar es Salaam and Makerere, by Acts of the respective countries.

2.3.1 University of Dar es Salaam (UDSM) and the Faculty of Science

The University College, Dar es Salaam, was founded in October 1961 and awarded Bachelors of Laws degrees during the first two years after its establishment. University of Dar es Salaam has a total student population of 6.500 to 7.000 in 2000-2002. It has three campuses, the main campus, the Muhimbili University College of Health Sciences and the University College of Lands and Architectural studies, each with 5279, 723 and 689 students respectively. The female student ratio is 27, 28 and 11% respectively for each campus. The main campus has 13 faculties. The main campus, which houses the Faculty of Science has a total academic staff of 503 in 2000/2001 academic year, with an average staff student ratio of 11.

The Faculty of Science is one of the oldest faculties in the university. In 2000/01 academic year, it had 1001 undergraduate and postgraduate students with a total of 127 academic staff. Table 2.3.1 gives students enrolment, number of academic staff, staff student ratio and gender ratios for 1995/96 to 2000/01 academic years.

Table 2.3.1 UNIVERSITY OF DAR ES SALAAM, FACULTY OF SCIENCE

Number of undergraduate (UG) and postgraduate (PG) students and number of staff during the years 1995/96 –2000/01.

YEAR	No. of students							No. of staff			Staff Student Ratio	M/F Student ratio	M/F Staff ratio	
	UG			PG				UG+Ph	M	F				TT
	M	F	TT	M	F	TT								
1995/96	469	78	547	93	3	96	643	95	7	102	6	7	14	
1996/97	492	96	588	94	3	97	685	95	6	101	7	6	16	
1997/98	625	167	792	25	9	34	826	99	6	105	8	4	17	
1998/99	622	167	789	26	7	33	822	116	8	124	7	4	15	
1999/00	655	188	843	33	8	41	884	116	8	124	7	4	15	
2000/01	729	204	933	49	19	68	1001	120	7	127	8	3	17	

2.3.2 Makerere University and the Faculty of Science

Makerere University was first established in 1922 as a Technical School with a student enrolment of 14. It has since then undergone major transformations. After a few years of teaching carpentry, building and mechanics, it started offering courses in medical care, Agriculture, Veterinary Sciences and Teacher Training. Since then it has changed from a University College of London, University College of East Africa to its current status as a fully fledged and independent public university.

At present Makerere University consists of one constituent college, one affiliated college, nine faculties, six institutes and a School of Postgraduate Studies. The student enrolment is about 30,000 for both undergraduate and postgraduate students. The university has approximately 1,000 academic staff with still a number of vacant positions to be filled. Currently, there is need for the creation of more establishments as a result of development of many more new degree programmes.

The Faculty of Science consists of seven academic departments, namely Biochemistry, Botany, Chemistry, Geology, Mathematics, Physics and Zoology.

These departments represent some of the subjects taught to the students of Science. Other subjects include Computer Science, Economics, Geography, Physical Education, Psychology and Statistics. The Faculty of Science also teaches students from the Faculties of Education, Medicine, Agriculture, the Institute of Statistics and Veterinary Medicine.

The Faculty of Science has developed specialised degree programmes which include the following:

- B.Sc. in Conservation Biology
- B.Sc. in Ethnobotany
- B.Sc. in Fisheries and Aquaculture
- B.Sc. in Geological resources Management
- B.Sc. in Industrial Chemistry
- B.Sc. in Sports Science

There are other programmes still being developed which include some aspects of applied sciences.. This is intended to increase the number of students coming to the Faculty of Science to take basic sciences. This has not yet had the expected impact in the short run but may possibly have in the long run.

Students enrolment in the Faculty of Science over the past five years averaged 1,100 per year, but is presently decreasing somewhat. This figure includes both undergraduates and postgraduates. The number of academic members of staff from the level of lecturer over the last five years has stood at an average of 120 per year. More than half of the staff have PhD degrees while most of the remaining ones have registered for PhD training. There is a gender imbalance, since there are many more male lecturers than females, with four departments having only one female lecturer each. The Faculty of Science is currently implementing a five-year strategic development plan.

Data from Faculty of Science are shown in Table 2.3.2 concerning students enrolment, at undergraduate and postgraduate levels from 1995/96 to 2000/2001 academic years.

Table 2.3.2 MAKERERE UNIVERSITY, FACULTY OF SCIENCE

Number of undergraduate (UG) and postgraduate (PG) students during the years 1995/96 – 2001/2002.

YEAR	NUMBER OF STUDENTS							STAFF STUDENT RATIO	F/M STUDENT RATIO
	UG			PG					
	M	F	TT	M	F	TT	UGT PG		
1995/96	891	236	1127	30	8	38	1165		21.1
1996/97	929	236	1165	26	7	33	1198		20.3
1997/98	1001	218	1219	61	25	86	1305	11	18.6
1998/99	906	203	1109	28	10	38	1147	10	18.6
1999/20	772	194	966	24	9	33	999	9	20.3
2000/20	685	188	873	33	14	47	920		22.0
2001/20	606	204	810						

2.3.3 University organisation

The organisation of Makerere University and University of Dar es Salaam are similar and are shown in Figure 1. Each university has a Council, a Senate, Colleges, Faculties, Institutes, and Departments. Makerere University in addition has schools. The Council Chairperson is elected amongst its members (Makerere) or appointed by the President (UDSM). The administrative flow chart is shown in Fig. 2. The Chancellor is appointed by the President upon recommendation of University Council. The Vice-Chancellor is appointed by the Chancellor on recommendation of University Council and Senate (Makerere) and by the President (UDSM). The Chief Administrative Officers, the Librarian and Deputy Vice-Chancellors are appointed by the President (UDSM) and Chancellor (Makerere). Deans are appointed by the Chancellor (UDSM) or elected by the Academic Faculty Board (Makerere). Directors are either appointed by the Chancellor (UDSM) or elected by Institute Board (Makerere). Heads of Department are appointed by the Vice-Chancellor on recommendation of the departments and the faculty.

Figure 1. Sketch of the university main organs at Makerere University and Dar es Salaam University. Committees, administrative units and other working groups under the different units are not shown - and are somewhat different at the two universities.

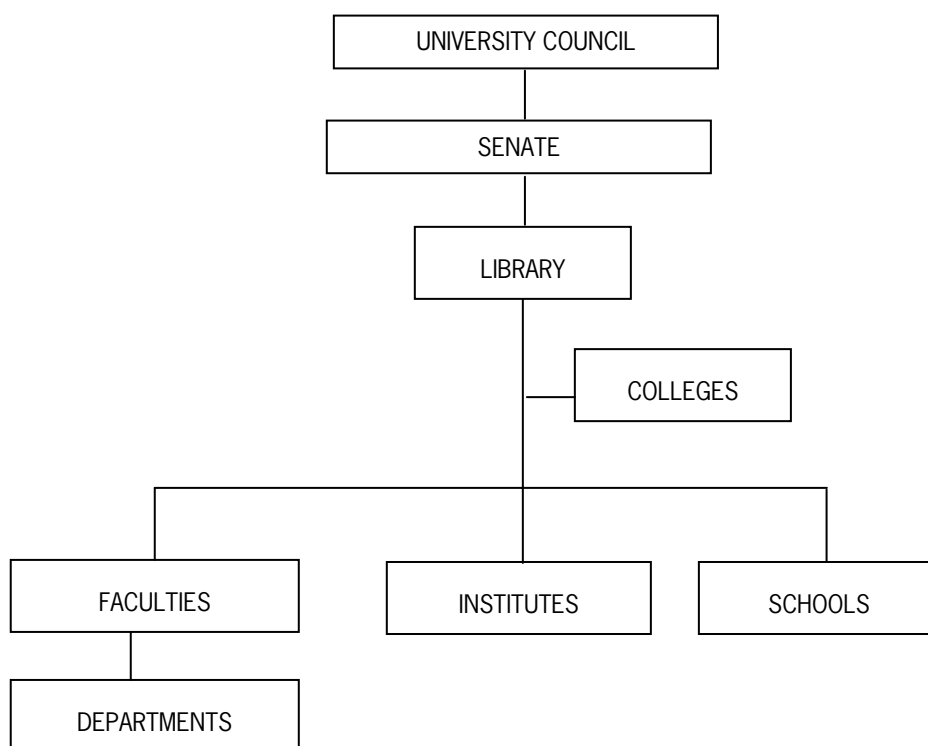
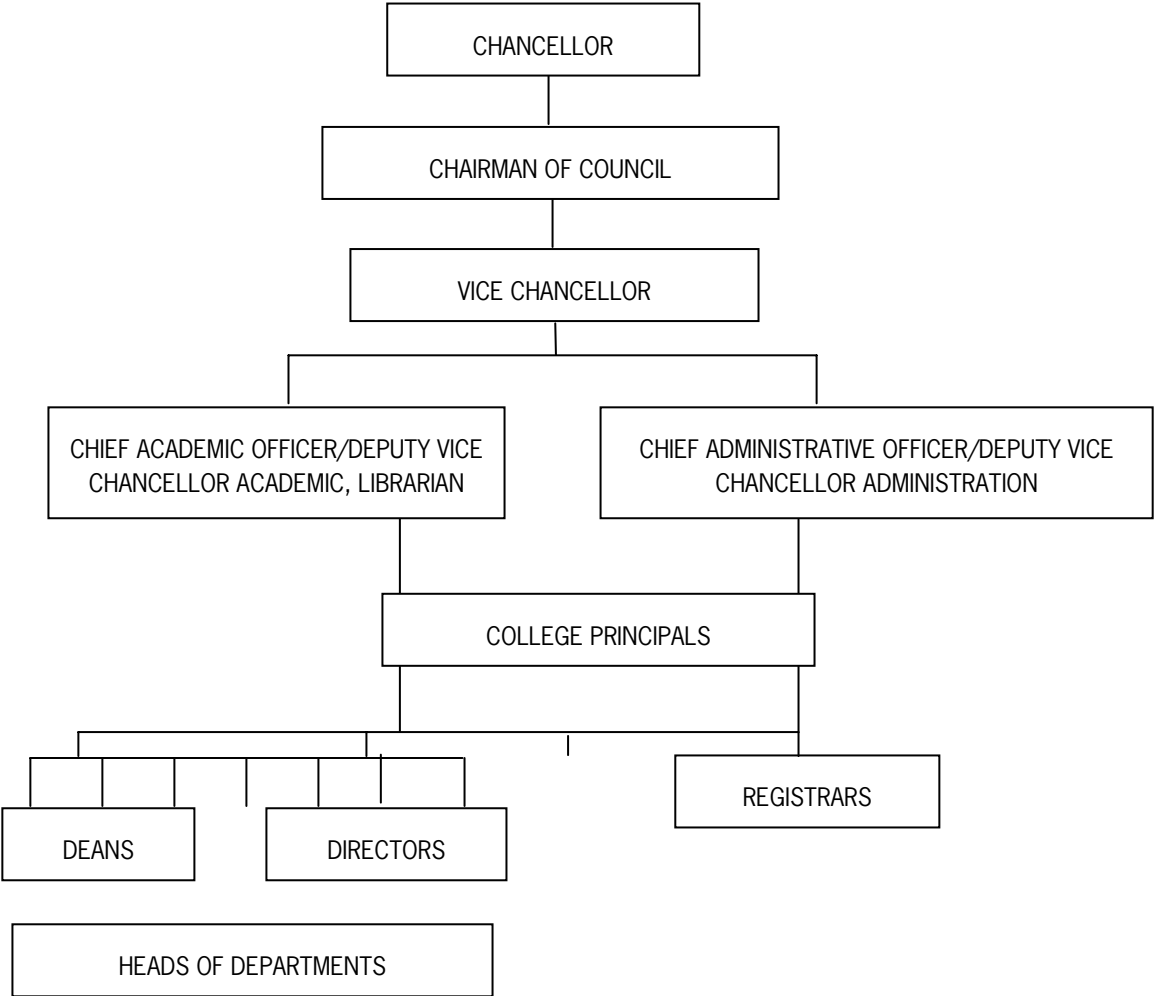


Figure 2. Flow chart over the decision making process at the two universities.



3 Response and Experiences from Contacts with Programme Activities at the Two Universities

3.1 Comments on the Questionnaires from Programme Perspectives.

In the following paragraph we will discuss some of the findings and conclusions in the order they have been treated in the Questionnaire. Since the grants from TWAS, TWOWS and ICTP are entirely individual, whereas the grants from ISP concern long term support to an individual in a research group or a research group as a whole we will comment on TWAS, TWOWS and ICTP separately from the comments on ISP. The full answers from the Programmes are given in appendices.

A. Recruitment of scholars and grantees.

A1. TWAS, TWOWS and ICTP

As noted in appendices 5, 6 and 7 the selection of grantees by TWAS, TWOWS and ICTP is based on open competition. Furthermore, the programmes are widely advertised at all universities and research institutions in developing countries including Makerere and Dar es Salaam universities. The advertisement is normally made through air mail/e-mail and web site. For TWAS and TWOWS the grants are open to areas in basic sciences, and there are special application forms to fill in and submit for those who wish to become grantees. For ICTP the activities consist of courses, training programmes, conferences and fellowships in mainly physics, mathematics and computer science, and there are application forms available on the ICTP homepage.

The home universities are expected to encourage their staff members to apply, and for some activities the head of department needs to sign the application. All three programmes have an active gender policy, and in some cases the rules are changed due to women's responsibilities for their children.

The selection of TWAS grantees is based on scientific merit as evaluated by international referees and scientific committees (one committee for each scientific field) consisting of internationally well-known professors.

- *With reference to what is said above, and as can also be noted in appendices 5, 6 and 7, we conclude that the recruitment process is open, transparent and democratic, and in accordance with best possible practise.*
- *The number of applications for the three programmes is very large, and there is room for more funding to the programmes to meet the future needs (See Table in TWOWS' answer to questionnaire, Appendix 7).*

A2. ISP

In contrast to what is said for TWAS, TWOWS and ICTP the recruitment process for beneficiaries of the two ISP programmes (IPPS and IPICS) is difficult to see through. Since the group leader and the choice of scientific field are both of major importance for the progress of the research group and the development of science in the faculty, one might have expected that at least the position of the group leader should be openly advertised and submitted to scientific evaluation by outside expertise. Furthermore, one would expect that the choice of group leader and group members

would be made in consultation with the dean and VC at the university in question. This seems, however, not always to have been the case. (The two directors gave different answers to this question both in their written statement and at the meeting in Uppsala; one of them speak of “application forms”, but no advertisement seems to have taken place). Thus, it seems that there is no open and transparent recruitment process; It was pointed out to us that the selection process is a responsibility of the department and university. However, the universities did not know this responsibility and it was never exercised in any way.

– *The relative lack of transparency and openness is risky, because even in cases where the choice of group leader and team is excellent, the choice might not be so easily accepted by other staff members at the respective university. There may also be a question concerning the ownership of the scientific activity. According to the philosophy of SAREC/Sida the ownership of the activity should belong to the university.*

B. The periods of scientific work

The questions under this heading (and also the next) are intended to give a feeling for the interaction between the home and host institutions for the grantees for those programmes, in which the grantees spend a period of time in a host institution in some other university. TWOWS regards the involvement of both institutions as “critical” (Appendix 7) for successful research for the grantee, and their view is also supported in the answers from ISP. A major concern regarding the relationship between the home and host institutions is the possibility to conduct research at the home institution. (One might otherwise fear, that research is mostly done in the host institutions, while teaching is done in the home institutions). There are many obstacles/difficulties in conducting research in developing countries, especially if the work is experimental. Some of these difficulties will be addressed in the following section. We are, however, satisfied by the awareness of this issue, which emerges from the answers to the questionnaire on this point.

C. Follow-up procedure

There seems to be a proper follow-up procedure for most of the Programmes. Thus, we have been supplied with lists of grantees/scholars, from which we have tried to identify scientists in Makerere and Dar es Salaam for interviews. The result of this activity, was however, very meagre, since there were only a few grantees from ICTP and TWAS and, furthermore it appeared that IPICS had not supported the University of Dar es Salaam, but a research institute. (See appendices 5–8). IPPS on the other hand, had supported several persons at both Makerere and Dar-es-Salaam research groups.

D. Programme development

The questions on programme development have to be seen in the light of the age of some of the Programmes, namely TWAS, ICTP and ISP. Changes in the attitudes of donors, who increasingly stress the ownership by the universities in developing countries, pose the question whether the programmes still have a role to fulfil. For TWOWS, TWAS and ICTP, there is still an important function to fulfil in linking different scholars from developing and developed countries together in activities related to recent development of sciences (ICTP), and providing grants for doing research at the home institutions, which otherwise could not be executed (TWAS). How ISP sees its future role was not explicit from the answers received from IPPS and IPICS. ISP should be encouraged to rethink on its future role given the changing patterns of donor relationships with developing world under globalization and democratisation process.

There exists the possibility of creating strong affiliated centres of ICTP and ISP in East Africa as has been done in some other parts of Africa. Such affiliated centres would enhance ownership at

national or regional levels, bring ICTP and ISP activities closer to people who need it, and possibly reduce costs. IPPS has established a Solar Energy Centre at the University of Dar es Salaam which is very active in training. The Programmes could assist in identifying such centres and strengthening their capacities.

3.2 Comments on the Questionnaires from Institutions

The issues raised in the questionnaire to 1) departments, 2) faculties and 3) the two universities (Appendix 9) aim at obtaining a detailed information on resources with respect to the human capacity, instrumentation, organisation and management. The evaluation team was also to learn about to which degree the four Programmes are known by staff and students. The answers from the institutions are given in appendices 10–12.

From the answers to the questionnaire on behalf of the faculties of science at UDSM and Makerere University (Appendix 12a and b) it is apparent that the faculties are active in developing strategic plans and plans for building institutional capacity. At the same time it appears that the faculties have been limited by the fact that there is no government funding for either MSc or PhD fellowships. Thus, the areas of research are very much in the hands of donors (Compare answers from the departments on the funding situation of PhD and MSc students, appendices 10 and 11). Also, in the case of ISP the faculty has not had any influence on either selection of fellowship holders or areas of research.

The answers to the questionnaire by departments in basic sciences show, that they have a fair number of very qualified scientists, many of whom are PhD holders trained by the Programmes. Mainly through donor support there is also equipment available, most of which is functioning. A few of the department heads have added lists of publications, or in other ways supplied the evaluation team with publications in international refereed journals.

– We therefore conclude that there is a very good scientific base on which to build more intense research efforts and develop PhD programmes in both fundamental and applied areas of research.

3.3 Impressions From Site Visits to the Programmes and Institutions

The evaluation team paid visits to SAREC/Sida, Programmes and Institutions during the weeks 28:th of January to 1:st of February, and 17–24:th of February. The people we met are listed in appendix 1. In this section some impressions we got are recorded, others are noted in appendices 13 and 14.

3.3.1 Meetings in Sweden with SAREC/Sida representatives (Dr Michael Ståhl and Dr Ros-Mari Bålöw) and directors and head of administration for ISP (Dr Malin Åkerblom, Dr Lennart Hasselgren and Mrs Åsa Bergengren)

At the meetings with SAREC-representatives the background of the evaluation task as elaborated in the ToR (Appendix 2) was explained.

In the meetings with the IPPS and IPICS directors, facts and figures of past and present activities were presented. The background and future of ISP was discussed. The choice of areas of research, and the choice of group leader and group members were of special interest to the evaluation team. Both directors at ISP were confident that they themselves could select the country, the research project and the project leader on the basis of their “intuition”, and that this was a good way of

getting activities of high quality. At ISP a project is usually started by a pilot grant, which will be supplemented with other grants if the activity is successful. After analysis of the areas of research it became evident that the areas had been chosen mainly by relevance criteria and thus were of the nature of “directed”/motivated research or applied research (See Chapter 2). For IPICS very few activities had been supported at the two involved universities; for IPPS the universities had been supported in relevant areas, which were also considered to be of interest for society. An average support period for a research group would be around 15–20 years.

3.3.2 Meeting in Trieste, Italy, ICTP, TWAS, TWOWS (Prof. Miguel A. Virasoro, Prof. Gallieno Denardo, Prof. Faheem Hussain, Prof. Mohamed Hassan, Ms. Maria Teresa Mahdavi and Ms Leena Mungapen)

At Trieste, the evaluation team entered into discussions of a new initiative, discussed at SAREC, which could fulfil a requirement made in the ToR (Appendix 2), namely “recommendations for a future collaborative initiative”. Within the framework of a future project involving Sida support to basic sciences, ICTP offered to assist Makerere University and University of Dar es Salaam in placing their students and academic staff into training and research programmes taking place in a number of Italian Laboratories linked to the Centre. There is a possibility that the Centre can extend sandwich programmes to other European laboratories. The Centre would be more than happy to receive applications from candidates for research topics and fellowships, give grants to visiting scholars to home institutions if requested and arrange other south-south collaboration between ICTP centres. The issue of technical staff mobility was raised. It was observed that the two universities need to have a salary structure that would retain trained technical staff.

ICTP is strong in Physics and Mathematics. It has assets as a cross road to scientific information and can assist the two institutions in analysis of what is achievable and practical. The institutions need to set their priorities, ICTP could provide necessary information as well as bring in other institutions needed to assist in implementing the set priorities. For example, ICTP has in-house experience in quality evaluation that the institutions could benefit from. It was recommended, that the new initiative should involve both national and regional stakeholders in order to establish a system of self-evaluation. ICTP facilities could be put at the disposal of the two universities. It was also recommended that the launching of the initiative should have a well organised publicity.

It was agreed that a project that aimed at making use of the four Programmes to support the scientific activities in the two universities needs strong co-ordination. The ideal characteristics for a project coordinator would be:

- Not one who is already involved
- A mathematician or physicist
- Active in promoting science
- Maybe retiring, has willingness to move to a new location
- Above local bias
- Has some experience of or contacts concerning how science is managed in a developed country.
- Should be motivated to do something positive in the region.
- Added asset if he/she has contacts with or working knowledge of donors.
- Has lived in countries where research organisation is difficult.

The universities should build support from society at the beginning of the initiative. Scientific bodies like TWAS and ICSU could assist the universities in making contact with a wider circle in society. Society's support can only be achieved through excellence, open and transparent management and organisation, and the relevance of the new programme to capacity building.

It was observed, that Makerere University and the University of Dar es Salaam have not actively participated in ICTP programmes and other activities. Between 1999 and 2000 there were only four persons supported by ICTP from Uganda and Tanzania. None of the supported persons came from the University of Dar es Salaam or Makerere University (See Appendix 3d). However, ICTP supported a college activity at the Department of Physics, University of Dar es Salaam.

The team met Dr. Paul K. Buah – Bassuah who has, with ICTP and TWAS assistance, established an African Laser Atomic and Molecular Sciences Network at the University of Cape Coast, Ghana.

Concerning TWAS Prof. Hassan indicated the importance TWAS places in supporting and training young scientists in the developing countries. It targets good groups in least developed countries for intensified grant support of USD 30,000 per year for three years. The grant covers all areas of basic and applied sciences. In addition, TWAS supports post-graduate training programme targeting those who have finished BSc.

The activities of TWAS offer possibility to inject new blood into the scientific institutions. The Academy is also willing to train technicians and staff who administer and manage research. Such training can be done at TWAS or at the institutions. TWAS would be able to identify experts who would offer such training. Furthermore, TWAS would be able to link institutional research groups with excellent groups in developing countries, such as India for example. TWAS has had a long history of co-operation and collaboration with the International Foundation for Science (IFS) and the International Science Programme (ISP). TWAS also offered to assist the two universities in promoting their links with policy makers and society.

The evaluation team was informed that TWAS advertises its grants to the two universities, but very few applications from University of Dar es Salaam and Makerere University are received. Even still fewer women apply from Africa than from Latin America. The evaluation process of research grant applications is transparent, peer reviewed and rigorous. It was discussed and agreed that in order to assist the two East African universities, there will be need to make special consideration in grants ceiling. The universities could submit a joint grant application with more than one researcher in the same laboratory.

TWAS has an established system for follow-up of past grantees. Replies to questionnaires on recent grantees up to 2001 have been compiled.

Third World Organization for Women in Science (TWOWS) was established in 1997/98 and is based in TWAS offices. It gives grants to women from sub-Saharan Africa and least developed countries wishing to pursue PhD degree. Studies at centres of excellence in the south are given for a maximum of four years. The number of fellowships awarded are given in appendix 3c. Tanzania and Uganda have done very well in TWOWS fellowship awards. Candidates from the two countries received twelve awards. Four of the Uganda grantees came from Makerere University while three of Tanzania awards came from the University of Dar es Salaam.

3.3.3 Meeting in Kampala, Makerere University

(Prof. P.J.M. Ssebuwufu – Vice-Chancellor
Prof. Hannington Oryem-Origa- Dean, Faculty of Science)

Prof. Ssebuwufu informed the Team that Uganda is formulating its national policy on science and technology. At present researchers set their own priorities. Some of the priorities that have been set in University research reflect societal problems like pollution, HIV/AIDS, etc. The university does not set rigid priorities but follows national concerns. Some examples of existing research groups within the Faculty of Science include Natural Products, and Bilharzia that build on multi-disciplinary research.

The university-society links are strengthened through “open days”, in which staff and students display their achievements. A Makerere University Innovation website has been developed that contains all activities on research and technology innovations. The university is planning a donors’ conference to discuss areas of co-operation. In conclusion and in response to an invitation of a policy maker to the Sida project workshop, the Vice-Chancellor suggested the invitation of the Executive Secretary of the Uganda National Commission for Science and Technology. He was very confident that Makerere University and University of Dar es Salaam are capable of co-ordinating any Sida-sponsored project.

The Dean expressed his need to have Local Area Network (LAN) installed in his office. His office has installed optic fibre network points through the university. However, funds are needed to purchase computers or work-stations that can allow the use of the university LAN and enter the Internet. The offices and departments, needing connectivity are: Deans Office, Department of Geology, Biochemistry, Zoology, Botany and Chemistry.

At a wrap-up meeting with the Heads of Departments it was recommended that the proposed new Sida initiative should be co-ordinated by the Dean’s office.

3.3.3.1 School of post-graduate studies

(Prof. Opuda-Asibo, director)

The university has established organisational structure for management and administration of postgraduate studies. There exists a Board of Post-Graduate Studies and a Board of Research, each with a Director. Deans are members of both Boards. Presently, the university offers PhD by research only. This is being changed to a mixture of course work and research. It is proposed to develop cross-cutting courses and subject specific courses. A student will take at least three compulsory cross-cutting courses and three from the field of specific courses.

The present Sida/SAREC support to Makerere University only supports Faculties of Medicine, Technology, Agriculture and Social Sciences. The Faculty of Science does not benefit from the support. The Director strongly endorsed the proposed concept of enhanced Sida support to basic sciences. He indicated that his office would be able to manage and administer the programme.

For information from meetings with heads of departments, see appendix 13.

3.3.4 Meetings in the University of Dar es Salaam (UDSM)

(Prof. M.L. Luhanga –vice chancellor, Prof. M.H.H. Kunya –chief academic officer, Prof. M.C.Y. Mbago – director, research and publication)

Prof. Luhanga in his response to our explanation of the missions TOR and the agenda stated as follows:

University of Dar es Salaam has evolved its own strategic plans. Each faculty has a research agenda in which all projects must fit. One SAREC research project had been supported outside the institutional framework. In the past, when SAREC projects ran into problems it turned to the university for solution. The university found it difficult to solve a problem when they did not know its evolution. The university has not found it possible to create synergy with such SAREC support. On the other hand, SAREC had in the past informed the university that it preferred to select its team leaders to manage its programmes as this reduced bureaucracy. Recently, there has been an agreement with SAREC to channel its support through the university.

The university places great emphasis on gender equality, ownership of programmes and projects and capacity building in its academic programmes. Therefore, there is need to have established general rules of operation. UDSM does not aspire to conduct full MSc and PhD programmes under the present environment. It encourages sandwich-training programmes. In the past, funders have forced the institutions to send its students abroad for training. There is need for flexibility in training and use of funds.

At present Sida has given the university bilateral assistance. The Sida desk officer visits the university from time to time. The established Sida/SAREC support to the Faculty of Engineering could form an example of organisation for enhanced Sida/SAREC support to the Faculty of Science. There is also need to establish a body that will co-ordinate Makerere University and University of Dar es Salaam. The Inter-University Council of East Africa is one such co-ordinating institution that the vice-chancellors have strengthened.

At present the Tanzanian government does not support postgraduate training. Science and technology are not priority areas of government and hence not presented to bilateral donors. The undergraduate education is a union matter and is supported by the union government.

3.3.4.1 Chief Academic Office

(Interview with Prof. Mayunga H.H. Nkunya).

Question: Prof. Nkunya, What impact has *NAPRECA* had to the region?

Answer: *NAPRECA* has conducted training workshops for junior academic staff, technicians. It has held one workshop per year with 20–25 trainees per workshop per session. It has sensitised academic staff to research.

NAPRECA has offered DAAD scholarships for MSc and PhD since 1989. To date more than 60 persons have been trained. There is more demand for PhD scholarships than for MSc

The following advantages have arisen from the programme:

- People trained and capacity built within the region.
- Short visits to advanced laboratories taken.
- Exposure of scientists achieved and their experience widened.
- University of Dar es Salaam, Department of Chemistry has trained six Ph.Ds under the project.

- Sustainability of research group is critical.
- Acquisition of expensive equipment is as important as its maintenance and use.
- NAPRECA network includes the University of Botswana, Dept. of Chemistry offering analytical services to NAPRECA members free of charge. The free service is supported by IPCS.
- UDSM is establishing a work-station that will access data and spectra from the university of Botswana NMR spectrometers.
- Travelling grants for students and staff have been awarded.

UDSM Capacity Building.

The university would like to promote:

- Training in research organisation, administration and management;
- Training in research proposal writing and reporting.
- On-going MSc and PhD programmes.

Impacts of ISP-IPPS and ICTP Projects

On questions regarding the impacts of IPPS and ICTP projects, the following comments were made:

Seismology I am familiar with the IPPS projects. The Seismology project was manned by the late Dr. Iranga. After his death, no true leadership has been available. A technician now mans the project. Seismic monitors were installed but there is no research. Dr. Manango from Dept. of Geology assists in supervising the technician. This project has not assisted in building capacity.

Nuclear Physics Dr. Bilal started the project but left to join politics. Some publications have come out of the project. There has been one Associate Professor promoted, 2 MSc. and 1 PhD produced. Mr. Kandoro has published research articles.

Solar Energy Physics This project has been very successful with a very well established research group. It is linked to society as it assists solar villages. The group is consulted by government, and postgraduate students are trained at MSc and PhD levels.

ICTP Low participation in ICTP activities have been due to leadership gap, exodus of trained personnel. The university re-absorbs staff who left it under normal conditions.

3.3.4.2 Directorate of Research Coordination

(Prof. Maurice C.Y. Mbago – Director

Mr. Isaac Nyella – Principal Administrative Officer

Ms. Agnes S. Muze Senior Principal Administrative Officer)

The Director indicated that the university has a well-established management and administrative structure for research. There is a Senate Research and Publication Committee as well at the faculty level. Associate deans for Research Affairs and Publications are assisting the deans. Faculty Research and Publication Committees receive proposals from the departments. The Faculty approved proposals go to the Senate Committee chaired by the vice chancellor with associate deans as members. The Sida/SAREC grants awards up to \$5000 that can be used for purchase of spare parts in instrumentation. The Directorate reports to the Chief Academic Officer.

3.3.4.3 Faculty of Science

(Dean, Prof. Rogath Thomas Kivaisi)

The Dean stated that the faculty has an establishment of 117 academic staff, 85 of whom hold PhD degrees. It has an undergraduate student population of 957 of whom 256 are female. Its postgraduate programmes has 138 MSc students (36 females) and 30 PhD students (5 females) giving a student grand total of 1125 of whom 297 are female.

The faculty has as its main issues: Research Priority, Planning and Strategic Plan Development. At present the faculty is reviewing its strategic plan. Some of the faculty identified research areas are:

- Microbiology and Biotechnology
- Renewable Energy: Solar, Wind, Biogas, Wave, etc.
- Ecology, Biodiversity and Conservation
- Ecology and Earth Resources of Tanzania.
- Information Technology
- Natural Products from Tanzanian Genetic Resources
- Environmental Modelling
- Nuclear Technology

The faculty research priority areas are being discussed and harmonised by departments. The Evaluation Team requested a full list of departmental research priority areas by latest 5th April.

Prof. Kivaisi gave an example from the Department of Physics that in 1977 grouped staff into 5 broad research priority areas. This enabled the department to develop programmes in Seismology, Applied Nuclear Physics and Solar Energy, Material Science as examples that has attracted long-term ISP support. Today, there is need for multidisciplinary research groups. In order to build a culture of multidisciplinary groups the faculty is encouraging stakeholders brainstorming meetings to develop concepts. The faculty will bear in mind the need to incorporate a regional approach to enhance a critical mass of the research groups. The dean gave as a top priority area the establishment of quality training coupled with strong research in areas of critical importance.

ICTP, TWAS and ISP participation from Faculty perspective

Prof. Kivaisi informed us that he himself had participated in three ICTP programmes. The advantages received were: contacts with experts, attendance of challenging lectures, and collection of research materials and literature. He was appointed an ICTP Associate but never made use of the grant due to timing conflict and job needs. He indicated that he was not happy with the school. He was recipient of a \$2000 TWAS grant in 1994. He indicated, that the Dean's Office receives TWAS application forms that he distributes to the departments, but there have been no response to the forms.

Prof. Kivaisi has participated in several ISP projects. The Programme helped him acquire best equipment for research. He was trained at MSc and PhD level by the Programme. He has also trained several students at MSc and PhD levels. In addition, the Programme through Regional Network helps to train post-graduate students. He introduced in 1990 a college similar to ICTP seminars where BSc, MSc or PhD holders who want to start research in solar energy or change their areas of research do attend courses. Three Kenyans have done PhD work in same area of research.

Prof. R.B.M. Zenzota, Head, Department of Zoology and Marine Biology joined the dean. He expressed his support for the proposed enhanced Sida support to fundamental sciences. He indicated that organisation of research groups had not taken root in his department. Discussions with Dr. Mgaya and Prof. Nikundiwe indicated that this department had not benefited from any of the Programmes awards, although they acknowledged that the Programmes' activities sharpened the skills. The departmental staff either lack information about the Programmes or motivation to use them. The Academic staff has to a large extent relied on state funding for research. There was a feeling that donor driven funding of research has been detractive as donor priorities do not coincide with departmental or national priorities. The department found it hard to attract research funding for fundamental areas in science. Neither ICTP nor ISP support biology. For meetings with departments, see appendix 14.

4 A New Initiative – Possibilities to Strengthen the Basic Sciences

4.1 The Need for a New Initiative

As seen in the previous chapters (chapters 2 and 3), the research and training activities supported by the programmes include surprisingly few participating members of academic staff and postgraduate students from Makerere University and University of Dar es Salaam except Department of Physics. In cases where such participation is included, the main activities are in applied and motivated/directed research. Some ongoing research activities at the two institutions are: Solar Energy, Seismology, Mössbauer and XRF spectroscopy, and PhD training courses for female students. Participation in ICTP theoretical seminars, diploma courses and research has not been taking place since 1998/99. Previous ICTP Associates included nine persons from the University of Dar es Salaam 1977–1998, and five Associates 1975–1998 from Makerere University.

As described in chapter 2 the goal for the scientific activities in fundamental science lies within the scientific domain itself, and the main task of a scientist doing fundamental science is to develop the scientific base, upon which future use of scientific results and new applications will rest.

Since the fundamental aspects of the different scientific areas are missing or very weak in the two universities, the evaluation team suggests a new initiative in which such research efforts are prioritised.

The new initiative should be seen as a *pilot project*, in which fundamental science is supported within one or a few prioritised areas within the faculties. The pilot project should include a graduate school of PhD and MSc students at each university. It should be supported by academic staff who is teaching also at the undergraduate level, but who have time and ability to take on the role as PhD supervisors.

The two faculties are eager to strengthen their postgraduate programmes and research activities. One of the institutions is planning for the introduction of advanced courses within their PhD programmes. Both faculties would like to have more postgraduate students registered, more resources given to support academic staff research, reduce heavy teaching load in some departments, and recruit younger and more qualified staff. *The evaluation team has sympathy for these ambitions, but would recommend that the ambitions should primarily be directed towards the fundamental aspects of prioritised areas, in which the faculty already have viable applied research activities.*

The programmes have indicated a strong willingness to assist the institutions in strengthening the fundamental aspects in science. All the programmes seem to be willing to offer training assistance to the institutions. Within the limit of the resources available to them, they would offer grants to successful applicants from the two institutions, assist the institutions to apply for additional resources, and train the technical staff and support staff from the institutions.

Therefore, given the convergence of the programmes capabilities and needs of the institutions, there is a possibility to initiate a new programme of support to basic sciences at Makerere University and University of Dar es Salaam. In the SAREC-initiated workshop on basic sciences in Kampala, 29–30:th of April, the suggestion of the new initiative was discussed from a number of perspectives, including 1) priority setting, 2) ownership by the African Universities, 3) infrastructure and management and 4) the creation of sustainable research groups. The participants split into

smaller working-groups, who discussed the initiative in general terms and also addressed the above mentioned perspectives. Some of their suggestions are discussed in the following sections and are also included in the recommendations (chapter 1).

4.2 Objectives of the Initiative

The evaluation team summarises the main objectives of the proposed new initiative in the text below.

The main objectives of the new initiative are to:

- Foster a new generation of young scientists, who are able to run all aspects of the university as teachers, researchers and research leaders.
- Train the recruited postgraduate students in the fundamental aspects of their scientific areas. At the same time they should have ability to communicate a clear comprehension of the interaction between the fundamental and applied fields of science.
- Train the recruited postgraduate students at UDSM and Makerere University, in a way that ensures that they have communication with a wider network of internationally well-known scientists.
- Recruit the postgraduate students by an academic-merit based competitive system. However, the recruitment process should be such that a gender balance can be achieved.
- Improve research infrastructure by providing necessary research equipment at the universities and facilitate access to Centres of excellence and laboratories with advanced instrumentation.
- Develop the technical, teaching and support staff in the Faculty of Science, University of Dar es Salaam and Makerere University.
- Support the formation of sustainable supercritical research groups within the prioritised areas, in order to decrease vulnerability to the loss of single personnel competence.
- Train group leaders and other university teachers in grant management writing and grant skills. This implies that mature scientists are expected to write successful research proposals and reports.

4.3 Means to reach the objectives

In order to reach the objectives a new way of co-operation between the programmes and the two faculties will have to be initiated. Firstly, there is need for each faculty to identify their priority research areas, evaluate their joint strengths and weaknesses, identify their training needs and develop strategies for fulfilling their objectives. Secondly, there are a number of obstacles in the present structures of programmes and institutions that also will have to be overcome. Thus there is need for special activities. These are illustrated in Figure 3. Some of the main activities are listed below.

– Establishment of postgraduate programmes at MSc and PhD levels.

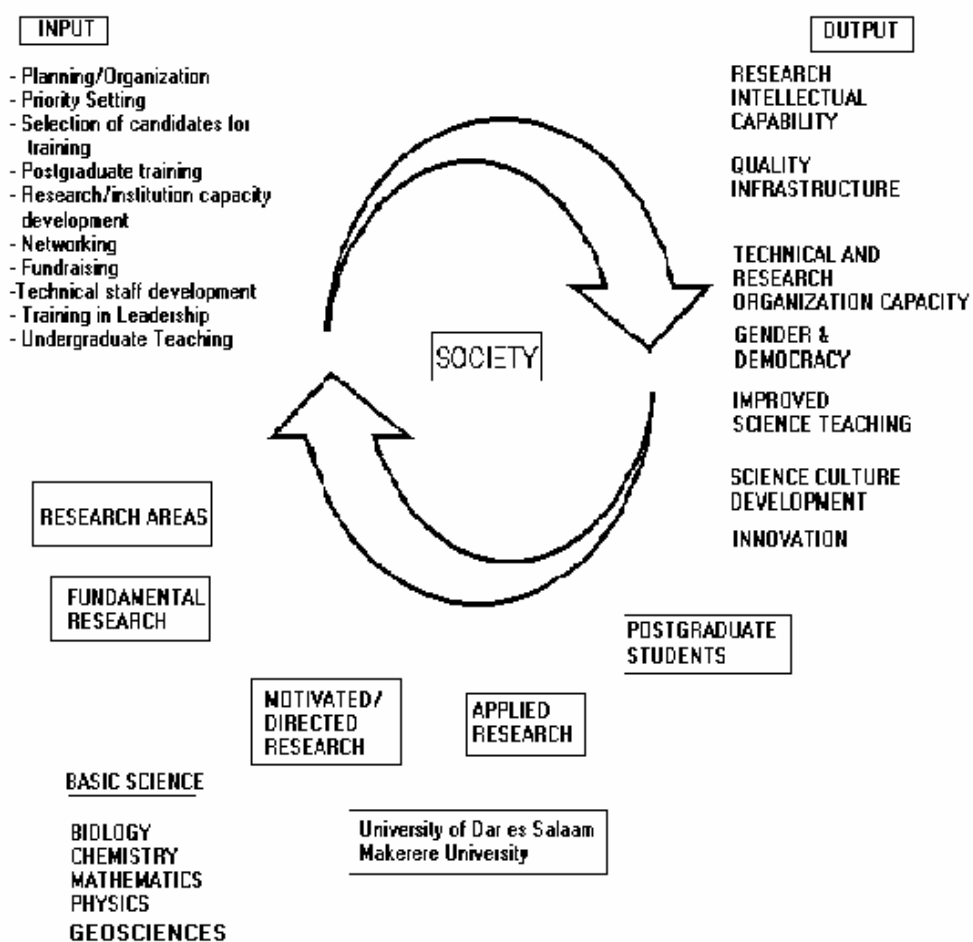
- 1) Special postgraduate scholarships need to be established at each faculty, that would support at least 15 masters and 5 PhD students per year at each university. Allocation of students to departments is left to faculty decision as per needs of department, courses and research priority areas. The need for a special fellowship is necessitated by the fact that at present the Uganda and Tanzania governments do not support postgraduate students. The economic ability of

most students do not allow self-fees payment. Donor support to postgraduate programmes in the faculty of science has not been co-ordinated and directed. Yet, without a viable postgraduate programmes in science there would be no development of new knowledge. It is estimated that support for postgraduate fellowships would cost about \$100,000 per year per university based on University of Dar es Salaam postgraduate fee structure. (see appendix 15 for example of cost estimate).

- 2) Packages of advanced courses should be developed in the project's first phase as part of a postgraduate programme. These courses should be used at either MSc and/or PhD levels, and should ensure that the postgraduate students have a high academic quality in their areas of competence. Each developed course should have identified textbooks and lecturers. Where such lecturers are not available locally, the programmes should assist in staff/student exchange and lecturer visits for the duration of the course.
- Formally a group of students can be organised in a *graduate programme*, so that the number of students for the postgraduate courses are always large enough to have a lively discussion within the group, and an exchange of ideas between group members. In a longer perspective, graduate programmes can be arranged within a number of priority science areas. The teachers could be invited experts provided through the Programmes and/or locally trained staff/senior researchers.
 - The graduate schools can be organised in different ways. If already existing PhD students in an applied area of science are included in the graduate programme, the programme could span the whole area of competence illustrated in Figure 3. Alternatively, one can imagine a programme course only directed to fundamental science – for example in mathematics, theoretical physics, theoretical chemistry, geosciences and other emerging knowledge areas.

Which model that will be best suited for the respective faculty and its priorities has to be discussed within the faculty itself.

Figure 3. Illustration of how the new initiative, suggested to be supported by SAREC through TWAS, TWOWS, ICTP and ISP, could work in a long-term perspective.



– Strengthening of Teaching and Research Infrastructure.

The two Faculties of Science of both universities have got the obligation to identify research priority areas in fundamental science relevant to their national development needs. A critical mass of academic staff, postgraduate students and technical staff could easily be built around the identified priority areas and form a research group. In the priority setting it is important to develop an open approach with visible criteria, and to have the time-perspective in mind. It is a fact that all areas in the different disciplines are not of the same degree of maturity at the two universities. Thus, one needs a long-term as well as a short-term perspective in the priority setting.

However, it is important to start within scientific areas in which there is some competence available. Special academic and refresher courses could be organized jointly with programmes to sharpen academic priorities and vision. If the first pilot project is successful it will be easy to argue for use of the same “model” or approach in “new” areas of science.

It is necessary to strengthen the infrastructure available in each department in order for quality teaching and research to take place. The Programmes should work with departments in identifying activities. The faculties should prepare activities, proposals and submit to the Programmes. Some resources could be obtained from existing Programme funds. Additional financing could be obtained through writing of joint research proposals to other donor agencies and a request could be made to Sida/SAREC for special funds for this. Procurement priorities of expensive research equipment should be undertaken jointly between the institutions and the assisting Programmes in the identified fields. Local, south-south and south-north training of academic staff should be utilized in all training activities. It is necessary that each university establish a central research laboratory with expensive but needed equipment for multidisciplinary research. The laboratory should have established staff and budget for its operations and maintenance. Establishment of a central basic science laboratory for the sub-region should be explored.

- Training of Technical staff.

Each piece of specialised equipment requires trained technical and academic staff. The training of academic staff should be organised through short visits to laboratories with such equipment. However, special training and refresher courses should also be organised for technicians. These could also involve the postgraduate students who will be utilising the instrumentation. As far as possible, the two faculties should train their technical and academic staff locally. Such training could be done at one of the regional university institutions or government research institutes.

Supplier of each equipment should be required to provide technical staff training, technical and user manuals, critical spare parts for at least one year and should have a local agent within the region. As far as possible local or international competitive bids should be considered for a pool of needed equipment within each and between the two institutions. Training of technical staff courses should include research management, procurement, servicing of equipment, and teamwork.

- Training of support staff.

There is need for efficient management of research. The management quality required calls for knowledge on processing of proposals, processing of postgraduate students, disbursement of funds, accounting for funds disbursed, procurement of consumables in an orderly and timely basis, writing of financial reports and other essential components that would promote competitive, transparent and accountable management and administration of human and financial resources. As far as practicable, such training should be done locally or through short term visits to the Programmes institutions.

- Training of scientific group leaders

In the creation of new knowledge, the scientific departments and the *research groups* play a crucial role in handing over the “old” knowledge to the younger generation. The existence of vital and sustainable research groups and departments is therefore a crucial issue. Apart from qualities like research skill and creativity a sustainable research group is characterised by an “institutional memory”, which is more long-lived than that of the individual. Through the “institutional memory” not only scientific knowledge is transferred from one generation to the next, but also practical matters like procurement and maintenance of instrumentation, knowledge on how to write and evaluate research proposals, and the more subtle knowledge on what works in a research project or not and what to expect from students/pupils.

The research groups in the faculties of science in Makerere University and the University of Dar es Salaam are generally small and often under-critical, (often consisting of only a few persons) and

therefore they are highly vulnerable to changes in the activities of these few persons. A supercritical research group should not be less than four academic staff plus similar number of students and technical staff. The previously mentioned lack of initiatives and applications for grants from the programmes (especially TWAS and ICTP) may partly be due to a situation in which young people at MSc level are not informed or stimulated by the more experienced staff to apply for grants or participation in courses/activities.

In the proposed initiative we expect that the recruited postgraduate students should be part of a super-critical research group with a competent team leader, who passes on information to the rest of the group, not only on scientific matters but also on different possibilities that may arise, for example to apply for grants, scholarships, travelling money etc. – In order to write good research applications the group leaders themselves might, however, benefit from training in writing and evaluation of research proposals. They might also benefit from training in programme management, so that they are prepared to undertake responsibilities for larger research programmes with scientific as well as administrative skill.

– Establishment of Linkages

There is need to assist the two faculties in establishing networks with experts in the south and north in order to avoid isolation, improve comparison and discussion of ideas and exchange of data and information. Additionally, there is need to link different fields of science together within the faculties of science, and also to link science with other fields within the university. Such linkages should be extended to the regional universities.

Linking the two universities together in the implementation of this project is essential. There is need to co-ordinate activities within this project with the four programmes, the universities and other donor agencies.

Another aspect of linkages is the need to recruit new scholars to assist in the development and implementation of PhD courses and supervision of the postgraduates.

We suggest that this need is addressed by making use of the worldwide contacts with scholars that already exists within the Programmes.

A crucial function in the linking process is that of co-ordination. After discussions with the different partners we recommend that a local co-ordinator should be appointed in the Dean's office. Such a co-ordinator should have the following qualifications.

- Possess a post-graduate degree in one of the basic sciences fields.
- Not be presently involved in the projects of Programmes.
- Be active in promoting science.
- Have solid experience; he or she could be retiring, but have willingness to move to a new location.
- Should be above local bias.
- Should have some experience and/or contact in a developed country.
- Should have lived in countries where organisation of research is difficult.
- Should have lived in countries where organised science operates.
- Contacts with or working knowledge of donors will be an added advantage.

The Universities should further discuss the need for an inter-university/programmes coordinator, functions and duties that may be assigned to such a person.

– Establish Small Research Grants.

It will take time for academic staff to write competitive proposals for research grants. In the beginning it is necessary to train academic and postgraduate students in research proposal writing. Graduates of such training should be encouraged to write research proposals that can be peer reviewed regionally. Establishment of a small grants fund at each institution is necessary during the first 3 to five years.

For an example of a tentative cost-estimation including the items raised under this point, see appendix 15.

4.4 The Kampala Workshop on Basic Sciences

The four working groups at the Kampala workshop gave recommendations and stressed some different aspects in the proposal of a new initiative. As comments on the proposal of a new initiative they stressed the importance of the following:

1. Group on priority setting:

- Development of skills in management of and proposal writing for research projects.
- Establishment of postgraduate programmes with minimum requirements for gender equality
- Possibilities of student exchange at post-graduate level (also involving transfer of credits)
- Strengthening of teaching, especially in new, emerging areas
- Need for the programmes to work with departments in implementing activities, for example procurement of instrumentation and expensive equipment
- Training of scientific group leaders
- Identification of national needs

Different broad areas were given as examples of prioritised, interdisciplinary research, for example 1) Mathematical modelling in medicine, economy, beach erosion and sociology; 2) Materials science with applications to bulk/composite material, polymers and thin films and 3) Environmental/analytical/industrial chemistry involving fundamental chemistry, raw materials and indigenous food plants, 4) Inorganic/physical chemistry (reaction mechanisms, coordination chemistry, quantum chemistry and 5) Organic chemistry with applications.

2. Group on African ownership of the research programmes:

The group agreed with the suggestions made by the evaluators in the draft report and added the following suggestions:

- In order to stimulate the interest in sciences in the young generation the faculties should work out a way of popularising basic sciences at pre-university level.
- The priority setting needs to be given more thought.

On the issue of ownership the following suggestions were made:

- Faculties should identify their priority research areas and communicate them with the staff and society.
- Faculties should evaluate their joint strengths and weaknesses
- Training needs at the departments should be identified
- Assistance from the four programmes and Sida should be sought when needed

- The research programmes adopted should be implemented as soon as possible
- Co-ordination of the new initiative should be done at the faculty level.

3. Group on infrastructure and management

*The running and maintenance of existing equipment was considered to be a key issue. Procurement of second hand equipment should be discouraged (it gives a lot of work with uncertain outcome)

*Development of human resources is another key issue. This area includes refresher courses for teachers and staff, training of technical staff, administrative staff and scientific group leaders.

*Establishment of joint centres of excellence between the east African universities was considered essential as well as procurement of specialised research equipment.

*Exchange of staff between universities should be facilitated.

*Practical means/recommendations on how to reach the targets would be to:

- Set up an equipment fund at the department level – not at group level. The present programme activities have led to a situation in which some researchers may miss a minor piece of equipment (a cartridge or some electronic device, or a lamp) while the next-door research neighbour may be adequately funded but not able to assist due to programme conditions.
- Allocate funds for training and refreshment courses for technical, administrative and scientific staff.
- Introduce teaching assistantships for post-graduate students in order to reduce the teaching loads of the university teachers.
- Apply the NUFU model for remuneration of programme co-ordinators.
- Sida/SAREC could allocate support for procurement of specialised equipment.

4. Group on sustainable research groups

The human components of a sustainable research group was identified to consist of:

Academic staff members, graduate students (staff members and non-staff students), research assistants, research fellows (some of whom might be alumni)

It was considered to be important for the research groups to initiate research proposals, independently of university bureaucracy. At the same time it was stated that the university system should oversee all research funds granted to the research groups. The need for short-term staff graduate training in deficient areas was stressed.

Graduate students on the new programme should have stipend and paid assistantship to enable them to complete their studies in time.

On the structure of sustainable research groups it was noted that they could either be 1) departmental or 2) multidisciplinary with a minimum size of four staff members. The Faculty should establish a research co-ordinator (vice-dean?) for financial and administrative purposes in order to ensure the research groups as much time and freedom as possible for the research tasks.

On linkages/communication recommendations were made on south-south as well as north-south linkages through:

*exchange programmes

*joint supervision of PhD students

*joint lectureships for degree programmes, including teaching components.

Acknowledgements

The evaluation team would like to express our sincere thanks for the hospitality of the Sida/SAREC representatives, the programmes and the universities during our visits to the different institutions, and for the work done by you in supplying us with documents on your activities, a small part of which is reflected in the appendices. We are also grateful for the constructive and interesting discussions we had with you at the workshop in Kampala.

Appendix 1

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Appendix 2

Terms of Reference for an Assessment of Sida's Support to the Basic Sciences in a National Context

1 BACKGROUND

Support to the basic sciences chemistry, physics, biology and mathematics is a prominent feature of the Swedish support to research cooperation and research capacity building at universities in developing countries.

The support is channelled both through Sida's bilateral support to universities in selected countries and through four organisations, namely International Science Programme (ISP), International Centre for Theoretical Physics (ICTP), Third World Academy of Sciences (TWAS) and Third World Organisation of Women in Science (TWOWS), hereinafter referred to as "The Programmes". The operationalisation of The Programmes is to a large extent based on scholarships and grants for research training, visits to laboratories in developed countries, and minor equipment, although the specific design in terms of eligibility varies within the different programmes.

The support from Sida to ISP and ICTP dates back to the 1970-ies and has been justified by the pivotal role of the basic sciences in national advanced knowledge systems and, eventually also by the complementarity between the activities within The Programmes and the bilateral programmes supported by Sida. Evaluations of two of The Programme, ISP (1993) and ICTP (1989 and 1996) have shown that these programmes contribute to the strengthening of national research capacity in a very cost-effective way. It has also been emphasised that the mode of operation of these programmes, including the opportunities to meet colleagues from other developing countries while on visit in Trieste or in Sweden is highly appreciated.

During 2001 Sida initiated an overhaul of the support to the basic sciences. As a first step a workshop was organised in Trieste, June 2001 with representatives of each of The Programmes. During the discussions all organisations expressed their interest to explore possibilities for joint activities, both as regards activities in developing countries as activities aiming at joint proposals to donor agencies.

Against this background it is of interest to assess the impact of the Programmes at the national level and to explore the feasibility of an initiative involving a selected number of African universities in collaboration with Sida and The Programmes.

2 PURPOSE AND SCOPE OF THE STUDY

The overarching purpose of the assessment is to provide a contribution, by way of recommendations to the ongoing discussion at Sida on future development and improvement of the support to the basic sciences in countries with weak research capacity.

The study comprises five parts:

- I. Preparatory desk study: compilation of progress reports from The Programmes and the documents from the workshop held in Trieste, June 2001
- II. An overview of the current situation for the basic sciences at the universities under study.

- III. An assessment of the perceived impact of the support from The Programmes to these universities.
- IV. Based on the findings the evaluators shall make general recommendations to the Programmes on how to enhance the impact of their activities at the national level in countries with very weak research capacity. The evaluators shall also make suggestions on the outline of a concerted action, involving three or four departments for basic sciences at the universities under study. The aim of the concerted action would be to strengthen research capacity at the universities by way of a co-ordinated supply of the different forms of support available within The Programmes.
- V. When a draft report is available a workshop shall be arranged, preferably in one of the African countries under study, with participation of representatives of the universities under study and of The Programmes. The latter will be invited to discuss how their different activities can be utilised by the departments that agree to collaborate in this focused action.

The conclusions and the recommendations arrived at by the evaluators are intended as contributions in the preparation during autumn 2002 by Sida/SAREC and the decision by the Research Council of Sida as for the future support from Sida to the basic sciences.

3 THE ASSIGNMENT

I. Preparatory desk study

The study shall include a compilation of the progress reports from ICTP, and TWAS sent to Sida during the last five years, or as for TWOWS since 1999, specifically addressing the following issues:

- the overall approach towards strengthening of research capacity in the basic sciences in particular in the Least Developed Countries of Sub-Saharan Africa;
- the significance of Sida's support to these activities, and
- current plans for development of the organisations' portfolio of activities.

The desk study shall also include a synthesis of the document resulting from the workshop held in Trieste, June 2001.

II. Current status of the basic sciences

The report shall provide an overview of the current status of the basic sciences at the universities under study. A brief description of the following shall be provided:

- faculty constituency: number of researchers with PhD (male/female), number of graduate students undergoing PhD training (male/female);
- access to national MSc and PhD courses in the basic sciences;
- number of course teachers (male/female);
- brief description of links with other universities/international collaboration;
- main sources and level of funding;
- number of undergraduate students;
- number of undergraduate, M.Sc. and Ph.D. students enrolled annually;
- internal mechanisms for assessment of quality and relevance of new or on-going research activities;

- have the universities any documented strategies for development of the basic sciences? If so, are these adequate in relation to present funding and facilities?
- what incentives are provided to trained researchers to stay at home and pursue their careers?
- is there a monitoring programme of the trained personnel, their labour movement and preferences of place of work?

III. Perceived impact of The Programmes

The evaluators shall address the following aspects, issues and questions:

Approaches used

The study shall provide a clear characterisation of the predominant approaches used by The Programmes in pursuance of the objectives agreed between them and Sida/SAREC, as regards the following:

- recruitment of the scholars: open announcements or recruitment of students from research groups previously involved in The Programmes;
- short-term/long-term scholarships for research training and/or research work at host institutions, with continuity or otherwise bringing the same scholars back to the same host institutions;
- one-off, or renewable small grants to researchers for work in their own home institutions;
- one-off, or renewable small grants for purchasing research equipment, consumables and literature, and for attending courses and conferences;
- networking among university departments and research institutions in a region or sub-region; and
- technical assistance and/or support services from industrialised country institution to developing country institution.

In identifying the predominant approaches used by The Programmes, the evaluators should take a close look at the actual practice rather than the stated intentions.

Contents in the supported projects

An overall assessment of the contents of the projects carried out by the scholars concerning the degree of research oriented to the basic sciences, i.e. physics and chemistry, as compared to projects oriented towards applied aspects such as biotechnology, biophysics, environmental chemistry, etc.

Gender balance

- Have The Programmes actively promoted a gender balance as for the recruitment of the students?
- Is gender equality articulated in the policies and strategies of The Programmes?

IV. Improvement of impact in the Least Developed Countries and Feasibility of a co-ordinated approach

The study shall assess and analyse the following issues:

At department level:

- present number of viable research teams in basic sciences
- main areas of research

- laboratory facilities
- assessment of training needed to promote on-going research efforts
- knowledge about The Programmes
- perceptions of possible benefits of The Programmes
- influence on the selection of scholarship/grant holders and/or areas of research

At faculty level:

- present plans and strategies for development in terms of institutional capacity, research capacity and research priorities;
- knowledge about The Programmes;
- perceptions of possible benefits of The Programmes, and
- influence on the selection of scholarship/grant holders and/or areas of research

At university level

To relate basic science support to the whole university in:

- postgraduate courses development and provision;
- research coordination, and
- research laboratories

The analysis shall result in general recommendations to the Programmes on how to enhance the impact of their activities at the national level in the Least Developed Countries.

The analysis shall also result in recommendations for a future collaborative initiative, that builds on existing capacity at both the departments involved in the study and of the available forms of support of The Programmes.

V. Workshop on future approaches

The recommendations and conclusions arrived at in the study outlined above shall form the basis for a workshop on future approaches for the support from Sida to the basic sciences. The workshop shall be arranged after a first draft of the study is available and with participation of representatives of the African universities and departments that agree to collaborate on the proposed collaborative initiative and representatives of ISP, ICTP, TWAS, TWOWS and Sida. The expected outcome of the workshop is an agreement on a plan for collaboration for the forthcoming three years period of time.

The conclusions from the workshop shall be included in the final report from the evaluation.

4 METHODOLOGY, TEAM AND TIME SCHEDULE

The team shall consist of two experts, qualified in different areas of basic sciences and science policy. At least one of the experts should be based in a developing country.

The study will comprise

- i. Compilation of reports from ISP, ICTP, TWAS and TWOWS to Sida, as well as the document produced during the workshop in Trieste, June 2001.
- ii. Visit to ISP, Uppsala and ICTP, TWAS and TWOWS in Trieste.
- iii. Visits to University of Dar-es-Salaam, Tanzania and to University of Makerere, Uganda
- iv. Overview over grantees supported by the Programmes during the last decade, interviews with a representative number of former students from each of The Programmes, with

- Heads of Departments at identified departments and with other people pertinent to the requested information
- v. Arrangement of a workshop with representatives of the universities that are object of the study, The Programmes and with representatives of the Sida.

The study will be carried out at the beginning of 2002 according to a time schedule agreed on with Department for Research Cooperation, Sida.

5 REPORTING

The report shall be written in English and should not exceed 50 pages, excluding annexes. Format and outline of the report shall follow the guidelines in *Sida Evaluation Report – a Standardised Format* (see Annex 1). A copy of the draft on paper and on diskette shall be submitted to Sida no later than April 15, 2002.

Three weeks after receiving the conclusions from the workshop and comments on the draft report a final version in four copies and on diskette shall be submitted to Sida. Subject to decision by Sida, the report will be published and distributed as a publication within the Sida Evaluations series. The report shall be written in Word 6.0 for Windows (or in a compatible format) and should be presented in a way that enables publication without further editing.

The evaluation assignment includes the production of a Newsletter summary following the guidelines in *Sida Evaluations Newsletter – Guidelines for Evaluation Managers and Consultants* (Annex 2) and also the completion of *Sida Evaluations Data Work Sheet* (Annex 3). The separate summary and a completed Data Work Sheet shall be submitted to Sida along with the draft report.

Appendix 3a

Table 2.2.1

ISP – IPPS Fellowship Holders at Makerere University and University of Dar es Salaam (During 1969–2002)

Fellowship holder	Gender	Research Area	Year
TANZANIA			
SEISMOLOGY			
1) Dr. Iranga, Mwita D. Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M (Died)	Seismology	1989-90 (6 m) 1991-92 (10 m) 1993-94 (1 m)
2) Mr. Ferdinand, Richard Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M	Seismology	1993-94 (3 m) 1994-95 (10 m) 1995-96 (4,5 m) 1997 (12 m)
3. Mr. Ntimizi, Athumani Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M (Died)	Seismology Technician Training (Technician)	1990-91 (8 m)
4. Ms. Nyenyembe, Anna. Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	F	Seismology (Technician)	1993-94 (6 m) 1994–95 (3 m) 2000 (1 m)
APPLIED NUCLEAR PHYSICS			
5. Dr. Makundi, Ismail Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M	Mössbauer Spectroscopy/X-Ray Fluorescence	1986-87 (10 m) 1997 (3 m)
6. Dr. Koleleni, Yusuf Ismail Department of Physics, University of Dar es Salaam P.O. Box 35063 Dar es Salaam Tanzania	M	X-Ray Fluorescence, Aerosols, Biological samples	1985-86 (10 m)
7. Mr. Munubi, Anania Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M (Died)	X-ray Fluorescence	1991-92 (10m/IAEA) 1993-94 (2 m)

8. Mr. Mwiruki, Godwin M. Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M (in U.S.A)	X-Ray Fluorescence	1992–93 (12 m)
MATERIALS FOR SOLAR ENERGY CONVERSION			
9. Prof. Kivaisi Rogath T. Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M	Solar Energy	1975–76 (10 m) 1978–79 (3 m) 1993–94 (1 m)
10. Prof.. Lushiku, Elias Musa Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M (Died)	Solar Energy/selective surface	1981-82 (12 m) 1984–85 (4 m) 1988–89 (1 m) 1994–95 (3 m)
11. Dr. Kashinje, Stanslaus P. Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M (in Rwanda)	Mössbauer Spectroscopy Solar cells	1977–78 (10 m)
12. Dr. Mbise, Godfrey W. Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M	Condensed Matter Physics and material sciences, solar energy selective surfaces	1987-88 (12 m) 1990-91 (12 m) 1992-93 (12 m) 1994-95 (4 m) 1995-96 (2 m)
13. Mr. Chewale, Silvani January Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M Dead	Solar Energy (M.Sc)	1978-79 (12 m)
14. Mr Mwaikuka, Japhet A. Department of Physics University of Dar es Salaam P.O. Box 35063 Tanzania	M (left Dept)	Vacuum Technology /Technician	1989-90 (2 m)
15. Mr. Nyakyi, Thomas Paul Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M	Electronics for microprocessor application (Technician)	1992-93 (7 m)
16. Mr. Kivambe, Maulid M. Department of Physics, University of Dar es Salaam P.O. Box 35063 Tanzania	M	Transmission Electron Microscopy (Technician)	2000 (3 m)

17. Mr. Mmari R Department of Physics University of Dar es Salaam P.O. Box 35063 Dar es Salaam Tanzania	M (in private company)	Vacuum technology (Technician)	1985–86 (2 m)
18. Mr. Mtelega Khalfan Department of Physics University of Dar es Salaam P.O. Box 35063 Dar es Salaam Tanzania	M (in Belgium)	Microproces sors Electronics (Technician)	1995/96 (4,5 m) 1997 (2 m)
OTHERS			
19. Mr. Mayige, Christopher Ngelya Department of Physics University of Dar es Salaam P.O. Box 35063 Dar es Salaam Tanzania	M	Laser spectroscop y	1978-79 (10 m)
20. Mr. Shilla, Daniel Abel Department of Physics, University of Dar es Salaam P.O. Box 35063 Dar es Salaam Tanzania	M	Transmission Electron Microscopy (Technician) Special grant given by Uppsala University to provide necessary training of technicians responsible for the TEM donated by Sida/SAREC	2000 (3 m)
21. Prof. Vitta, Paul B. Department of Physics, University of Dar es Salaam Dar es Salaam Tanzania	M (in UNESCO)	Atmospheric Physics	1973–74 (10 m)

UGANDA			
SEISMOLOGY			
22. Dr. Twezigomwe, Ezra Makerere University Department of Physics, P.O. Box 7062 Kampala, Uganda	M	Seismology	1989-80 (3 m) 1991-92 (10 m) 1992-93 (1 m) 1993-94 (6 m) 1994-95 (3 m) 1995-96 (5 m)
23. Mr. Ruben Kashambuzi Dept. of Geological Survey and Mines P.O. Box 9 Entebbe, Uganda	M	Seismology	1989/90 (3 m)
24. Mr. Gadi Turyomuryguendo Dept. of Geological Survey and Mines P.O. Box 9 Entebbe, Uganda	M	Seismology	1992/93 (3 m) 1993/94 (6 m) 1994/95 (4 m) 1995/96 (6,5 m)
25. Mr. Fred Muiitta Dept. of Geological Survey and Mines P.O. Box 9 Entebbe, Uganda	M	Seismology Technician	1994/95 (1,5 m)
26. Mr. Isaiah Tumwikiringe Dept. of Geological Survey and Mines P.O. Box 9 Entebbe, Uganda	M	Seismology Technician	2000 (1 m)
27. Mr. Lubega, Joseph Makerere University Department of Physics, P.O. Box 7062 Kampala, Uganda	M	Seismology (Technician)	1994-95 (1,5 m)
THIN FILMS			
28. Dr. Otiti Tom Makerere University Department of Physics, P.O. Box 7062 Kampala, Uganda	M	Thin Films	1995-96 (7 m) 2000 (5 m) 2001 (2,5 m)
OTHERS			
29. Dr. Ilukor Odeke, Jokana Makerere University Department of Physics P.O. 7062 Kampala, Uganda	M (Died)	Solid State Physics/Ultra sonics	1969-70 (10 m)

Source: Papers given to Evaluation Team

Table 2.2.2
Summary of ISP Fellowship Holders by Degrees and Gender at University of Dar es Salaam and Makerere University

(Note, that the total in Table 2.2.2 does not correspond to total in Table 2.2.1, probably because some trainees were not university staff.

PhD=students on doctoral programmes

MSc=students on MSc, MPhil or equivalent programmes)

Tanzania	PhD	MSc	Technician	M	F
University of Dar es Salaam	8			8	-
Department of Physics			8	7	1
P.O. Box 35063		5		5	
Dar es Salaam					
Tanzania					
Total	8	5	8	20	1
Uganda	PhD	MSc	Technician	M	F
Makerere University Department	3			3	-
of Physics		(2)		(2)	-
P.O. Box 7062					
Kampala					
Uganda					
and (Geological Survey and			1 + (1)	1 + (1)	
Mines)					
Total	3	(2)	1 + (1)	4 + (3)	-

Table 2.2.3.
Gender Distribution Among Staff and Students in Research Groups Supported by IPPS.

Project	Project Leader	Staff						Students			
		PhD		Other Academics		Technician		PhD		MSc	
		M	F	M	F	M	F	M	F	<u>M</u>	F
Tan:01/1	M	1		2		4	1	1			
Tan:01/2	M	3				2		2		2	
Tan:01/3	M	2		1		1		1		1	
Uga:01/1	M	2		2		1		1		2	
Uga:01/2	M	1		1		2					
Total	5	9	0	6	0	10	1	5	0	5	0

Source ISP Annual Report 2000, p. 28

Notes:

Tan = Tanzania

Uga = Uganda

M = Male

F = Female

Tan:01/1 = Atmospheric Physics and Geophysics (Seismology)

Tan:01/2 = Condensed matter physics and material science

Tan:01/3 = Applied Nuclear Physics, X-ray Fluorescence, Mössbauer

Uga:01/1 = Condensed matter physics and material science

Uga:01/2 = Atmospheric Physics and Geophysics (Seismology)

Table 2.2.4
ISP-IPPS Grants Allocation to Projects at University of Dar Es Salaam and Makerere University (in Ksek). Prior to 1999: 4,236, 4,819 And 1,629 KSEK Had Been Allocated to the Respective Programmes Tan: 01/1,2,3.

Project	1999	2000	2001	2002	Total
Tan:01/1	279	129	120		528
Tan:01/2		518	678	608	1,804
Tan:01/3	80	50	0		130
Uga:01/2	125	236	158		519
Uga:01/1		269	361	253	883

Note, that the table is extracted from two tables (Table 8, p. 34 and Table 9, p. 35) of Annual Report 2000.

Table 2.2.5**ISP – IPICS Support to Research Group at Makerere University and to Networks Co-Ordinated from University of Dar es Salaam**

Research group/Network; Title, Name and Address of group leader/coordinator	Gender	Research Area	Grant Amount SEK	
			Year	
1. Group UGA:01 Prof. Kiremire, Bernard Makerere University Department of Physics, P.O. Box 7062 Kampala, Uganda E-mail: gashabe@infocom.co.ug	M	Pesticides residue in L. Victoria	'99 '00 '01 '02	80,000 160,000 310,000 300,000
2. Network NAPRECA Prof Mayunga Nkunya Department of Chemistry, University of Dar es Salaam Dar es Salaam Tanzania E-mail: nkunya@chem.udsm.ac.tz	M	Natural products Research Network for Eastern and Central Africa (NAPRECA) (supported since 1988)	'99 '00 '01 '02	170,000 170,000 170,000 210,000
3. Network ANCAP Dr. Michael Kishimba. Department of Chemistry, University of Dar es Salaam Dar es Salaam Tanzania Email:Kishimba@chem.udsm.ac.tz	M	African Network for Analysis of Pesticides (ANCAP)	'01 '02	100,000 190,000

Non – University Institution in Tanzania

	Gender	Research Area	Grant Amount SEK	
4. Group TAN:01 Dr. Godwin Ndossi, present group leader Tanzania Food and Nutrition Centre (TFNC) P.O. Box 977 Dar es Salaam Tanzania Email:<fsn@ud.co.tz>	M	Nutritional biochemistry/ biotechnology (supported since 1981)	'81- '98 '99 '00 '01 '02	3761,000 300,000 320,000 320,000 300,000
Fellowship holders			Year (months)	
5. Wilbard Lorri (TFNC)	M	Weaning food developing	1987-93 (26 m)	
6. Dr. Nicholas Mlingi (TFNC)	M	Nutritional evaluation of fermented cassava	1982/83 (12 m) 1987/96 (30 m)	
7. Dr. Rose Kingamkono (née Mnjunju) (TFNC)	F	Weaning food development	83/84 (4 m) 84/85 (8 m) 89/90 (2 m) 90/97 (30 m)	

	Gender	Research Area	Grant Amount SEK
8. Ms. Generose Mulokozi Ph.D Student (TFNC)	F	Provitamin A and Carotenoids in vege-tables and fruits	94/95 (3 m) 96-00 (17 m)
9. Dr. Simon Tatala Ph.D Student (TFNC)	M	Weaning food development/anaemia	92/93 (1 m) 94-00 (18 m)
10. Mr. Elifation Towo Ph.D Student (TFNC)	M	Polyphenols in food: effect on nutrient availability	93/94 (10 m) 94/95 (4 m) 98-00 (11 m)
11. Alexander Mosha (TFNC)	M	Nutritional evaluation of germinated sorghum	81/82 (12 m) 82/83 (2 m)
12. Nyafole Lu-Kalinga (TFNC)	M	Protein quality/ iron bioavailability in sorghum	84/85 (12 m) 85/86 (3 m)
13. Mabina T. Hakimjee (TFNC)	M	Microbiology	86/87 (12 m)
14. Moses Urio (TFNC)	M	Microbiology	90/91 (10 m) 91/91 (3 m)
15. Amri Juma (TFNC)	M	Analysis of provitamin A	95/96 (4 m) 97 (6 m)
16. Vincent Assey (TFNC)	M	Iodine deficiency	98 (3 m)
17. F. Kavisha (TFNC)	M	Iodine deficiency	88/89 (1 m)
18. Claver Temalilwa (TFNC)	M	Analysis of aflatoxins and metabolites in food/urine	85/86 (12 m)

Table 2.2.6.
**Use of IPICS Funds for Tanzania Food and Nutrition Centre Capacity Building
(k-SEK)**

Year	Training/Exchange	Other Project Costs (equipment, etc)	Total
1981/88	600	323	923
1988/89	34	20	54
1989/90	72	45	117
1990/91	287	75	362
1991/92	120	46	166
1992/93	252	79	331
1993/94	253	36	289
1994/95	205	139	344
1995/96(18 months)	365	244	609
1997	151	124	275
1998	189	102	291
1999	131	48	178
2000	168	201	369
	2827	1482	4308

Source: Paper given to evaluation team headed TAN: 01. In addition to the above expenses, the project has been allocated SEK 320,000, 320,000 and 300,000 in 2000, 2001 and 2002 as per Annual Report for year 2000.

Appendix 3b

Extract from TWAS Report, prepared by M.T. Mahdavi

Summaries of Grants Awarded in 1993 - 2001

By field

FIELD	AF/AC	AS	LA	TOTAL
Biology	85	96	219	400
Chemistry	57	64	79	200
Mathematics	27	13	16	56
Physics	48	74	49	171
Total	217	247	363	827

By region

REGION	BIO	CHE	MATHS	PHYS	TOTAL
AF/AC	85	57	27	48	217
AS	96	64	13	74	247
LA	219	79	16	49	363
Total	400	200	56	171	827

Standard abbreviations:

Fields

BIO	Biology	(red)
CHE:	Chemistry	(green)
MATHS:	Mathematics	(blue)
PHYS:	Physics	(yellow)

Region

AF/AC:	Africa and Arab Region	(light blue)
AS:	Asia and the Pacific	(dark blue)
LA:	Latin America and the Caribbean	(brown)

Least Developed Countries (LDC) highlighted in grey

Summary by country

Grants Awarded in 1993–2001

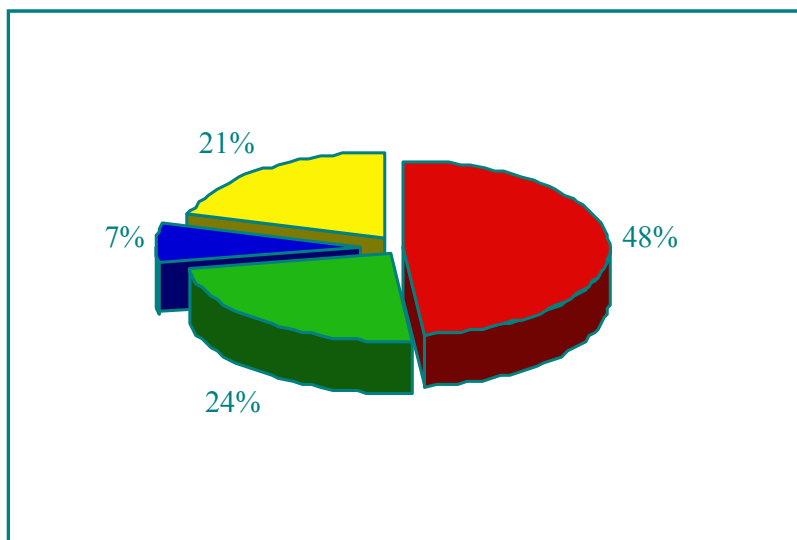
COUNTRY	BIO	CHE	MATHS	PHYS	TOTAL
Algeria		1	1	2	4
Argentina	50	19	3	9	81
Bangladesh	3	7	1	2	13
Benin	1			1	2
Botswana		1			1
Brazil	46	6	1	17	70
Burkina Faso		1			1
Cameroon	6	5	1		12
Chile	22	6		1	29
China	6	9	3	18	36
Colombia	6	3			9
Congo		1	3	1	5
Costa Rica	1	3			4
Côte d'Ivoire			3	2	5
Cuba	17	11	10	12	50
Ecuador	1	2		2	5
Egypt	5	2		5	12
Ethiopia	4	1			5
Ghana	2	1		3	6
Guatemala	1			1	2
Guinea			1		1
Guyana				1	1
India	28	25	3	26	82
Indonesia	1	3	4	4	12
Iran, Islamic Republic of	5	1	1	1	8
Jamaica	1	4			5
Jordan	1	1		1	3
Kenya	15	6		1	22
Korea, Republic of	4				4
Lebanon	9				9
Malaysia	8	1		2	11
Mali	1				1
Mauritania			1		1
Mexico	35	15	1	5	56

Mongolia	1				1
Morocco	11	12	5	4	32
Mozambique				1	1
Myanmar	1			2	3
Nepal	2	1			3
Nigeria	14	6	8	7	35
Pakistan	9	5		5	19
Palestine (West Bank)	1	2			3
Papua New Guinea	1				1
Peru	7	2	1	1	11
Philippines	5	2	1	2	10
Senegal	2	8	2	9	21
Seychelles	1				1
South Africa		4	1		5
Sri Lanka	7	7		2	16
Sudan	2		1		3
Swaziland	1				1
Syria		3		2	5
Tanzania	1			1	2
Thailand	1				1
Togo				1	1
Trinidad and Tobago	1				1
Tunisia	2			2	4
Turkey	11	3		5	19
Uganda	4				4
Uruguay	19	8			27
Venezuela	12				12
Vietnam	2			5	7
Zambia	1			2	3
Zimbabwe	2	2		3	7
Grand Total	64	400	200	56	171
				171	827

Grants awarded in 1993–2001

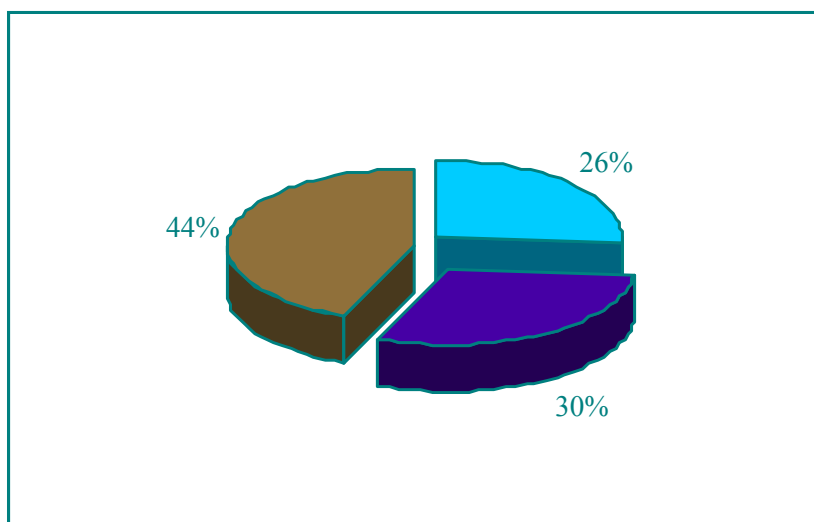
By field

Total grants awarded: 827



By region

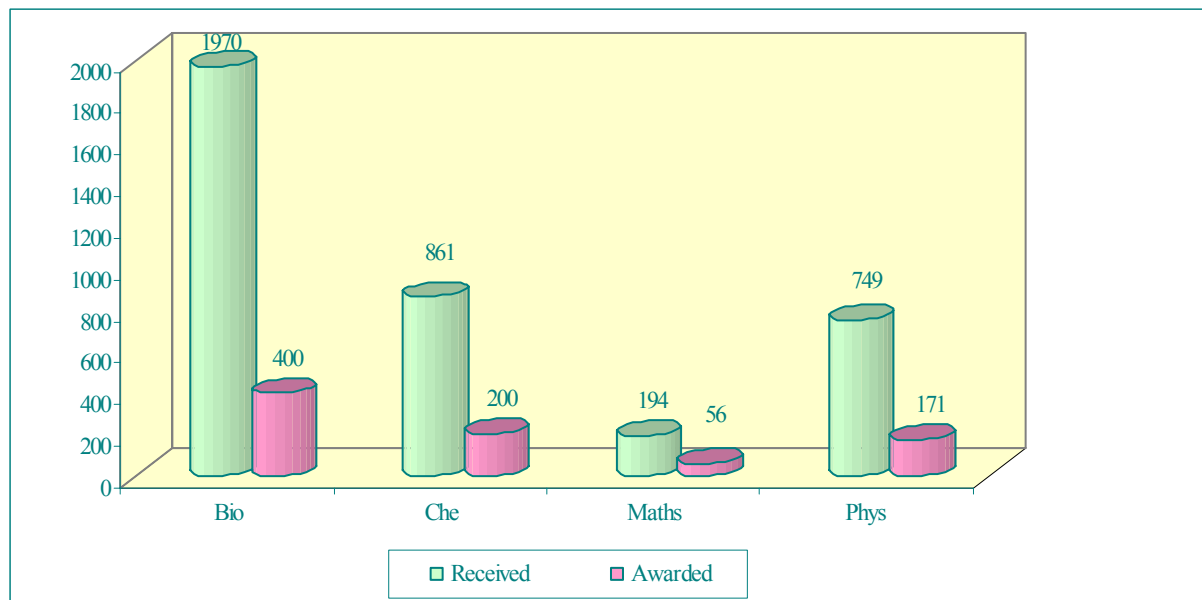
Total grants awarded: 827



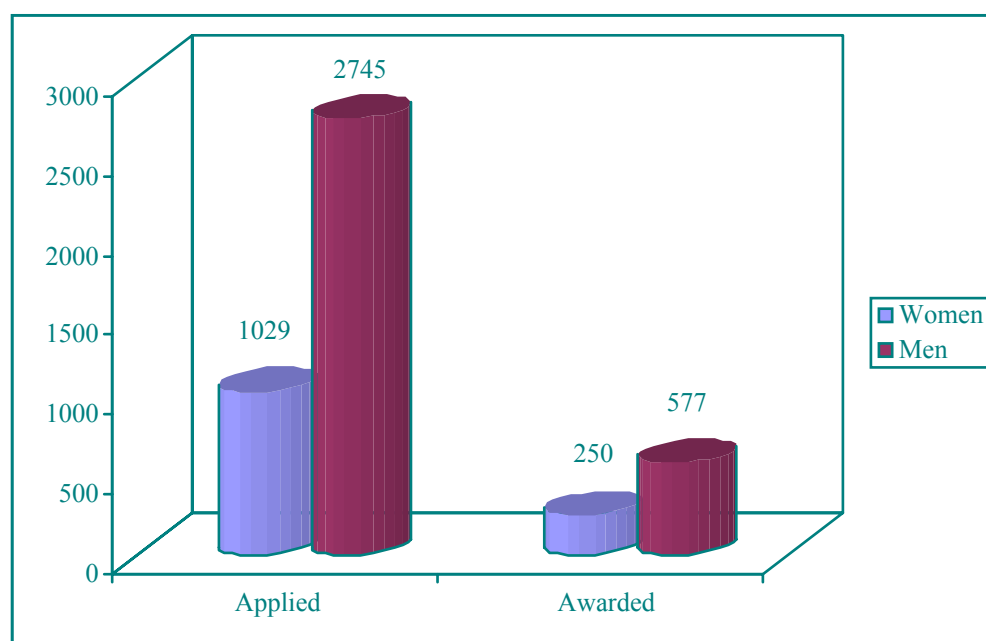
Applications Received/Granted in 1993–2001

(Total Applications Received: 3,774; Total Grants Awarded: 827)

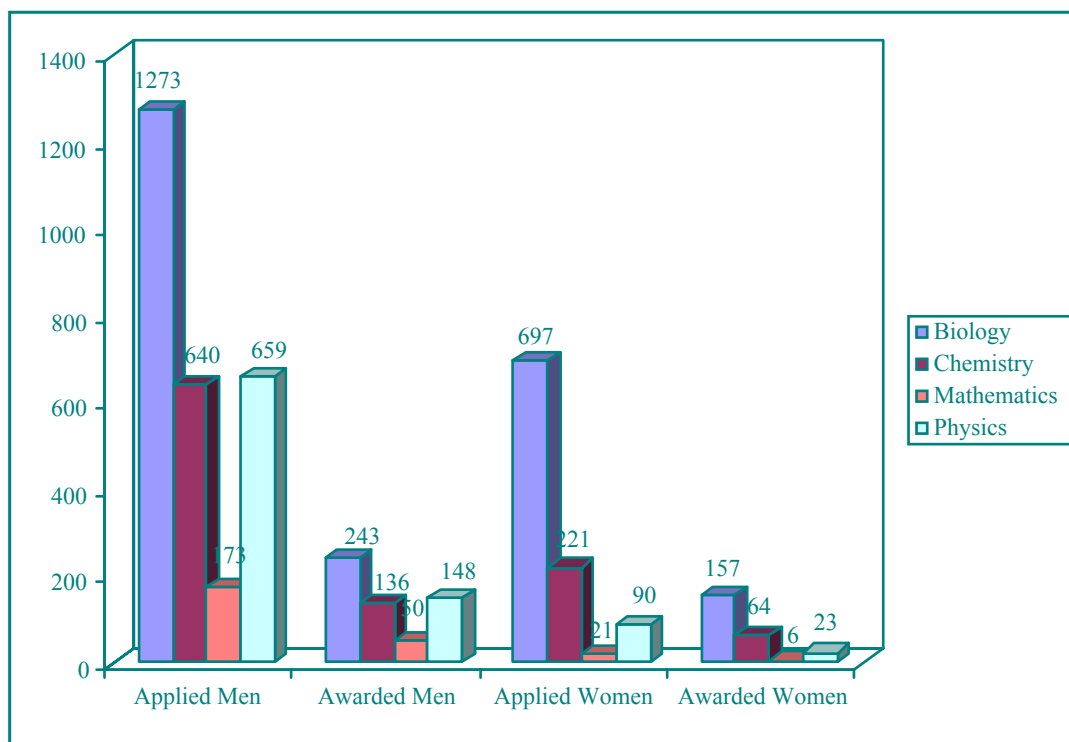
By field



(Total Applications Received from Men: 2,745; Total Grants Awarded to Men: 577;
Total Applications Received from Women: 1,029; Total Grants Awarded to Women: 250)



By field



Appendix 3c

Table 2.2.7
TWAS Grantees at University of Dar Es Salaam and Makerere University During 1993–2001

Grantee's Title, Name and Address	Gender	Research Areas
1. Dr. Kivaisi Rogath Thomas Department of Physics, Univeristy of Dar es Salaam P.O. Box 35063, Dar es Salaam, Tanzania	M	Solar Energy
2.Dr. Byarugaba, Wilson Department of Pathology, Makerere Medical School, P.O. Box 7072 Kampala, Uganda	M	Pharmacology and Toxicology
3. Dr. Ngommuo Ahmed Juma Department of Veterinary, Physiology, Biochemistry, Pharmacology and Toxicology, Sokoine University of Agriculture, P.O. Box 3000, Chuo Kikuu Morogoro Tanzania	M	Pharmacology and Toxicology
4. Dr. Egwang Thomas Gordon Department of Medical Parasitology MED Biotech Laboratories P.O. Box 9364 Kampala, Uganda	M	Molecular Parasitology (two grants)
5. Dr. Musoke Miph Boses Ecology – Zoology Division Uganda Virus Research Institute P.O. Box 49 Entebbe, Uganda	M	Ecology-microbiology

Table 2.2.8 TWOWS Grantees in Uganda and Tanzania 1998–2000

Name, Address,	Gender	Research Area
1. Hariet Ezeza Okatch Makerere University, Kampala, Uganda	F	A study of carbohydrate – inorganic complexes to enhance their ionisation as well as characterization at atmospheric pressure with mass spectrometry (Analytical chemistry)
2. Jolly J. Hoona Ministry of Agriculture, Animal Industry and Fisheries, Dept. of Animal Production and Marketing, Entebbe, Uganda	F	Livestock data systems and production economics
3. Angela Mercy Rutakomozibwa, Ministry of Education and Culture, Dar es Salaam, Tanzania	F	Materials for solar energy application
4. Amelia S. Buriyo Botany Department, University of Dar es Salaam, Tanzania	F	Botany (Phycology)
5. Evarina M. Lukonge, Agricultural Research Institute, Ukiriguni, Tanzania	F	Cotton breeding and genetic improvement in the western cotton growing areas of Tanzania.
6 .Elizabeth Mkoba, National Training Institute, Tanzania	F	Information Technology
7. Ngoyako Mtenga Livestock Training Institute, Tanzania	F	-
8 .Rosealba Lowia, Makerere University Kampala, Uganda	F	Fisheries Science
9. Ndekya Mary Oriyo Univeristy of Dar es Salaam Tanzania	F	Biology
10. Margaret Emmanuel Samiji, Univeristy of Dar es Salaam Tanzania	F	Material science for solar energy application
11. Maud Mugisha Kamatenesi Botany Department Makerere University Kampala, Uganda	F	Ethnomedicine-Natural Products: The role of traditional medicinal practioners in gynaecology, obstetrics and early care in South – Western Uganda
12. Irene Naigaga Faculty of Veterinary Medicine Makerere University, Kampala, Uganda	F	Aquatic ecology and toxicology; aquatic ecosystem health.

Table 2.2.9 Summary of TWOWS Awards.

Year	No. of Applicants	Fellowship Awarded	Fellowship Utilized
1998	110	27	15
2000	158	39	17
2001	450		

Appendix 3d

Table 2.2.10.
ICTP Sida Supported Associates Grantees, from Uganda and Tanzania in 1999 and 2000

Name, Address	Gender	Research Area
1. Venerabilis K. Kululetera, Directorate of Meteorology, P.O. Box 30556, Dar es Salaam Tanzania	F	Development of a long-range weather forecasting model in Tanzania. Development of long-range forecasting model for relationships such as El-Nino/Southern Oscillation and rainfall variability in Tanzania, sea surface temperatures and quasi biennial oscillation with aim of establishing their usefulness in the formulation of a forecasting model.
2. Wilbroard Edward Muhogora National Radiation Commission P.O. box 743, Arusha Tanzania	M	Medical. Dose assessment and optimal dose reduction in diagnostic radiology. Development of a quality assurance programme for the National Dosimetry Laboratory.
3. Michel Kasigwa Department of Mathematics Mbarara University of Science and Technology P.O. Box 1410 Mbarara, Uganda	M	Mathematics. Functional analysis and operator theory. Operator on Banach spaces and their applications. In particular the algebra of such operators and the necessary and sufficient conditions to derive more general results
4. Sixth college on thin films Department of Physics University of Sar es Salaam Tanzania		Network activity

Young Collaborators Programme

Kikwasi, Wilberforce Kahwa Directory of Meteorology P.O. Box 3056 Dar es Salaam, Tanzania	M	Climatology and Meteorology
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Appendix 4

Questions to the programmes

Dear colleagues at ISP, ICTP, TWAS and TWOWS,

As a starting point in our assessment of Sida's support to the basic sciences and before coming to visit you and take part of your experiences we want to formulate some questions to you concerning the programmes, in order to be better prepared. We would very much like to get your information in written form, supported by documents and files that you may have in store. According to the ToR the study should focus on the actual practice and characterise the predominant approaches used by your Programmes.

The questions that we address now will later be followed up and elaborated when we meet you and when we interview the representatives of departments and faculties at the Universities of Makerere and Dar-es-Salaam, and when we also interview some of your grantees/scholars. Since the programmes address basic sciences – and also according to the ToR- we want information on basic sciences (chemistry, biology, physics, and mathematics), and in cases where the procedures differ between the subjects concerning the points raised below, we would like you to describe the situation for the different research areas separately. We are also aware of the fact, that not all of the above mentioned basic sciences areas are represented in some of the Programmes, and we want your answers only in your own scientific areas.

Thus, at present we would like information on the following points:

A. Concerning recruitment of scholars/grantees:

- 1) Is the recruitment of scholars achieved through open advertisements at Makerere and Dar-es-Salaam universities? Or how are prospective grantees informed about the possibilities offered by the programmes?
- 2) Are your programmes well-known to prospective candidates at the two above mentioned universities?
- 3) Is the advertisement/recruitment made in co-operation with the home institution/university? Which influence does the home university have on the choice of scholar/grantee?
- 4) Are the grants/scholarships directed towards certain fields of basic sciences or are they totally open as regards basic scientific area within the main fields?
- 5) In which manner are the priorities of the home university for developing/strengthening certain sub-fields of basic sciences taken care of?
- 6) Which criteria are used for selecting the scholars/grantees?
- 7) Which body is responsible for making the selection of scholar? Is there a scientific committee evaluating the merits of the applicants? If, so according to which principles does this committee work? Describe the profiles of the committee members (scientific/organisational status, affiliation, research field).

- 8) In which form is the final choice of grantee/scholar reported? Is there any written documentation concerning the evaluation of the merits of the individual applicant?
- 9) In which way have you promoted a gender balance within the programmes (if applicable)?
- 10) Describe the procedure by which the host institution in the host country is found. How much information is given to the host institution before a scholar is enrolled? Is there a personal encounter and discussion between the guest grantee and the host institution before the scientific research starts?

B. Concerning the periods of scientific work:

- 1) In which way is the contact between the home and host institutions established and promoted?
- 2) Is the home institution taking part in the planning of the time-schedule(s) for the visits to host institutions?
- 3) Are the home institutions taking part in the choice of research problems addressed by the grantees? Describe in which way the research problems addressed by the grantees are followed-up when they return to their home institutions. Is domestic training performed as a complement to that of the Programme?
- 4) Give an over-all view of the scientific activity of the scholars during their periods at the home universities. If there are obstacles to scientific work at the home universities, which are the major obstacles to enhanced scientific productivity (for example lack of equipment, infrastructure (please specify), sub-critical research environment etc)?
- 5) Describe your methods for quality assurance in the research work of the scholars abroad and at home.
- 6) In which way can the impact of the scholarship be seen when the scholar returns to his (her) home institution? – Give examples.
- 7) What incentives are provided to scholars returning to their home institutions to pursue their careers?
- 8) Make a short overview over the financial support given to the following items:
 - a) salary, housing, travel etc for the grantee, b) (minor) equipment and materials to facilitate research work at the home institution and c) financial support to the host-institution.
- 9) To which extent, and how is the host department involved in the strengthening of the home department during and after the training periods of the scholars?

C. Follow-up procedure

1. Describe in which way the aims of your Programme are assessed within your organisation.
2. In which way are the achievements of the scholars who have renewed scholarships reported to you and recognised by your organisation?
3. Do you keep an updated data-base over your former grantees/scholars? If so, how often is it up-dated. Submit a copy from your data-base.
4. Make a table over your grantees for the latest *ten* years, separately for each basic sciences discipline, and for the two universities of Makerere and Dar-es-Salaam, respectively (the time ten years is not applicable to TWOWS) containing information on the following points:
 - 1) Name, sex(f or m), title, function/work, present address, present work address, telephone number, fax number and e-mail number.
 - 2) Visiting periods at host institutions, name and discipline of institution, year, date, length of visit(s)

- 3) Scientific area(s) of basic research, sub-discipline (ex. organic chemistry, atomic physics etc)
- 4) Achievements through the programme, for example MSc, PhD, peer-review publications, books, research grants from international organisations, leadership of research group, department, faculty or institute etc
- 5) List the proportions between the reviewed scientific publications built on research made abroad and those built on research made at the home institution.
- 6) List research visits to other research institutions abroad, especially to regional universities and research institutions.

D. Programme development

Some programmes started a few decades ago, and since then many things have happened at the international scene and in the developing countries. In Sweden and most other industrialized countries the general awareness of the situation in developing countries has increased dramatically, and many universities have now an international office or special programmes on internationalisation. We would like you to describe briefly how your own programmes have developed in view of these changes.

1. How have the changes and knowledge in Swedish and other western universities influenced your scholarship programmes? Have the international units and/or the host institutions at the universities been involved in suggesting priorities in the research of the grantees?
2. In which ways have the increased independence and the maturity of the science faculties at the universities in Makerere and Dar Es Salaam been involved in the development of the Programmes?

We also would like to take the opportunity to ask you to send us documents which you think will be of interest in view of these questions and the Terms of Reference (submitted) under the addresses given below.

With best wishes

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Room No. 812
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Environmental Physics
Experimental Physics
Chalmers University of Technology
412 96 Göteborg
Sweden

Appendix 5

Answers from ICTP to questionnaire.

A. CONCERNING RECRUITMENT OF SCHOLARS/GRANTEES

Questions 1 and 2.

The ICTP has an extensive mailing list of Universities and Research Institutes in the developing countries. Posters are printed for all its activities and these are mailed to all the institutions on the mailing list. All activities of the Centre are posted on its homepage and application forms are also available on the homepage. Thus we believe that the various courses, training programmes, conferences, fellowships, etc., are widely advertised in the developing countries. Our associates and former participants in its activities also make an effort to publicise the activities of the Centre.

Questions 3 and 4.

The Centre offers programmes in a wide range of subjects, which change over the years, in fundamental physics, mathematics and computer sciences. This is essentially because of the intrinsic nature of the subjects in that developments in the basic sciences have their own dynamics and the Centre, being an advanced research institute, follows and leads in research at the cutting edge through its long term research groups. Another reason for the diversity on offer is because we have to cater to the needs of diverse universities in the developing countries. The prospective candidate can choose from this wide range what suits him best. Also the home university has a choice in encouraging its staff and students to apply for specific programmes which suit its needs from the activities on offer. Actually the ICTP external activities, i.e. those carried out in the developing countries, require the approval of the head of the department on every application. These programmes can then be used by the home university for developing/strengthening whatever sub-fields of basic sciences that it wants. This is the priority of the home university. Of course we do not cover all fields of physics or mathematics, let alone all of basic sciences, because of our limited resources. Proposals for new projects are made also by scientists who visit the ICTP on the occasion of its activities: many projects implemented in the developing countries were conceived by scientists while at the ICTP.

Questions 6 and 7 and 8.

The criteria used for selection are the following:

- a. The first and obvious criteria is the scientific and academic quality of the applicant. We select those who are adequately prepared and who would benefit from the programme.
- b. The ICTP also believes in taking some risks. What we mean by this is that we are prepared to take candidates from underprivileged regions who may not have outstanding qualifications on paper or outstanding recommendations or who come from unknown institutions but whom we believe may have the potential to perform well in and to benefit from the programme. In many cases such risks have paid off handsomely.
- c. The Centre also has an active gender policy. We actively encourage the participation of women scientists in all our activities and try to select as many qualified women as possible.

- d. The Centre also takes into account geographical distribution, keeping quality in mind, so that all areas of the developing world can benefit from our programmes. Regional cooperation is especially supported.

The selection of scholars for our various programmes is usually done by scientific committees set up for each activity. These committees spend a lot of time carefully evaluating each applicant before making the selection. The principles of evaluation are as outlined above. The committee members are active researchers in their respective fields, some of them from within the Centre and some from outside academic institutions. The selected candidate is directly informed of his selection by the organiser of the activity.

Question 9.

Specific provisions have been made in the selection rules for women in the Associateship programme. Since there is an upper age limit to become an associate and recognising that many women scientists have to interrupt their careers to have children, 2 years plus 1.5 years for each child are added to the maximum age for women associates. Further, since women cannot stay away long from their small children, the Centre allows women with small children to stay less than the mandatory 42 days on their first visit as an associate. In fact this policy has led to an increase in the number of women associates.

B. PROGRAMME DEVELOPMENT

As mentioned above, the detailed subjects, within fundamental physics and mathematics, of the research and training programmes of the Centre have changed over the years because of the internal developments in these fields. Although in general these are autonomous decisions of the ICTP we have always been open to suggestions from outside. In fact a few years ago we did ask for proposals from institutions in the advanced countries as well as from the developing countries for new projects and new ideas. Many activities at the Centre have been generated from demands from outside as for example the setting up of the Weather and Climate group or the new activities in soft condensed matter for which the suggestion came from some developing countries. As fundamental physics and mathematics develop in these countries we expect more inputs from scientists working there. The ICTP implements a South-South-North policy by supporting regional cooperation in the developing world and simultaneously by stimulating collaboration of those groups with ICTP directly and with other institutions in the North.

Appendix 6

Answers to questionnaire from TWAS

A. Concerning recruitment of scholars/grantees

- 1) Yes, the selection of TWAS grantees is based on open competition and the programme is widely advertised at all universities and research institutions in developing countries including Makerere and Dar-es-Salaam universities. The advertisement is normally made through air mail/e-mail and web site.
- 2) Yes, as indicated in point 1 above.
- 3) Yes, the universities and institutions are normally included in our mailing list. The only influence the home university has on the selection is a supporting statement required from the head of the institution.
- 4) Yes, the grants are open to all areas in basic sciences, i.e. biology, chemistry, mathematics and physics.
- 5) In the majority of developing countries, especially in Africa, the capacity of basic sciences lags far behind capacities in applied sciences. Hence, the choice of supporting basic sciences is a priority for the majority of universities and institutions in the developing countries.
- 6) Applicants for the grants should be nationals of developing countries with an advanced academic degree and some research experience, and hold positions at universities or research institutes in developing countries. As a general rule the grants are normally awarded to young competent scientists (under the age of 45 years) from those developing countries where the basic tools of research are seriously lacking. The selection is based on scientific merit.
- 7) TWAS selects the grantees. There are four scientific committees (one for each field) responsible for selecting the grantees. The committees consider all the requests received together with the comments received from international referees to whom the applications are sent for evaluation. Each committee consists of 4/5 members and a chairperson. All of them are either professors at the University of Trieste or attached to international organizations (ICGEB, ICTP, ICS, SISSA, CNR) and they cover the four areas of basic sciences.
- 8) Once the selection is made by the appropriate scientific committee information is sent to the grantee as well as the head of his/her institutions. The evaluation of the merits of the applicants is obtained from 3-5 referees selected from the international scientific community. TWAS has a list of 3,000 referees (including TWAS members) who assist the Academy in refereeing proposals received.
- 9) In as much as possible the programme encourages applications from competent female scientists. The scientific committees responsible for the selection of the grantees are aware of the importance of the gender balance. It is, however, important for this programme to base the final selection on scientific merit.
- 10) In this programme the applications are received from individuals and not from institutions.

B. Concerning the periods of scientific work

- 1) Not applicable for this programme.

- 2) Not applicable for this programme.
- 3) Not applicable for this programme.
- 4) The main objective of this programme is to assist the grantees in their research projects identified by them by purchasing the research needs required. The obstacle that this programme addresses is the lack of research facilities such as scientific equipment, expendable supplies and scientific literature.
- 5) The quality assurance is normally evaluated on the basis of scientific research papers published in international journals.
- 6) Not applicable for this programme.
- 7) Not applicable for this programme.
- 8)
 - a) No salary, housing, travel, etc. is provided by the grant.
 - b) TWAS grants are intended only for the purchases of scientific equipment, expendable laboratory supplies and scientific literature (textbooks and proceedings only). The scientific equipment, literature and any unused part of the supplies remain the property of the home institution at the end of the grant period. This is clearly stated in the RGA (research grant agreement), which is signed, by the TWAS Executive Director, the grantee and the head of the home institution.
 - c) No other financial support to the host institute is provided.
- 9) Not applicable for this programme.

C. Follow-up procedure

- 1) The programme is designed to meet one of the major objectives of the Academy, namely to support the research efforts of young promising scientists in the developing countries by addressing their needs.
- 2) The achievements of the grantees under this programme are normally reported in the final report required from each grantee. This final report lists the research accomplishments made during the grant period. Some of these results are made available to the programme's scientific committees' members and those who refereed the original proposals.
- 3) Yes, an updated database is kept for all grantees. During the last ten years the database was updated four times and the last updated was made in the year 2000.
- 4)
 - 1) List attached.
 - 2) Not applicable for this programme.
 - 3) Already in the list attached to point 1.
- 4)–5) The achievements of this programme are normally in the form of list of publications in international/national journals. These are currently evaluated by the programme's scientific committees. A sample of the evaluation is attached.
- 6) Not applicable for this programme.

D. Programme development

- 1) Sida/SAREC support to TWAS Research Grants is relatively recent and is totally based on initiatives originating from scientists in developing countries.
- 2) The continuing demand for this programme reflects in many ways the increased independence and the maturity of a good number of scientists in many developing countries.

Appendix 7

Answers to questionnaire from TWOWS

A. Concerning recruitment of scholars/grantees:

- 1) *Is the recruitment of scholars achieved through open advertisements at Makerere and Dar-es-Salaam universities? Or how are prospective grantees informed about the possibilities offered by the programmes?*
 - TWOWS publicises and disseminates fellowship information through mailing lists and websites. Each year over 1,400 applications and information material are distributed to institutes and individuals in Sub-Saharan Africa (SSA) and LDCs. Fellowship information is also available via the TWOWS website and through related Internet site links. Both Makerere and Dar-es-Salaam universities are on the TWOWS/TWAS mailing lists.
- 2) *Are your programmes well-known to prospective candidates at the two above mentioned universities?*
 - Yes, TWOWS has received over 50 applications from individuals from the above institutes.
- 3) *Is the advertisement/recruitment made in co-operation with the home institution/university? Which influence does the home university have on the choice of scholar/grantee?*
 - Dissemination of information and advertisement of the fellowships is in collaboration with the home institution as the documentation is also sent directly to the institute, requesting them to publicise the programme. Recruitment is based on scientific merit and recommendations from the home institution.
- 4) *Are the grants/scholarships directed towards certain fields of basic sciences or are they totally open as regards basic scientific area within the main fields?*
 - Applications are considered in both basic and applied sciences.
- 5) *In which manner are the priorities of the home university for developing/strengthening certain sub-fields of basic sciences taken care of?*
 - The programme aims at strengthening the staff capacities at the home institution by providing advanced scientific training abroad at centres of excellence in the South.
- 6) *Which criteria are used for selecting the scholars/grantees?*
 - On the basis of academic achievements and scientific merit, as well as the needs and requirements of the home institution.
- 7) *Which body is responsible for making the selection of scholar? Is there a scientific committee evaluating the merits of the applicants? If, so according to which principles does this committee work? Describe the profiles of the committee members (scientific/organisational status, affiliation, research field).*
 - TWOWS is responsible for the selection of fellowships and has established a high-level committee from among leading scientists at ICTP, to assist in the selection of applications. Evaluation is based on:
 - Scientific merit – degree awarded, letters of recommendation and the proposed Ph.D. project proposal.
 - Country – preference given to small, poorer and under represented countries.
 - Age- preference to younger applicants.
- 8) *In which form is the final choice of grantee/scholar reported? Is there any written documentation concerning the evaluation of the merits of the individual applicant?*

– Members of the committee are requested to provide grades and comments on the suitability of potential students.

9) *In which way have you promoted a gender balance within the programmes (if applicable)?*

– Not applicable.

10) *Describe the procedure by which the host institution in the host country is found. How much information is given to the host institution before a scholar is enrolled? Is there a personal encounter and discussion between the guest grantee and the host institution before the scientific research starts?*

– The application requires the applicant to specify in order of preference three potential host institutes. In certain cases some applicants do not have access to appropriate information pertaining to institutes outside their home country/region. In these cases TWOWS provides the applicants with the directory, “Profiles of Institutions for Scientific Exchange and Training in the South”. This is published by the Third World Network of Scientific Organizations (TWNSO) in collaboration with the South Centre and TWAS.

A letter of introduction is sent to the potential host institutes. This provides information about TWOWS and the fellowship programme. The academic achievements of the applicant are outlined, together with the Ph.D. project proposal and curriculum vitae.

Ideally, TWOWS would like to facilitate the provision of interviews with potential host institutes, however so far this has not been feasible because of the high expenditure involved.

B. Concerning the periods of scientific work:

1) *In which way is the contact between the home and host institutions established and promoted?*

– The involvement of both home and host institutes in this programme is critical. The home institute is required to approve the application and provide appropriate support to the sandwich (part-time) Ph.D. programme.

The host institute, where most of the research work is conducted, is required to provide research facilities, supervision/tuition and other logistics.

Written agreements are essential and required for each application.

2) *Is the home institution taking part in the planning of the time-schedule(s) for the visits to host institutions?*

– TWOWS requires the student and both institutes to agree on the content and modalities of the Ph.D. project. This is dealt with directly by the student who discusses the study programme with her prospective supervisors.

3) *Are the home institutions taking part in the choice of research problems addressed by the grantees? Describe in which way the research problems addressed by the grantees are followed-up when they return to their home institutions. Is domestic training performed as a complement to that of the Programme?*

– The research proposal is specified with the application, which must be fully endorsed by the head of the home institute. The grantee specifies her research project which also has to be approved by the potential host supervisor.

4) *Give an over-all view of the scientific activity of the scholars during their periods at the home universities. If there are obstacles to scientific work at the home universities, which are the major obstacles to enhanced scientific productivity (for example lack of equipment, infrastructure (please specify), sub-critical research environment etc)?*

– Applicants usually have inadequate research facilities (advanced research equipment and supervision) at the home institute. This programme provides them with the opportunity to carry out research projects at centres of excellence outside their home country.

- 5) *Describe your methods for quality assurance in the research work of the scholars abroad and at home.*
 – Student, host and home supervisors are requested to provide annual scientific progress reports to TWOWS. TWOWS regularly monitors all comments and suggestions of both institutes and students.
- 6) *In which way can the impact of the scholarship be seen when the scholar returns to his (her) home institution? – Give examples.*
 – The programme was recently established therefore none of the students have completed their Ph.D. programme. This issue will be addressed in the future.
- 7) *What incentives are provided to scholars returning to their home institutions to pursue their careers?*
 – Students will be informed about relevant programmes of sister organizations, such as the various research grants and post-doctoral fellowships of the Third World Academy of Sciences (TWAS).
- 8) *Make a short overview over the financial support given to the following items:*
- a) *salary, housing, travel etc for the grantee*
 – The fellowship provides stipend (accommodation and living expenses)
 Travel to and from the host institute and home country
 Medical insurance
 Visa/Study expenses
 Registration and re-registration fees
 Foreign student fee
 Minor equipment and materials/consumables
- b) *(minor) equipment and materials to facilitate research work at the home institution*
 – Not applicable.
- c) *financial support to the host-institution.*
 – Supervision/tuition fees
 University contingency fee
- 9) *To which extent, and how is the host department involved in the strengthening of the home department during and after the training periods of the scholars?*
 – Research visits to the host institute has fostered further research collaboration between home and host.

C. Follow-up procedure

- 1) *Describe in which way the aims of your Programme are assessed within your organisation.*
 – The programme was established in response to one of the major objectives of TWOWS, namely to improve access to education and training opportunities for young promising women scientists in developing countries.
- 2) *In which way are the achievements of the scholars who have renewed scholarships reported to you and recognised by your organisation?*
 – Host supervisor may request grant extension and/or conversion from part-time to full-time, this is supported by progress reports.
- 3) *Do you keep an updated data-base over your former grantees/scholars? If so, how often is it up-dated. Submit a copy from your data-base.*

– Yes, a complete database of all applicants and scholars which requires regular and systematic updating. Please refer to sample file ANNEX 1, which has selected applications from Uganda and Tanzania.

- 4) *Make a table over your grantees for the latest ten years, separately for each basic sciences discipline, and for the two universities of Makerere and Dar-es-Salaam, respectively (the time ten years is not applicable to TWOWS) containing information on the following points:*
- 1) *Name, sex(f or m), title, function/work, present address, present work address, telephone number, fax number and e-mail number.*
 - 2) *Visiting periods at host institutions, name and discipline of institution, year, date, length of visit(s)*
 - 3) *Scientific area(s) of basic research, sub-discipline (ex. organic chemistry, atomic physics etc)*
 - 4) *Achievements through the programme, for example MSc, PhD, peer-review publications, books, research grants from international organisations, leadership of research group, department, faculty or institute etc*
 - 5) *List the proportions between the reviewed scientific publications built on research made abroad and those built on research made at the home institution.*
 - 6) *List research visits to other research institutions abroad, especially to regional universities and research institutions.*

– Please refer to ANNEX 2

D. Programme development

Some programmes started a few decades ago, and since then many things have happened at the international scene and in the developing countries. In Sweden and most other industrialized countries the general awareness of the situation in developing countries has increased dramatically, and many universities have now an international office or special programmes on internationalisation. We would like you to describe briefly how your own programmes have developed in view of these changes.

- 1) *How have the changes and knowledge in Swedish and other western universities influenced your scholarship programmes? Have the international units and/or the host institutions at the universities been involved in suggesting priorities in the research of the grantees?*

– Not applicable

- 2) *In which ways have the increased independence and the maturity of the science faculties at the universities in Makerere and Dar Es Salaam been involved in the development of the Programmes?*

– Not applicable.

We also would like to take the opportunity to ask you to send us documents which you think will be of interest in view of these questions and the Terms of Reference (submitted) under the addresses given below.

The table below demonstrates the enormous increase in demand for the TWOWS Postgraduate Fellowships

Year	Applications Processed	Grants Awarded
1998	110	28
2000	158	43
2001	385	58
October 2001	407	

The TWOWS Postgraduate Fellowship application form is also attached for information, ANNEX 3.

Appendix 8a

Answers to questionnaire by IPPS

All answers below are based on the fact that the ISP gives grants to projects and networks, not to individuals.

Reference is also made to the answers from Malin and our conversation in Uppsala.

A. Concerning recruitment of scholars/grantees:

1. *Is the recruitment of scholars achieved through open advertisements at Makerere and Dar-es-Salaam universities? Or how are prospective grantees informed about the possibilities offered by the programmes?* See comment above!
2. *Are your programmes well-known to prospective candidates at the two above mentioned universities?* Yes. The activities are well known to all staff members at the department.
3. *Is the advertisement/recruitment made in co-operation with the home institution/university? Which influence does the home university have on the choice of scholar/grantee?* Question one: yes, question two: All proposals are made by the group at the department and are always signed by the Head.
4. *Are the grants/scholarships directed towards certain fields of basic sciences or are they totally open as regards basic scientific area within the main fields?* We respond the requests on support. Our mandate is physics in a broad sense – both directed fundamental research as well as applied research
5. *In which manner are the priorities of the home university for developing/strengthening certain sub-fields of basic sciences taken care of?* We always respond to the requests coming in. The requests must be in line with the priorities set by the department and thus the faculty and thus the university. All proposals for support are signed by the Head of Dept.
6. *Which criteria are used for selecting the scholars/grantees?* Fellowships are given to technicians, MSc and PhD students as well as senior scientists according to the needs as expressed by the group supported. Note that in general training is about 30% of the project grants.
7. *Which body is responsible for making the selection of scholar? Is there a scientific committee evaluating the merits of the applicants? If, so according to which principles does this committee work? Describe the profiles of the committee members (scientific/organisational status, affiliation, research field).* All project applications (also signed by the Head of Dept.) are reviewed by a reference group consisting of Nordic country physicists and one physicist from each of the three continents Africa, Asia and Latin America. The recommendations from this group are taken to the board for decisions.
8. *In which form is the final choice of grantee/scholar reported? Is there any written documentation concerning the evaluation of the merits of the individual applicant?* We are in constant contacts with the project leaders, who are informed about the outcome of the discussions in the reference group. Please also note, that all proposals are presented to the reference group by a representative of the applying group. This means a lot of discussions at a very preliminary stage. Please also note that we still make use of “application forms” for fellowships in order to have as detailed information about every fellowship holder as possible.
9. *In which way have you promoted a gender balance within the programmes (if applicable)?* This issue have been discussed for many years and we urge the groups to try and give priorities to female physicists. A slight improvement can be noted.

10. Describe the procedure by which the host institution in the host country is found. How much information is given to the host institution before a scholar is enrolled? Is there a personal encounter and discussion between the guest grantee and the host institution before the scientific research starts? The host group should be engaged in research work in line with the request coming in. We have a good network of contacts not only in the Nordic countries but also in the regions. Through the internet this type of information is also more easily made available to the groups in the developing countries. In some cases when an activity is started from scratch it could also mean that some senior scientists from the department pays visits to many potential research teams in mainly Sweden in order to have as good background information as possible. We also want the Swedish host group to be involved in the more long-term planning already from the beginning. Note also, that in most cases, a group supported has more than one host group.

B. Concerning the periods of scientific work:

1. *In which way is the contact between the home and host institutions established and promoted?* See 10 above. Since our support is long-term in nature it is natural to already from the beginning plan on a long-term basis. A fellowship is only one part of the support given.
2. *Is the home institution taking part in the planning of the time-schedule(s) for the visits to host institutions?* Always. It must fit both parties.
3. *Are the home institutions taking part in the choice of research problems addressed by the grantees? Describe in which way the research problems addressed by the grantees are followed-up when they return to their home institutions. Is domestic training performed as a complement to that of the Programme?* Since a fellowship is part of the project support, this is always the case.
4. *Give an over-all view of the scientific activity of the scholars during their periods at the home universities. If there are obstacles to scientific work at the home universities, which are the major obstacles to enhanced scientific productivity (for example lack of equipment, infrastructure (please specify), sub-critical research environment etc)?*
I am not sure that I understand your questions since we are supporting science in countries where the scientific base and infrastructure is very weak and thus there are always a lot of obstacles. The most important thing for us is the strengthening of the local infrastructure. It takes a very long time to build such an infrastructure up and the local resources are often limited. However, in all the projects we support we are sure of that there are some facilities available. As said above about 70% of the project grants goes to the strengthening of the local environment. But the always present limitations imply that planning of MSc and PhD sandwich programmes must be done very carefully and that the progresses made must be constantly monitored..... We could of course also talk about teaching loads, difficulties to release equipment etc. from customs, lack of periodicals, problems in getting spares, how to get a company representative interested in problems encountered etc..... The list is as you are well aware of very long.
5. *Describe your methods for quality assurance in the research work of the scholars abroad and at home.* We want publications in internationally refereed journals. MSc and PhD theses should be of an international standard and here the Swedish co-supervisors play an important role. Theses should be reviewed by external examiners. We ask for yearly activity reports including copies of publications. We also ask for exam work to be reviewed by us and the Swedish host group, etc. Very often manuscripts are prepared in co-operation with the Swedish counterparts but also if this is not the case manuscripts are often sent for comments.
6. *In which way can the impact of the scholarship be seen when the scholar returns to his (her) home institution? – Give examples.* Already when a fellowship is asked for, all parties involved should be aware of why? This also means that the scholar is very well aware of his role in the group at the home department. During the period outside the home department, there is normally a constant contact with people back home. Further, upon return there is a natural transfer of new ideas, experimental techniques etc.

7. *What incentives are provided to scholars returning to their home institutions to pursue their careers?*
8. *Make a short overview over the financial support given to the following items:*
 - a) *salary, housing, travel etc for the grantee, b) (minor) equipment and materials to facilitate research work at the home institution and c) financial support to the host-institution.* A) As a whole about 30% of a project grant. The rest to strengthen the local infrastructure. Note that a project grant could vary as much as from SEK 50,000 per year to SEK 700,000.
9. *To which extent, and how is the host department involved in the strengthening of the home department during and after the training periods of the scholars?* This varies. In the best cases the co-operation established implies a steady exchange of information, joint publications, exchange visits etc. However, in almost every case, there is a flow of information through the ISP. We often ask for advices, and, as a routine, applications on support as well as activity reports are sent to the host departments for comments.

C. Follow-up procedure

1. *Describe in which way the aims of your Programme are assessed within your organisation.* Through the representatives of the university in our executive committee and our board and through the reference groups etc. There are also constant evaluations of the progresses from both ISP staff visits and from visits by other Nordic Country (mainly) scientist.
2. *In which way are the achievements of the scholars who have renewed scholarships reported to you and recognised by your organisation?* Each group provides extensive annual scientific reports.
3. *Do you keep an updated data-base over your former grantees/scholars? If so, how often is it up-dated. Submit a copy from your data-base.* Presently our database on fellowship holders is being updated.
4. *Make a table over your grantees for the latest **ten** years, separately for each basic sciences discipline, and for the two universities of Makerere and Dar-es-Salaam, respectively (the time ten years is not applicable to TWOWS) containing information on the following points:*
 - 1) *Name, sex(f or m), title, function/work, present address, present work address, telephone number, fax number and e-mail number.*
 - 2) *Visiting periods at host institutions, name and discipline of institution, year, date, length of visit(s)*
 - 3) *Scientific area(s) of basic research, sub-discipline (ex. organic chemistry, atomic physics etc)*
 - 4) *Achievements through the programme, for example MSc, PhD, peer-review publications, books, research grants from international organisations, leadership of research group, department, faculty or institute etc*
 - 5) *List the proportions between the reviewed scientific publications built on research made abroad and those built on research made at the home institution.*
 - 6) *List research visits to other research institutions abroad, especially to regional universities and research institutions.*

A printout from our database, presently being updated, has been provided.

D. Programme development

Some programmes started a few decades ago, and since then many things have happened at the international scene and in the developing countries. In Sweden and most other industrialized countries the general awareness of the situation in developing countries has increased dramatically, and many universities have now an international office or special programmes on internationalisation. We would like you to describe briefly how your own programmes have developed in view of these changes.

1. a) *How have the changes and knowledge in Swedish and other western universities influenced your scholarship programmes?* b) *Have the international units and/or the host institutions at the universities been involved in suggesting priorities in the research of the grantees?* We are constantly trying to improve our way of working. Please note once again, that we are not a programme for fellowships but that possibilities for training, at all levels, are included in our project support.

Appendix 8b

Answers to questionnaire by IPICS

A. Concerning recruitment of scholars/grantees:

1. *Is the recruitment of scholars achieved through open advertisements at Makerere and Dar-es-Salaam universities? Or how are prospective grantees informed about the possibilities offered by the programmes?* No, there is no open advertisement for our support. The character of the programme is such that only one or two new projects are started annually, so a wide-spread announcement is not appropriate. The UGA:01 project leader together with several others was informed personally of the ISP when I took part in the Pan-African Chemical Conference in Durban 1998. (Last year the Dept of Chemistry of the University of Bamako, Mali, was invited to propose a project, and I met with all researchers and presented our programme.)
2. *Are your programmes well-known to prospective candidates at the two above mentioned universities?* I do not think so, and I have not informed about the programme because of the few new projects we start.
3. *Is the advertisement/recruitment made in co-operation with the home institution/university? Which influence does the home university have on the choice of scholar/grantee?* For the case of UGA:01, the invitation was directed to the present project leader. On my first visit to Makerere, in the preparatory phase, I visited the VC (who is a chemist), and he was positive to the project. In principle he could have stopped the project if he so wanted; in practice a VC does not stop a flow of grants into the university, so his influence in the selection of project is not obvious. (In the case of Mali the Dept of Chemistry was approached, and the project leader was selected in a thorough discussion between me and the dean of the faculty.)
4. *Are the grants/scholarships directed towards certain fields of basic sciences or are they totally open as regards basic scientific area within the main fields?* They are directed to chemistry, from the borders to physics (e.g. material science) to the border to biology (biochemistry, biological chemistry).
5. *In which manner are the priorities of the home university for developing/strengthening certain sub-fields of basic sciences taken care of?* In the first hand we seek for good scientists who are dedicated and could lead, expand and sustain a research group, introduce research culture, and be a model for others. Therefore the choice of sub-field of chemistry has a lower priority. Also, in the poorest of universities, our main target, there is not much choice, alas.
6. *Which criteria are used for selecting the scholars/grantees?* There are two main criteria – a good project leader and a relevant project, in that order. The project leader should be a good scientist, with a strong will and vision in research, and at the same time a good manager. The project leader should be good at stimulating and encouraging her/his co-workers – a property which is extra important where the research infrastructure is weak. The project should have some bearing on the society in the country. In the beginning probably quite applied, to get acceptance by the society; in more developed universities there is room for also the fundamental research.
7. *Which body is responsible for making the selection of scholar? Is there a scientific committee evaluating the merits of the applicants? If, so according to which principles does this committee work? Describe the profiles of the committee members (scientific/organisational status, affiliation, research field).* Up to last year the judgement has been done by the programme director (in chemistry), after consultations with local and Swedish scientists. Since 2001 there is an IPICS reference group, with representatives from the three Southern continents as well as from the Nordic countries, and from a broad spectrum of chemical disciplines (see attached list). Good science, possibilities for a viable research team, and relevance for the country (either it is more towards applied or more fundamental research) is essential.

8. *In which form is the final choice of grantee/scholar reported? Is there any written documentation concerning the evaluation of the merits of the individual applicant?* So far the project leaders are informed by e-mail from me directly after the decision of the ISP board, together with comments reflecting the views of referees/the reference group. A contract is then sent for signing of the project leader.
9. *In which way have you promoted a gender balance within the programmes (if applicable)?* By discussing and pointing out the desire for a gender balance. (Our main problem is in Latin America where we get mainly female students.)
10. *Describe the procedure by which the host institution in the host country is found. How much information is given to the host institution before a scholar is enrolled? Is there a personal encounter and discussion between the guest grantee and the host institution before the scientific research starts?* Both the project leader (through literature search) and I try to find out about possible collaborating partners. Then the project leader visits a number of possible groups in Sweden to see what fits. Often two or three collaborating groups are needed in the long run to match the needs of the supported group.

B. Concerning the periods of scientific work:

1. *In which way is the contact between the home and host institutions established and promoted?* Contact is established as given in A.10. Contacts are then most often directly by the home and the host lab, through article writing etc. ISP facilitates visits in both directions. For fellowships to postgraduate students, ISP is a link, and takes care of practical matters. ISP also promotes and encourages the cooperation if stagnant.
2. *Is the home institution taking part in the planning of the time-schedule(s) for the visits to host institutions?* This is first suggested by the home institution, and then discussed with the host institution, often through ISP, and adjusted so it fits both.
3. *Are the home institutions taking part in the choice of research problems addressed by the grantees? Describe in which way the research problems addressed by the grantees are followed-up when they return to their home institutions. Is domestic training performed as a complement to that of the Programme?* As far as possible the training abroad should be an expansion of the research in the home laboratory. If that is not possible, the training should be in line with the research in the home laboratory, and the most methods that are learnt should be possible to set up and applied at home. In some cases the period abroad is to do measurements of own samples on equipment not possible to obtain or maintain at home.
4. *Give an over-all view of the scientific activity of the scholars during their periods at the home universities. If there are obstacles to scientific work at the home universities, which are the major obstacles to enhanced scientific productivity (for example lack of equipment, infrastructure (please specify), sub-critical research environment etc)?* One of the more frustrating things is to clear equipment and consumables from customs. ISP tries to help in various ways through good paper work, and best transport channels. Rapid service of equipment is another obstacle.
5. *Describe your methods for quality assurance in the research work of the scholars abroad and at home.* Wherever possible the research should lead to a publication in an international journal, which gives at least a basic standard.
6. *In which way can the impact of the scholarship be seen when the scholar returns to his (her) home institution? – Give examples.* The most obvious is when new methods are set up, and function. Continuing publication/co-publication with the host is another example.
7. *What incentives are provided to scholars returning to their home institutions to pursue their careers?*
8. *Make a short overview over the financial support given to the following items:*
 - a) salary, housing, travel etc for the grantee, b) (minor) equipment and materials to facilitate research work at the home institution and c) financial support to the host-institution. For IPICS as a whole the distribution is about one third to each of training (including support to host institution), building infrastructure at home, and regional cooperation. Support to host institution is roughly one fourth of the total training cost.

9. *To which extent, and how is the host department involved in the strengthening of the home department during and after the training periods of the scholars?* This varies. The most usual is that contact is kept to write articles in common. Most often there is e-mail communication between the student and/or the project leader and the host for advice, trouble shooting, literature tips. Often the host visits the home lab, sometimes regularly (e.g. the TFNC host visits Dar almost every year). More fellows from the same home lab go the host lab. Often the host advises the home lab and IPICS on purchase of equipment and reagents.

C. Follow-up procedure

1. *Describe in which way the aims of your Programme are assessed within your organisation.* Through the representatives of the university in our executive committee and our board.
2. *In which way are the achievements of the scholars who have renewed scholarships reported to you and recognised by your organisation?* Each group provides extensive annual scientific reports.
3. *Do you keep an updated data-base over your former grantees/scholars? If so, how often is it up-dated. Submit a copy from your data-base.* Not really, IPPS does. We do have a database of fellows, but my interest has more been on the research capacity in the home lab so I have tried to give that first priority. The data are compiled in the book 'Summing up, looking into the future' by Rune Liminga 1975, and in the project catalogues (new version is presently being compiled).
4. *Make a table over your grantees for the latest **ten** years, separately for each basic sciences discipline, and for the two universities of Makerere and Dar-es-Salaam, respectively (the time ten years is not applicable to TWOWS) containing information on the following points:*
 1. *Name, sex(f or m), title, function/work, present address, present work address, telephone number, fax number and e-mail number.*
 2. *Visiting periods at host institutions, name and discipline of institution, year, date, length of visit(s)*
 3. *Scientific area(s) of basic research, sub-discipline (ex. organic chemistry, atomic physics etc)*
 4. *Achievements through the programme, for example MSc, PhD, peer-review publications, books, research grants from international organisations, leadership of research group, department, faculty or institute etc*
 5. *List the proportions between the reviewed scientific publications built on research made abroad and those built on research made at the home institution.*
 6. *List research visits to other research institutions abroad, especially to regional universities and research institutions.*

D. Programme development

Some programmes started a few decades ago, and since then many things have happened at the international scene and in the developing countries. In Sweden and most other industrialized countries the general awareness of the situation in developing countries has increased dramatically, and many universities have now an international office or special programmes on internationalisation. We would like you to describe briefly how your own programmes have developed in view of these changes.

1 a)How have the changes and knowledge in Swedish and other western universities influenced your scholarship programmes? b)Have the international units and/or the host institutions at the universities been involved in suggesting priorities in the research of the grantees?

- a) The increased awareness has led to that some universities, such as UDSM and Makerere get much support from elsewhere which makes IPICS support less crucial for those universities, and leads IPICS to scout for more needing universities. b) The host labs have more and more at least partly to fit the students into their own research programme, and therefore it is essential to be able to change collaborating group if the host has to work on things of less interest to the home lab.

8b) Continued questions – answers IN CAPITALS:

Evaluator's Comment: – We still miss the tables under point C4 (follow-up procedure) for both of you in a file form, which can be copied onto a diskette as appendices to the final report (SAREC wants the report as a file and on a diskette). Can you please supply us with those?

EXCEPT FOR A 10 DAY VISIT BY PROF KIREMIRE MAY 2001 WE HAVE HAD NO GRANTEES YET

– *Your answers (from ISSP and IPICS) to other questions are deviating somewhat from each other, for example if your programmes are well known or not at the two universities.*

THIS IS NOT TOO REMARKABLE, SINCE THE PROGRAMME IS NOT OPENLY ADVERTISED (DUE TO THE FEW NEW PROJECTS STARTED), AND SINCE WE HAVE NOT BEEN ACTIVE AT UDSM, AND ARE ONLY THREE YEARS OLD AT MAKERERE

– *On the other hand many answers agree between you. – we have read your answers to the first part so that:*

1) you are not advertising the support openly for prospective scientists,

CORRECT

2) that you both have made your choice of programme areas (subject of research) according to the priorities of the universities (VCs) and the deans

IPICS DOES NOT PRIMARILY GO FOR THE PRIORITIES OF THE DEAN/VC BUT AIM AT GOOD RESEARCHERS AND RESEARCH LEADERS. HOWEVER, THE RESEARCH AREA SHOULD BE ACCEPTED BY THE DEAN/VC.

and that you agree with the local leadership on the project leaders

YES

3) that you have not actively promoted gender balance (only by discussions)

AND MEETING WITH PROSPECTIVE CANDIDATES TRYING TO ENCOURAGE THEM TO JOIN

– *On the issue of programme development through the years there is not much clarity from any of you. Does that mean that you have not made any specific adjustment of the procedures and contents of research during the last decades?*

THERE HAS NOT BEEN MUCH ROOM FOR CHANGING IN THREE YEARS. IF LOOKING AS IPICS AS A WHOLE, MUCH HAS CHANGED ALONG THE DECADES, FROM FELLOWSHIP PROGRAMME TO SUPPORT TO RESEARCH GROUPS AND INFRASTRUCTURE, AND TOWARDS VARIOUS TYPES OF REGIONAL NETWORKING.

– *Thus, we are interested to know which criteria you use in selecting the group leader: Can anyone apply for this position?*

IN PRINCIPLE YES, ANYONE CAN APPROACH US WITH RESEARCH IDEAS AND WISH FOR FUNDING, BUT WE DO NOT ADVERTISE

– *What is the material you have at hand to be able to say that you have chosen the best possible candidate?*

RECOMMENDATIONS FROM SCIENTISTS WITHIN THE REGIONS – COUNTRY – UNIVERSITY – COLLABORATORS IN OTHER CONTINENTS. DIRECTOR'S VISITS AND DISCUSSIONS WITH THE PROSPECTIVE LEADER. PILOT GRANTS FOR A FEW YEARS TO TEST. FORMER IPICS STUDENTS WHO HAVE DEVELOPED AND SHOWN TO BE GOOD AND DEDICATED. NORMAL BACK RECORDS.

– *By which process are you choosing the field of research for the group? Is that in accordance with the strategy of the Department/Faculty/University?*

WE ARE NOT CHOOSING THE FIELD. MAIN THING IS TO PROMOTE GOOD RESEARCH AND RESEARCH CULTURE. HOWEVER, IT MUST BE CLEAR THAT THE RESEARCH AND/OR THE RESEARCH TRAINING SHALL BE OF BENEFIT TO THE COUNTRY OR REGION IN THE LONG PERSPECTIVE. IF IT DOES NOT FIT IN, WE DO NOT SUPPORT.

– How do you look upon scientific leadership? – Is there a special training which you provide for the group leaders, or how are they to know what is expected from them?

WE ARE IN STEADY CONTACT WITH THEM AND DISCUSS THESE THINGS, BOTH BY ON-SITE VISITS AND BY CORRESPONDENCE. THERE ARE ALSO OUR GUIDELINES AND FORMS FOR APPLICATION, BUDGETING AND REPORTING.

– You hinted once, that it is the group leaders who select the other group members, which you support. By which process are these other members selected?

THEY ARE PRIMARILY POST-GRADUATE STUDENTS, SELECTED ACCORDING TO PROCEDURES NORMAL FOR THAT UNIVERSITY.

– Are you not at all involved in the selection of group members yourselves?

NO. RIGHT OR WRONG WE LEAVE THAT TO THE PROJECT LEADER, BUT ARE OPEN FOR DISCUSSIONS IF SHE/HE WANTS. BUT WE HAVE THE POSSIBILITY TO INTERVENE WHEN A FELLOW IS CHOSEN FOR ABROAD TRAINING (WHICH I HAVE NOT HAD ANY REASON TO DO SO FAR).

– Another interesting subject is how the groups evolve over time. From your reports it is not easy to see in which way they are meeting new challenges and/or which other tasks they have, for example in developing new MSc and PhD courses, etc. Can you say something on these specific points?

THE THREE YEARS HAVE BEEN USED TO START UP THE INFRASTRUCTURE. THE PRESENT SYSTEM DOES NOT ALLOW FOR COURSE WORK. BUT PROF KIREMIRE HAS BEEN INVOLVED IN THE REVITALISATION OF THE NUSESA NETWORK, AND IN THE FORMATION OF THE ANCAP NETWORK.

– For an outsider it is not easy to see through whether there has actually been any development of the research groups during the last decades, but we guess that something must have taken place. Can you please describe this?

I HOPE YOU SAW AND WERE BRIEFED ON THIS BY PROF KIREMIRE, SAW THE NEW LOCALITIES PUT IN CLEAN ORDER AND MET THE STUDENTS. THE BASIS IS NOW THERE, AND THIS YEAR WILL MAKE A LEAP IN BOTH INFRASTRUCTURE AND RESEARCH RESULTS.

Appendix 9

Questions to universities

Dear colleagues at University of Dar es Salaam and Makerere University,

The two of us, who have signed this document have been selected by Sida/SAREC to perform an evaluation of the Sida/SAREC support to basic sciences within the programmes, ISP, ICTP, TWAS and TWOWS (See ToR, Appendix 1). The ToR raises many issues and also demands us to visit you and interview you and a representative number of former and present grantees. As a starting point in our assessment we have made a list of questions/issues which we first want to discuss with the Programmes (See Appendix 2 for the letter to the Programmes). After that we will come to visit your universities, and finally – after making the first draft report – a workshop will be arranged to discuss conclusions and recommendations.

(See ToR, Appendix 1). We hope that we can have fruitful discussions with your universities from which the activities within basic sciences will eventually benefit.

Thus, at the present stage we want to inform you about the questions raised to the Programmes. We would also like you to have a close look at the ToR, and start to collect the information requested by Sida/SAREC. At present we will list some of the relevant issues that we want to discuss with you, but at a later stage (after getting full information from the Programmes), we might ask you for complementary information concerning individuals whom we want to interview.

The Sida/SAREC ToR requests information at three levels: Institutional, Faculty and University level, respectively. To answer the issues raised in ToR we would like you to supply us with material in answer to the following questions:

1. At the Departmental Level

- Give a break down of available facilities in the department in a tabular form; eg. Laboratory facilities, research facilities, library, staff offices, computing facilities, meeting facilities, etc.
- Give a breakdown of staff in the department with their qualifications, ranking and specialization.
- List names and types of teaching and research equipment in the department and indicate those functioning.
- What are the research groups (areas) in the department?
- Indicate viable research areas with an indicator such as publications, research grants, students trained etc.
- Give a breakdown of trained postgraduate students with their degrees, gender and source of funding.
- What are the assessed training needs to support the research areas?
- Does everybody in the department know of the Programmes mentioned above?
- How has the academic staff used the Programmes to benefit their research/training?
- How do you process selection of scholarship or grant holders into the Programme activities.

2. *At the Faculty Level*

- Describe the existing plans and strategies for the development of institutional capacity, research capacity and research priorities in basic sciences..
- If there are no such plans or strategies, when will they be formulated?
- Is the faculty aware of the activities of the Programmes?
- How has the faculty helped steering the basic sciences activities of the Programmes?
- What benefits have the faculty received from the Programmes?
- What role does the faculty play in the selection of scholarship/grant holders and/or areas of research?
- Does the faculty have a peer reviewed and competitive selection process of scholarship/grant holders?
- Define the scientific areas of basic sciences in chemistry, biology, physics and mathematics as opposed to applied sciences.

3. *At University Level*

- How are postgraduate courses developed and approved?
- What resources are available for post-graduate courses?
- Give a table showing the budgeted and actual expenditures for postgraduate courses in basic sciences.
- How does the university coordinate research?
- Are there multi-disciplinary research groups within the university?
- How are research priority areas decided within the university?
- Give an indication of university provided research facilities in the last five years in basic sciences?
- How was priority on research facilities made?
- Who was the major source of funding for the facilities/research projects in basic sciences?
- Are you satisfied with the present organisation of scholarships by the four Programmes from the perspective of academic outcome and cost-effectiveness? What changes would you like to see in the future for better use of resources?

With best wishes

Prof. Shem O. Wandiga
Kenya National Academy
of Sciences
P.O. Box 394 50
Utalili House, Utalili Street.
Room No. 812
Nairobi
Kenya

Prof. Eva Selin Lindgren
Environmental Physics
Experimental Physics
Chalmers University of Technology
412 96 Göteborg
Sweden

Appendix 10a

Answer to questionnaire

Makerere University Department of Chemistry Information for Sida/Sarec Re: Their Support to Basic Sciences

1. Physical Facilities in Departmental Buildings

Item	Number
Teaching Laboratory	7
Research Laboratory	11
Staff Office	22
Staff Meeting Room	1
Instrument Room	1
Book Bank Room	1
Reference Library Room	1
Computer Room	1

2. Computing Facilities

Use for PC	Number	Remarks
Office	6	
Instrument	3	
*Teaching Laboratory	5	Additional 5 soon coming

***NOTE:** The Department for the moment offers one computer-based course of the BIC programme. This course will also be offered to the B.SC. programme in the revised courses for this programme. So, we are in the process of increasing the number of PCs to at least 100, thus the great need for funds to build capacity for this facility.

3. Inventory of chemistry academic staff

Name	Qualifications	Position	Specialization
H. Ssekaalo	B.Sc.,M.Sc.,Ph.D.	Professor/Head of Dept.	Inorganic Chemistry
J.T. Nyangababo	B.Sc.,M.Sc.,Ph.D., Dip.Env.Sci.	Ass. Professor	Analytical/ Environmental Chemistry
B.T. Kiremire	B.Sc.,Ph.D.	Ass. Professor	Organic Chemistry
J. Mbabazi	B.Sc.,Dip.Educ, M.Sc.,Ph.D.	Sen. Lecturer	Physical Chemistry
S.J Murumu	B.Sc.,M.Sc.,Ph.D.	Sen. Lecturer	Organic Chemistry
G.B. Mpango	B.Sc.,M.Sc.,Ph.D.	Sen. Lecturer	Organic Chemistry
S.A. Nyanzi	B.Sc.,Dip.Educ, M.Sc,D.Sc.	Sen. Lecturer	Environmental Chemistry/Analytical Chemistry/Food Chemistry
P.K. Mwesigye	B.Sc, P.G.D.E., M.Sc.,Ph.D.,	Sen. Lecturer	Industrial Chem./Chemical Engineering
R.S. Muyanja	B.Sc.,M.Sc.	Lecturer	Industrial Chem./Chemical Engineering
G. Nambatya	B.Sc., PG.D.E., M.Sc.,Ph.D.,	Lecturer	Organic Chemistry
G.M. Mabudo	M.Sc.	Lecturer	Chem. Engineering/Process Engineering
G.W. A. Nyakairu	B.Sc.,M.Sc.,D.Sc.	Lecturer	Industrial Chemistry/ Geochemistry
M. Ntale	B.Sc.,P.G.D.E.,M.Sc.,	Lecturer	Analytical Chemistry
D. Kasule	B.Sc.,M.Sc.	Lecturer	Chemical Engineering
J. Wasswa	B.Sc.,M.Sc.	Lecturer	Physical Chemistry/ Environmental Science
J. Ssekamatte	B.Sc.,P.G.D.E.,M.Sc.,	Lecturer	Physical Chemistry
B. Naziriwo	B.Sc.,M.Sc.	Lecturer	Analytical Chemistry
C. Olima	B.Sc.,M.Sc.	Lecturer	Organic Chemistry
A. Matovu	B.Sc.,M.Sc.	Assistant Lecturer	Inorganic Chemistry
S.A. Ghaffar	Ph.D.	Visiting Senior Lecturer	Organic Chemistry
N. H. Kirsch	Ph.D.	Lecturer	Food Chemistry/Analytical Chemistry
I.T. Mukasa	B.Sc.,P.G.D.E.,M.Sc.	Teaching Assistant	Inorganic Chemistry
G. Kyazze	B.Sc.	Teaching Assistant	Industrial Chemistry
D. Ogulei	B.Sc.	Teaching Assistant	Industrial Chemistry
R. Byamukama	B.Sc.	Teaching Assistant	Analytical Chemistry

4. Major Teaching and Research Equipment in the Department

Item	Qty	Remarks
1. Spectrophotometer, Shimadzu UV 1201V	1	Functioning
2. Spectrophotometer ATI UNICAM 8620	2	- do -
3. GC unit, PE 8500 with ECD/FID	2	- do -
4. GC Unit, UNICAM 610 with FID	1	- do -
5. HPLC Unit, GILSON	1	- do -
6. Nitrogen Generator, DH UHPNO750, FOR GC	1	- do -
7. Hydrogen Generator DH UHP-20H, for GC	1	- do -
8. GPC Unit with LKB 2150 pump	1	To be assembled soon
9. Polarographic Analyzer/Stripping Voltammeter, Model 264A, EG & G PRINCETON	1	Electrolytic cell defective, new one required together with mercury

5. Research Areas in the Department, Indicators thereof and Gender Distribution

- a) Research Areas:
- i) Natural Products: e.g.
 - Indigenous Food Plants (Uganda)
 - Seed oils
 - Plant pigments
 - ii) Environmental Chemistry: e.g.
 - Pesticide Residues Analysis.
 - Heavy metal pollutants.
 - iii) Coordination and Theoretical Chemistry.
 - iv) Inorganic Industrial Raw Materials.
 - v) Organic Industrial Raw Materials.
 - vi) Inorganic Reactions Mechanisms.
- b) Indicators and gender distribution over the last 10 years:
- i) Publications
 - 7 Articles, 4 M.Sc. Theses (Natural Products).
 - 12 Articles, 17 M.Sc. Theses (Environmental Chemistry).
 - Articles (Coordination and Theoretical Chemistry).
 - ii) Research grants for past students and gender distribution
 - 19 M.Sc. Holders (14 male, 5 female) funded by Norwegian Council of Universities Committee for Development, Research and Education (NUFU).

- M.Sc. holders (2 male, 1 female) funded by International Development Research Centre (IDRC).
- 1 M.Sc. holder (male) funded by International Programme in Chemical Sciences (IPICS).

6. Postgraduate Students currently in the Department

- a) M.Sc.: 7
 - 2 sponsored by IDRC.
 - 5 self-sponsored.
- b) Ph.D: 2
 - 1 sponsored by IPICS
 - 1 sponsored by L. Victoria Environment Management Programme (LVEMP)

7. Assessed Training Needs to Support the Research Areas in the Department

- a) A lot of funding is required for following chemical instruments for the Department to run viable research areas:
 - i) FTIR spectrometer.
 - ii) NMR spectrometer.
 - iii) UV-VIS spectrophotometer (more sophisticated one with wider wavelengths range than the ones we are having).
 - iv) AAS spectrophotometer.
 - v) Polarographic cyclic voltammetric analyzer.
 - vi) Mass spectrometer.
 - vii) X-ray/electron diffractometer with ORTEP facility.
- b) Carbon, hydrogen and nitrogen analyzer assembly.
- c) Liquid nitrogen plant.
- d) Training technical staff to handle sophisticated chemical instruments.

8. Whether Everybody Knows about the Programmes

- Those who known about them are likely to have through circulars advertising fellowships/scholarships posted on notice boards or circulated to the staff using academic staff list.

Professor H. Ssekaalo
Head of department

Appendix 10 b

Answer to questionnaire

Makerere University Department of Physics

<i>Laboratory Facilities:</i>	1 st Year Laboratory 2 nd Year Laboratory 3 rd Year Laboratory 1 st Year Optics Laboratory 2 nd Year Optics Laboratory Project Laboratory Workshop
<i>Research Facilities:</i>	Furnaces up to 1700 degrees Centigrade Pyranometers Radon Gas monitor Orion Seismometers MEQ Seismographs Computers Vacuum Coating Unit Reflection Ellipsometry MOKE Magnetometer Alpha – Step 500 profiler
<i>Library:</i>	One Departmental Library.
<i>Staff Offices:</i>	10 Staff Offices
<i>Computing Facilities:</i>	1 Computer Laboratory with 5 Computers 7 Computers in 7 Staff offices.
<i>Meeting Facilities:</i>	Meetings are often carried out in the Departmental Library
<i>Teaching and Research Equipment:</i>	Furnaces up to 1700 degrees Centigrade Pyranometers Radon Gas monitor Orion Seismometers MEQ Seismographs Computers Vacuum Coating Unit Reflection Ellipsometry MOKE Magnetometer Alpha – Step 500 profiler

PUBLICATIONS

Authors	Title of Paper	Journal	Year
1. E.J.K.B.Banda M.Twesigye-Omwe	Effects of Creosote Oil on the Mechanical Properties of Selected Uganda Timbers	Forest Products Journal	1997
2. George W.A.Nyakairu and Yisto Kaahwa	Phase Transitions in Local clays	American ceramic Society Bulletin	1998
3. E.J.K.Banda and A. Kavuma	Electrical and Dielectrical properties of Selected Uganda clays	International Journal of Biochemi Physics	1998
4. A. Anguma	Contamination Levels of radioisotope 137 Co in Lake Victoria	Proceedings of Evaluation work-shop of NVFU Project 39.2/91	1998
5. Y. Lemeriga	Low Level Counting of radionuckicles 137Cs, 238V, 232Th, 40K, in selected places in the districts of Hoima and Mbale	-ditto-	1998
5. F. Mutonyi	Effects of particles size and processing Conditions on the porosity of sintered Kaolin.	-ditto-	1998
6. D.N.Luwalira, E.J.K.B.Banda and T.T.Otiti	Prediction of solar insolation on a horizontal surface	International Journal of Biochemi Physics	Submitted 1999
7. F. Mutonyi D'Ujanga	Dependence of porosity on compaction Pressure in dry-pressed samples of kaolin.	-ditto-	-ditto-
8. F. Mutonyi D'Ujanga	Electrical Properties of sintered kaolin	Proceedings of regional Conference on Materials Science, Makerere University	1999
9. J.Arineitwe and E.J.K.B.Banda	Dependence of Electrical and Dielectric properties of unglazed Uganda clays on Particle size, compaction f	-ditto-	-ditto-
10. T. Otiti, C.M.Demanet and K.T.Hillie	Effects of oblique deposition on surface roughness and grain size of Ni films.	International Journal of Biochemi Physics	1999

11. A. Kwezi and T.Otiti	Optical properties of Aluminium films	Proceedings of Regional Conference on Materials Science	1999
11. J. Arineitwe and E.J.K.B.Banda		Proceedings of Regional Conference on Material science, Nairobi University	2000
13. F. Mutonyi D'Ujanga	Electrical Properties of sintered kaolin	-ditto-	1999
14. E.J.K.B.Banda	Raising the Profile of Physics in Uganda Schools	Proceedings of the 3 rd World Congress of Physical societies	2000
15. T. Otiti	Optical and Electrical anisotropy in Obliquely evaporated Fe films	Journal of Materials Science Letters	2001
16. F.M.D'Ujanga Y.Kaahwa and L. Atteraas	The polarizing Effects in Sintered kaolin	Tanzania Journal of Science	2001
17. F.M.D'Ujanga, Y.Kaahwa and M. Hempel	Phase Changes of kaolin during sintering	Clays and clay minerals	Submitted 2001
18. F.M.D'Ujanga and Y.Kaahwa	Model for the Electrical Conductivity of Porous ceramics	American ceramic Bulletin	Submitted 2001
19. M. Seeti	A graph reader using a ccd image sensor	Machine Graphics and Vision Journal	Submitted 2001
20. M. Seeti	Display of very low frequency waveforms	International Journal of Electronics	Submitted 2001
21. Twesigomwe, E.M	Scientific and Policy considerations of the Kabarole Earthquake,	Uganda National Council for Science and Technology Newsletter, Vol.3, no.1	1994
22. Twesigomwe, E.M.	The Kisomoro earthquake	W.Uganda,	1994
23. Twesigomwe, E.M and Sseemmanda, E.,	Seismotectonics of Rwenzori region. Proceedings	Rwenzori Scientific Conference 15-16	1996.
24. Twesigomwe, E.M	Probabilistic Seismic Hazard Assessment of Uganda.	Ph.D.thesis, Makerere University,	1996
25. Twesigomwe, E.M.	Seismic hazards in Uganda.	Journal of African Earth Sciences, v24 no 1/2 185-195	1997

26. Twesigomwe, E.M	Earthquake risks and their mitigation,	Uganda Institution of Professional Engineers Newsletter, vol 16, no.2,	1997
27. Twesigomwe, E.M. and Tugume, F	Seismicity of Uganda since 1991	Proceedings of the ESARSWG Conference on Earthquake risks and their Mitigation, p24-27	1999
28. Twesigomwe, E.M.	Monitoring of Earthquakes in Uganda	Proceedings of First USSA International Conference of Earthquake Disaster Preparedness	2000
29. Otit T.	Optical and Electrical anisotropy in obliquely evaporated Fe films	J.Mater. Sc. Lett.20	2001
30. T. Otit, G.A. Niklasson, P.Svedlindh, C. G. Granquist	Anisotropic optical	Magnetic and electrical properties of obliquely evaporated Ni films, Thin solid Films 307	1997
31. T.Otiti, C.M. Demanet and K.T.Hillie	Effects of oblique deposition on surface roughness and grain size of Ni films	Biochemi Physics, Vol 8 and 9 Nos. 1 and 2	1999
32. A.Kwezi and T.Otiti	Optical and electrical properties of thermally deposited Al films	Biochemi Physics, Vol.8 and 9 Nos 1 and 2	1999
33. Mbise G. Otit T, and Kivaisi R.T.	Spectral and Angular Selective Coatings with Induced Transmission,	Proc.of 1 st World Renewable Energy Congress, Reading University U.K. edited by A.A.M. Sayigh, vol.3	1990
34. F.Esiangu, T.Otiti and R.T.Kivaisi	Ellipsometry Determination of thickness of normally evaporated Zinc sulphide films	African J.Sci and Tech. Series B.vol.6 No.1	1992

TRAINED POSTGRADUATE STUDENTS:

<i>Student</i>	<i>Gender</i>	<i>Degree</i>	<i>Year</i>	<i>Funding</i>
1. Odegard C.	Female	M.Sc.	1995	NUFU
2. Azoru-ra C.	Male	M.Sc.	1995	NUFU
3. Kamabale D.	Male	M.Sc.	1996	NUFU
4. Ssozi T.	Male	M.Sc.	1996	NUFU
5. Twesigomwe M.N.	Male	M.Sc.	1996	NUFU
6. Kavuma A.	Male	M.Sc.	1997	NUFU
7. Anguma S.	Male	M.Sc.	1999	NUFU
8. Aogon J.	Male	M.Sc.	1997	NUFU
9. Kanya S.	Male	M.Sc.	1999	NUFU
10. Kwezi A.	Male	M.Sc.	1999	NUFU
11. Lemeriga Y.	Male	M.Sc.	1999	NUFU
12. Luwarila D.	Male	M.Sc.	1997	NUFU
13. Mubiru J.	Male	M.Sc.	2000	NUFU
14. Arincitwe J.	Male	M.Sc.	2001	NUFU
15. Kachope R.	Male	M.Sc.	2000	NUFU
16. Katogole D.	Male	M.Sc.	1999	NUFU
17. Odong-Edimu C.*	Male	Ph.D.	1999	NUFU
18. Twesigomwe E.M.	Male	Ph.D.	2000	IPS
19. Mucunguzi E.R.	Male	Ph.D.	2001	NUFU
20. Seeti	Male	Ph.D.	2002	NUFU
21. Otiiti T.T.	Male	Ph.D.	2002	IPS
22. D'Ujanga F.M.	Female	Ph.D.	2002	NUFU
23. Kisolo A. W.	Male	Ph.D.	To submit 2002	NUFU

* Deceased.

Appendix 10c

The Dean
Faculty of Science
Makerere University

Dear Sir,

RE: Sida/SAREC

I have tried as much as possible to answer the questions that were asked at Departmental level. They listed basic sciences as involving Mathematics, Chemistry and Biology. I am wondering in which category Geology is grouped. We shall appreciate if we shall also benefit from this support. The Department never at all benefited from NUFU support. Geology is a basic science.

Kindly sell the idea to them.

Thank you Sir.

Yours sincerely,

Dr. E. Barifaijo

Head of Department

Laboratory Facilities	Research Facilities	Library	Staff Offices	Computing Facilities	Meeting Facilities	Teaching Equipment
2 Teaching Labs, 3 Research Labs 2 Darkrooms 1 Sample Preparation room 1 Store	AAS facility, XRF Unit (not yet installed), Thin section making equipment, research microscope, core drilling machine, photospectrometer, field cars, field gear and equipment, plotter, scanner, soil testing equipment, GPS, digitising board, photocopier	1 Library room combining undergraduate and postgraduate students. Size about 6 x 4 metres.	1 big staff room, 1 room accommodating 4 staff members, 3 individual offices and office of the Head of Department	4 Personal computers with printers. E-mail facilities available	Use of any of the teaching labs.	Slide and overhead projectors, petrographic microscopes, handlenses, hardness kits, hardness tester, reflecting microscopes, hammers, compasses, mirror stereoscopes, stereonets', geologic and topographic maps. Primary and secondary jaw crushers, pulverisers and thin section polishing machines.

1.

2. STAFF IN THE DEPARTMENT

First Name	Others	Qualification	Department	Position	Speciality	Postal address	E-mail
Biryabarema	M.	B.Sc., M.Sc., PGDip. Eng. Geo., Ph.D	Geology	Assoc. Prof	Structural Geo./Geomorphology/ Remote Sensing	P.O. Box 7062, Kla	eagn@infocom.co.ug
Barrafajo	E.	B.Sc., M.Sc., PG Dip. Min. Expl., P.h.D.	Geology	Senior Lecturer/Head	Petrology/Economic Geology	P.O. Box 7062, Kla	eagn@infocom.co.ug
Muwanga	A.	B.Sc., M.Sc., Ph.D.	Geology	Senior Lecturer	Environmental Geochemistry/Engineering Geology	P.O. Box 7062, Kla	eagn@infocom.co.ug
Tiberindwa	J.	B.Sc., M.Sc., PGDE, Ph.D.	Geology	Lecturer	Economic Geology/Petrology	P.O.Box 7062, Kla	eagn@infocom.co.ug
Ssemmanda	I.	B.Sc., PGDE, M.Sc., Ph.D.	Geology	Part time Lecturer	Sedimentology/ Palaentology	P.O. Box 7062, Kla	eagn@infocom.co.ug
Owor	M.	B.Sc., PGDip. GrH ₂ O Res., M.Sc.	Geology	Lecturer	Hydrogeology	P.O. Box 7062, Kla	eagn@infocom.co.ug
Nyakaana	J.	B.Sc., PG Geophy., M.Sc.	Geology	Teaching Assistant	Geophysics	P.O. Box 7062, Kla	eagn@infocom.co.ug
Schumann	A.	B.Sc., M.Sc., Ph.d.	Geology	Senior Leturer	Petrology/Mineralogy	P.O. Box 7062, Kla	eagn@infocom.co.ug
Nagudi	B.	B.Sc., M.Sc., Ph.d.	Geology	Lecturer	Petrology/Geochemistry	P.O. Box 7062, Kla	eagn@infocom.co.ug
Kabanda	F.	B.Sc., PG Mngt., M.Sc.	Geology	Lecturer	Stratigraphy/Petroleum Geology	P.O. Box 7062, Kla	eagn@infocom.co.ug
Kuterema	A.A.	B.Sc., M.Sc.	Geology	Lecturer	Geoinformatics	P.O. Box 7062, Kla	eagn@infocom.co.ug
Kulyanyingi	P.K.	B.Sc.	Geology	Assistant Lecturer	Petrology/Mineralogy	P.O. Box 7062, Kla	eagn@infocom.co.ug
Kiberu	J.M.	B.Sc.	Geology	Assistant Lecturer	Geophysics	P.O. Box 7062, Kla	eagn@infocom.co.ug

3. Teaching and research equipments are listed in No.1. The majority are in working condition. The machines in the Departmental workshop are outdated models and require utter replacement, that is thin section making equipment, jaw crushers, pulverisers and polishing machines.
4. The research groups are Petrology, Environmental Geochemistry, Hydrogeology, Geophysics and Palynology.
5. The viable research areas are the on-going research projects (See Appendix I). Publications since 1997 (See Appendix II). Many are in press.

Students trained - 4 Recent Ph.Ds, 1 Recent M.Sc.,
 - 1 on-going M.Sc. in The Netherlands,
 - 5 On-going M.Sc. in the Department under the auspices of DAAD
 - 2 Completed M.Sc. pending Graduation in the Department
 (1 sponsored by DAAD).

6. Trained Postgraduate Students in the Department since 2000

Surname	First Name	Degree Obtained	Gender	Source of Funding
Barifaijo	Erasmus	Ph.D	Male	Makerere University
Biryabarema	Michael	Ph.D	Male	Makerere University
Ssemmanda	Immaculate	Ph.D	Female	International Decade of East African Lakes (IDEAL)
Mukwaya	Christine	M.Sc	Female	Self
Kulyanyingi	Peggy	M.Sc	Female	DAAD

7. Training Needs

The Department still needs to train its young staff for capacity building. There is need to develop the curriculum and do further training in hydrogeology, engineering geology, geochemistry, geophysics and GIS. Those areas are still in need of development. Research facilities need to be augmented. Logistical support such as field vehicles, equipment, IT, computers and software is needed.

8. Programmes mentioned

TWAS is familiar to most of us. We normally see the courses advertised at the International Centre for Theoretical Physics (ICTP). In September (10–12) last year, TWAS sponsored the Geological Society of Uganda (GSU) with US \$2000 to support international travel of some foreign participants to the Conference which the Society organised in Kampala, Uganda. Most of the members of this Department were on the Local Organising Committee (LOC). The other programmes are not familiar to us.

9. None has used any of those programmes for research.

10. Selection for scholarship and grant holders in this University is done by the Central Executive of the University. The Head of Department may only write a reference letter.

Dr. E. Barifaijo
Head of Department

Appendix I

On-going Projects

1. East African Geo-Science Network

Funding Agency: DAAD with an input from the Department of Geology

Aims:

to foster the development and co-ordination of geoscientific research in East Africa and its sustainability

to improve geoscientific education in East Africa

to facilitate the publicity and dissemination of geoscientific information to governments and public

to endeavour to create awareness and advice on mitigation of natural and anthropogenic hazards

Benefits: development of co-operation of geo-scientists within the East African region.

2 computers and accessories, e-mail/internet connection and user fees for one year.

Duration: the sponsorship from DAAD lasted one year but the network should continue.

Participants: membership should comprise all geo-scientists in East Africa.

2. Environmental Monitoring of The Impact of Heavy Metals From Kilembe and Kasese Cobalt Stockpiles on Wetlands and Lake George Basin.

Funding Agency: Fonds Francaise Pour l'Environmental mondial (FFEM)

Aims: To monitor and assess the environmental impact of former mining operations in Kilembe and the current metal processing in Kasese in conjunction with other components of the projects.

Benefits:

Interdisciplinary research M.Sc. dissertation and publications

Duration: 1¹/₂ years

Participants: Interdisciplinary project involving Departments of Geology, Botany and MUIENR.

It involves members of staff from each of the Departments and institute, one student from each and a research assistant on short-term contact. Also involved are personnel from KCCL, ILM, UWA, NEMA.

In Geology Department, Project Leader – Dr. A. Muwanga

Co-investigator – Dr. A. Schumann

1 M. Sc. Student

1 research assistant

3. Co-Operative Research Programme Between Department of Geology (MAK) and Institute of Geosciences Technical University of Braunschweig (Germany)

Funding Agency: Volkswagen Stiftung (Foundation) – Germany

Aims: Collaborative research between the two institutions on effectiveness of wetlands north of Lake George as natural barriers against migration of heavy metals. To be carried out parallel to Project 2 above.

Benefits:

Equipment, literature and software for the Department

1 PhD and 1 M. Sc. student from MAK and 2 Diploma (M.Sc.) students from TU

Braunschweig

Thesis and publications

Duration: 3 years

Participants:

Makerere

Project leader – Dr. A. Muwanga

Dr. A. Schumann

1 PhD student – Mr. Michael, Owor

1 M. Sc. student – Mr. Andrew Ochan

Braunschweig

Project Leader – Prof. Dr. W. Pohl

Prof. Dr. J. Wolff

Prof. Dr. D. Zachmann

M.Sc. students

4. Title of the Project: The African Pollen Database (APD)

Funding agency: INCO-DC project funded by the European Union (EU)

Through MEDIAS-FRANCE

Aims: To collect the data of fossil and modern pollen from different sites in Africa into one database and to make it available to all researchers who wish to benefit from it.

Pollen data is collected at four centres:

1. AROSTOM in Congo Brazaville

2. Makerere University, Department of Geology

3. University of Arome, Togo

4. University of Addis Ababa, Ethiopia.

Benefits: Researchers including Ugandans can access the data if need arises. The Department of Petroleum Exploration and Production would benefit from such data.

Phase one 1998–March, 2002.

Duration: Phase two is expected to start in 2002. It awaits confirmation by EU.

Participants:

1. IMMACULATE SSEMMANDA

Department of Geology, Makerere University.

2. ELENGA HILAIRE
AROSTOM, Brazzaville, Congo.

3. EDOTH THERESA
University of Arome, Togo.

4. MOHAMMED UMAR MOHAMMED
University of Addis Ababa
Ethiopia.

5. Title Of The Project: Assessing the Potential to Reconstruct the History of Disease From Lake Sediments In East Africa: A Proposal for a Pilot Study in Uganda (Unscr File No. Ec 482).

Project Leader: DAVID RYVES (PhD)
Geological Survey of Denmark and
Greenland (GEUS).

Participants:

1. IMMACULATE SSEMMANDA
Geology Department, Makerere University (GEUS).
2. OLE BENNIKE (PhD)
(GEUS).
3. Dr. MENNO BOUMA
School of Tropical Diseases, London

Funding Agency: DANIDA

Aims

1. To reconstruct the history of disease (malaria) using parts of fossil vectors such as mosquitoes, tsetse flies that are preserved in the sediments of lakes particularly the crater lakes.
2. To investigate if there is a relationship between disease outbreaks and climate.

Benefits:

To help the medical personnel predict the outbreaks of epidemics (cholera) using the climatic signals and to minimize deaths.

Duration: the first phase lasted from November 2000 to November 2001. The second phase is expected to start in March 2002 if DANIDA accepts to provide funds.

APPENDIX II

Recent Publications, Seminar Presentations and Reports of Academic Staff members of the Department of Geology Since 1997

Dr. Erasmus Barifajjo

Publications

Barifajjo, E., 1999. Earth Science Education in Uganda. *Journal of African Earth Sciences*, **28**, No. 4, 843-849.

Barifaijo, E. and Kabanda, F., 2001. Mining and the Current Mineral Target Areas of Uganda. Proceedings of the Workshop on “Challenges and perspectives of Interdisciplinary Geo-Networks in East Africa”, Kampala, Uganda. Documenta Naturae 136, 51-60.

Barifaijo, E., Muwanga, A., and Schumann, A., 2001. The geochemistry of the potassic basalts from the Bufumbira volcanic field in southwestern Uganda. African Journal of Earth Sciences (submitted article).

Barifaijo, E., 2001. The petrology of the volcanic rocks of Uganda. Newsletter of the Geological Society of Uganda, 1 No.1, 42-49.

Barifaijo, E. and Muwanga, A., 2001. The utilisation of volcanic raw materials in Uganda. Newsletter of the Geological Society of Uganda, 1, No.1, 30-33

Reports (unpublished)

Barifaijo, E., 1999. The potential of the Bufumbira basalts to conserve energy. Report prepared for the National Environment Management Authority (NEMA), 58 pp.

Associate Professor Michael Biryabarema

Publications

Biryabarema, M. and Nkanika, W.R.P., 2000. Engineering classification of Rwanda soils; an overview. Proceedings of the workshop on “challenges and Perspectives of Interdisciplinary Geo- Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).

Biryabarema, M., 2000. Siting for disposal of municipal solid waste in greater Kampala, Uganda. Proceedings of the workshop on “Challenges and Perspectives of Interdisciplinary Geo-Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).

Reports (unpublished)

Biryabarema, M., 1998. Do rocks have a role in soil fertility? The Ugandan example. A report prepared at the request of His Excellency the President of the Republic Uganda.

Biryabarema, M., and Owor, M., 1998, 1998. Establishment of water catchment monitoring stations in the Rwenzori Mountains National Park. A report prepared under the Rwenzori Mountains Conservation project.

Dr. Andrew Muwanga

Publications

Muwanga, A., 1997. Heavy metal fluxes in the vicinity of a mining area, Kilembe, Uganda. Zbl. Geol. Paläont., Teil 1, H7/8, Stuttgart p. 699-711.

Muwanga, A., 1997. Environmental impacts of copper mining at Kilembe, Uganda: a geochemical investigation of heavy metal pollution of drainage waters, stream sediments and soils in the Kilembe valley in relation to mine waste disposal. Ph.D. Thesis. Braunschweiger gowissenschaftliche arbeiten, 21, 140 pp.

Muwanga, A., 2000. Environmental degradation due to mining; a Ugandan case study. Proceedings of the Pan-African workshop on sustainable Coastal Management, Maputo (in press).

Muwanga, A. & Kamuhangire, E., 2000. Geological background on Geosites in Uganda and their potential as Geotourism destinations: A need for conservation. Proceedings of the UNESCO workshop on Conservation of Geological Sites in East Africa (in press).

Muwanga, A., 2000. Prospects of interdisciplinary Geo-Networks in East Africa. Proceedings of the Workshop on “Challenges and Perspectives of Interdisciplinary Geo-Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).

Muwanga, A., Schumann, A., & Biryabarema, M., 2000. Landslides in Uganda: Documentation of a natural hazard. Proceedings of the workshop on “Challenges and Perspectives of Interdisciplinary Geo-Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).

Muwanga, A., 2000. Use of statistical methods to predict availability of heavy metals in tailings and sediments in a former mine area (Uganda). Proceedings of the workshop on “Challenges and Perspectives of Interdisciplinary Geo- Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).

Barifaijo, E., Muwanga, A., and Schumann, A., 2000. The geochemistry of the potassic basalts from Bufumbira volcanic field in southwestern Uganda. African journal of Earth Sciences (submitted article).

Seminar Presentations (unpublished)

Muwanga, A., 1998. Environmental degradation due to mining: a Ugandan case study. ”Pan-African Workshop on Sustainable Integrated Coastal Management”, Maputo, Mozambique.

Muwanga, A., 1999. Geosites in Uganda. The need for geoconservation. “UNESCO Workshop on Conservation of Geological sites in East Africa”, Nairobi, Kenya.

Muwanga, A., 2000. Saline lakes in the Katwe volcanic field, Uganda. “Workshop on Saline-Alkaline Lakes in Eastern and Southern Africa”, Nairobi, Kenya.

Reports (unpublished)

Schumann, A., Muwanga, A., & Twesigomwe, E.

1999. Proposal for the feasibility study for a water storage at river Yaze/Rwanda-Geology and Geophysics. Report prepared for Gauff Engineers, Kampala, Uganda, 15 pp.

Muwanga, A., 1999. Baseline study in hydrogeology for Kampala, Mpigi, Mukono and Luwero districts. Report prepared for Private Sector participation in Low Water Well Drilling in Africa, 25 pp.

Dr. Andreas Schumann

Publications

*Valeton, I., Schumann, A., Vinx, R. & Wieneke, M., 1997. Supergene alteration since the Upper Cretaceous on alkaline igneous and metasomatic rocks of the Pocos de Caldas ring complex, Minas Gerais, Brazil. Applied Geochemistry, **12**, 133-154.*

*Mutakyahwa, M. K. D., Schumann, A. & Hachmann, W., 1999. Weathering behaviour of a cristobalite bearing trachyte, N-Tanzania. Mitt. Geol., Paläont. Inst. Univ. Hamburg, **83**, 103-114.*

Schumann, A., Barifajjo, E. & Geisler T., 1999. Preliminary results on the origin of granitoid rocks of eastern Uganda and around Kampala: Magmatic or metasomatic? Journal of African Earth Sciences, 28 (4a), 71-72.

Hollnack, D. and *Schumann, A., 2000. Course of the Workshop. Proceedings of the Workshop on “Challenges and Perspectives of Interdisciplinary Geo- Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).*

Muwanga, A., *Schumann, A.* and Biryabarema, M., 2000. Landslides in Uganda – Documentation of a Natural Hazard. Proceedings of the Workshop on “Challenges and Perspectives of Interdisciplinary Geo-Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).

Schumann, A. and Kulyanyingi, P. K., 2000. A first approach of a new understanding of the Uganda Precambrian “Granite Gneisses”. Proceedings of the Workshop on “Challenges and Perspectives of Interdisciplinary Geo-Networks in East Africa”, Kampala, Uganda. Documenta Naturae (in press).

Barifajjo, E., Muwanga, A., and *Schumann, A., 2000. The geochemistry of the potassic basalts from the Bufumbira volcanic field in southwestern Uganda. African Journal of Earth Sciences (submitted article).*

Seminar Presentations (unpublished)

Schumann, A., Mutakyahwa, M. K. D. & Hachmann, w., 1997. Weathering of a cristobalite bearing trachyte and implications for using gibbsite bearing weathering sequences as time tracer in Tanzania., Afrikas Klimageschichte unter geowissenschaftlichen Aspekten, Jahrestagung der Afrikagruppe deutscher Geowissenschaftler (AdG), Bremen, Germany.

Schumann, A., 1997. Aspects of misinterpretation of high grade metamorphic rocks, migmatites and clues for their magmatic origin, Smola, Norway. Workshop in memory of the late Prof. Dr. J. T. Nanyaro, Department of Geology, UDSM, Tanzania.

Schumann, A., 1997. Supergene alteration on Cretaceous alkaline and metasomatic rocks of the Pocos de Caldas ring structure. Workshop in memory of the late Prof. Dr. J. T. Nanyaro, Dept. of Geology, UDSM, Tanzania.

Biryabarema, M. & *Schumann, A., 1998. Recent landslides in eastern Uganda –Documentation of a natural hazard. Conference on “Challenges and Perspectives of Universities in Africa (GTZ, CIM, DAAD, DSE)”, Kampala, Uganda.*

Schumann, A., Muwanga, A. Barifajjo, E., Kulyanyingi, P. K. K., 2000. The necessity of interregional co-operation in geo-sciences. 18th Colloquium of African Geology at the Karl-Franzens University, Graz, Styria, Austria.

Reports (unpublished)

Schumann, A., 1998. Petrographical analysis of amphibolite samples from Masese Quarry, Jinja. Report prepared for Impregilo-Salini Joint Venture, Owen Falls Extension Project, Geotechnical laboratory, 2 pp.

Schumann, A., 1999. Microscopic hard rock analysis. Report prepared for the Faculty of Technology, Dept. of Civil Engineering, Makerere University, Kampala, Uganda. Project:

Using labour based methods in paving access streets and pedestrian walkways using locally produced natural stones, 2 pp.

Schumann, A., Muwanga, A. & Twesigomwe, E., 1999. Proposal for the feasibility study for a water storage at river Yanze/Rwanda – Geology and Geophysics. Report prepared for Gauff Engineers, Kampala, Uganda, 15 pp.

Schumann, A. 1999. Microscopic rock analysis. Report prepared for Faculty of Technology, Dept. of Civil Engineering, Makerere University, Kampala, Uganda. Project: Investigating the effect of surface characteristics of aggregates on bitumen-aggregate interaction, 2 pp.

Schumann, A., Kabanda F., 2000. Petroleum exploration and its possible effects to the environment – Case study of Murchison Falls National Park. Report prepared for German Technical Cooperation (GTZ) and Uganda Wildlife Authority (UWA), 12 pp.

Schumann, A., Echegu, S., 2000. Geo-touristic sites at Murchison Falls Conservation Area. Report prepared for German Technical Cooperation (GTZ) and Uganda Wildlife Authority (UWA), 50 pp.

Mrs. Immaculate Ssemmanda

Publications

Vincens, A., *Ssemmanda, I., Roux, M., Jully, D., 1997. Study of the modern pollen grain in Western Uganda with a numerical approach. Review of Paleobot. and Palynol., 96, 145-168.*

Twesigomwe, D., *Ssemmanda, I., 1998. Seismotectonics of the Rwenzori region. In: Osmaston H. et al. (ed.), The Rwenzori Mountains National Park, Uganda, 66-74.*

Jolly D., Prentice I. C., Bonnefile R., Ballouche J. A., Bengo M., Brenac P., Buchet G., Burney D., Cazet J. P., Cehddadi R., Edoth T., Elenga H., Elmoutaki S., Guiot J. N. Laarif R., Edoth J. T., Elenga H., Elmoutaki S., Guiot J. N. Laarif F., Lamb H., Lezine A.M., Maley J., Muaka-Mbenza, Peyron O., Reille M., Reynaud-Farrera I., Riollet G., Ritchie J. C., Roche E., Scott L., *Ssemmanda, I., Straka H., mlhamed U., Van Campo E., Sikiminywa Vilimumbalo, Vincens A., waller M., 1998. Biome reconstruction from pollen and plant microfossil data for Africa and Arabian Peninsula at 0 and 6ka. J. of Biogeography, 25, 1007-1027.*

Ssemmanda, I., Vincens A., 1999. Preliminary pollen record from the deep waters of Lake Victoria (East Africa). Palaeoecology of Africa and surrounding Islands, Balkema, Rotterdam, 26, 137-147.

Seminar presentations (unpublished)

Ssemmanda, I., Vincens, A., 1997. Pollen record from the deep waters of Lake Victoria. 3rd Symposium of African Palynology, Johannesburg, South Africa, September 1997, p. 42.

APD Members (including *Ssemmanda I., 1999. AFRICAN Pollen Database: an international network for understanding past and present ecosystems in sub-Saharan Africa. INQUA, Durban, South Africa, August 1999, p. 10.*

Nakimera-Ssemmanda I., Osmaston H., Hamilton a., Vincens A., 2000. Human influence on the vegetation of Fort Portal area, Western Uganda. IDEAL 20 International Symposium, Makokola, Malawi, Janvier 2000, p. 31.

Ssemmanda I., Vincens A., 2000. Vegetation and climate changes around Fort Portal area, Western Uganda, during the Late Holocene.

Appendix 10d

Answers to questionnaire

Makerere University
Department of Zoology
Information for Sida/Sarec February 20, 2002

1. Available Facilities		
Item	Quantity	Remarks
Laboratory (teaching)	2	
Laboratory (research) (Limnology, Fisheries, Ecology, Entomology/Parasitology)	1	
Museum	1	Highly valuable for research, Very wide collection
Vavering	1	Needs repair
Library	1	Needs: furniture, mobile shelves, restocking books
Staff Offices	17	
Computing facilities (PCs)	7	
Meeting facilities (Lecture Theatre seats about 100 people)	1	Badly needs power point/projection facility
Dark room	1	-
2. Staff in the Department of Zoology		
Please see the list attached		
3. Teaching and Research equipment functioning unless (stated otherwise)		
Item	Quantity	Comments
Teaching Microscopes	3	
Compound microscopes	50	
Dissecting microscopes	60	
Inverted microscopes	2	
Hydro lab for Limnological work	1	Parts missing from factory
Local Area Network (LAN)		Incomplete installation
Out-boat Engine(s) functional	1	
Electricity power generator	1	
Autoclave	1	
Ovens	4	
Refrigerators	2	
Centrifuge		

4. *Research groups (areas) in the department of Zoology*

- a) Fisheries, Limnology and aquatic Sciences
- b) Entomology
- c) Parasitology
- d) Ecology

5. *Viable reach areas and indicators*

<i>Research area</i>		<i>Indicator</i>
Limnology	Project title	Nature Society and Water
	Funding	Norwegian Research Council/University of Burgen
	Students	(see database) 1 PhD, 3 MSc
Fisheries	Project title	Lake Victoria Environmental Management Project (LVEMP) Support to Zoology Department
	Funding	US \$350 for five years commencing July 01 1997
	Objective	Capacity building
	Staff trained	<ul style="list-style-type: none"> – Two staff (Glads N. Bwanika and Rose Lowia supported for PhD training at Makerere, South Africa and USA) – One female Support Staff trained 3 months in Canada – Over 95% staff computer literacy achieved through training – Support Staff trained in Limnology in Uganda
Ecology	Project title	– Bat communities in Insular habitats: Implications for their conservation in Uganda
	Funding	Mcanthur Foundation US. 20 million, Uganda Wildlife USH. 12 million
	Student (Staff)	PhD study, 3 years commencing January 2002, Makerere University.
Entomology	Project title	Queen rearing
	Funding	Voca funded Professor Tew from USA to visit the department to assist in the structuring of teaching and research in Economic Entomology.

Parasitology	Project title	Ecology of plant extracts against <i>Plasmodium in vitro</i>
	Funding:	One MSc student C- Obbo partially funded by National Council for Science and Technology Ush. One million

Crocodile Census in Uganda

Breakdown of trained postgraduate with their degrees, gender and source of funding

Please see database for MSc and PhD

6. *Assessed training needs to support the research*

- a) Staff Development – seven young academic staff recently appointed need training to PhD level to meet target of the department of Zoology 2001-2005 strategic plan.
- b) Support staff
- c) Staff academic and technical exchanges
- d) Automation of teaching and learning development of Local Area Net Work (LAN) hardware and software
- e) Library: Books, furniture access to electronic literature in the departmental library.
- f) Gear for field work: tents, engines, various camping gear etc
- g) Transport: water transport and land transport
- h) Equipment: cold storage, hardware and software

7. *Does everybody in the Department know of the programmes mentioned above?*

Staff tend to know more about their respective programmes and individual research. There is need to improve in this.

8. *How has the academic staff used the programmes:*

- Academic staff exchange with University of Burgen department of Zoology – one female staff (Nature Society and water project, Limnology: end of year 2001.
- One female academic staff spent 3 months at University of Florida department of Zoology USA, to learn techniques in fish aging: end of the year 2002.
- One female staff spent three months in Canada end of the year 2000, learning techniques in water quality.
- One female student has just completed PhD study in Kenya funded through Entomology Programme at ICIPE
- One female student is undertaking PhD study at Rhodes University South Africa in the area of fisheries.

9. *Processing of Scholarship*

This is done by the donor agency.

Appendix 10d cont.

Makerere University – Department of Zoology

List of Staff in the Department of Zoology

id	First name	Others	Qualification	Department	Position	Speciality	Postal address	E-mail
090	Makanga	B.	Dip. Ed. BSc., MSc., PhD	Zoology	Assoc. Professor	Parasitology	P.O. Box 7062, Kampala	Zoology@imul.com
091	Banage	W.B	B.Sc., Ph.D	Zoology	Professor	Ecology	P.O. Box 7062, Kampala	Zoology@imul.com
093	Kaddu	J.B	BSc, MSc, Ph.D, MIS	Zoology	Assoc. Professor /Head of Department	Entomology/ Parasitology	P.O. Box 7062, Kla P.O. Box 3267 Kla	Kaddujb@hotmail.com Zoology@imul.com
094	Masaba	S	B.A., M.Sc, Ph.D	Zoology	Assoc. Professor	Parasitology	P.O. Box 7062	Zoology@imul.com
096	Isabirye	Basuta	B.Sc, Dip., Ed., MSc., Ph.D	Zoology	Senior Lecturer	Mammalogy	P.O. Box 7062	Zoology@imul.com
097	Okwakol	J.N.M.	B.Sc, M.Sc, Ph.D	Zoology	Professor	Ecology	P.O. Box 7062	Zoology@imul.com
098	Baranga	D	B.Sc, M.Sc, Ph.D	Zoology	Senior Lecturer	Mammalogy	P.O. Box 7062	Zoology@imul.com
099	Miyingo	K.A	B.Sc, Dip. Ed, M.Sc, Ph.D	Zoology	Lecturer	Entomology	P.O. Box 7062	Zoology@imul.com
0100	Afunaduula	O	B.Sc., MSc.	Zoology	Lecturer	Histologist	P.O. Box 7062	Zoology@imul.com
0101	Kityo	R	B.Sc., M.Sc.	Zoology	Lecturer	Museum Curator	P.O. Box 7062	Zoology@imul.com
0102	Akol	A	B.Sc., M.Sc.	Zoology	Lecturer		P.O. Box 7062	Zoology@imul.com
0103	Bugenyi	FW	B.Sc., M.Sc., Ph.D	Zoology	Senior Lecturer	Limnologist	P.O. Box 7062	Zoology@imul.com
0104	Kizito	Y.S	B.Sc., M.Sc., Ph.D	Zoology	Senior Lecturer	Limnologist	P.O. Box 7062	Zoology@imul.com
0105	Lowia	R	B.Sc., M.Sc.	Zoology	Lecturer	Fish Biologist	P.O. Box 7062	Zoology@imul.com
0106	Namuswe	G	B.Sc., M.Sc	Zoology	Lecturer	Fisheries	P.O. Box 7062	Zoology@imul.com

Appendix 10e

Answer to questionnaire

Department of Mathematics
Makerere University
P O BOX 7062 Kampala, UGANDA
Tel: 256 41 540692
e-mail: hod@math.mu.ac.ug

Proposal for Sida's Support for Basic Sciences.

1. Introduction.

The Mathematics department at Makerere welcomes the proposal for support for basic science. The Department of Mathematics at Makerere University is involved in the teaching of mathematics in the Faculties of Science, Education, Arts, Social Sciences, the Department of Pharmacy, Medical School, the Institute of Computer Science and the Institute of Statistics and Applied Economics (ISAE). The Department offers both an undergraduate programme and postgraduate programmes.

The Mathematics department at Makerere University has offered courses at post-graduate level since 1986. The major mission of the department has been:

- To provide training for those who intend to apply Mathematics in industry, economic development and scientific research;
- To provide training for mathematicians who are interested in fundamental ideas of Mathematics.

The department has also been training for its own self-renewal in form of capacity building.

The department of Mathematics at Makerere would like to foster interdepartmental multidisciplinary research linkages within the faculty of science. Research in such areas as Fisheries, Genetics and Water quality control is proposed.

2. Research Areas.

Three areas represent a strategic direction for teaching and research in the Mathematics department of Makerere University:

Analysis & Dynamical Systems:

Lead by Dr. P J Mangheni has trained most of the teaching staff at higher institutions in Uganda. The programme has recently been joined by Dr Vincent A. Ssembatya from the University of Florida in the U.S.A. Mr Saul Nsubuga is in advanced stages of completing a Ph.D. at Edinburgh in Algebraic Topology.

Biomathematics:

Lead by Prof. L S. Luboobi, has been most active research group already with regional connections. Prof. Luboobi has supervised Ph.D.s in the area at the University of Nairobi and University of Dar es Salaam. He has been visiting professor and external examiner at Dar and Sokoine University. The research team includes Dr. J. Y. T. Mugisha and Mr. G. Bafaki (in the final stages of his Ph. D). Dr. F. Nabugoomu leads the Statistical modelling group to be joined by Mrs. R. Nsubuga who is in her final stages of her Ph. D. at Edinburgh.

Financial Mathematics:

This is a new area of interest for research and teaching. Lead staff is Mr J Kasozi (on Ph. D. with Prof. Paulsen of the University in Bergen, Norway), to be joined by Mr Ssebugenyi currently doing an M.Sc. degree at University of Twente.

In addition we propose short courses in:

- (i) Statistical Modelling
- (ii) Numerical & Computational Methods

Our new Master of Mathematics at Makerere provides a flexible framework for sharing of courses in the three areas and providing the required background for Ph D.

Proposed Programmes for Sida support:

- (1) Capacity building component to include further training of core staff in the above areas to Ph .D. (15 Ph.D.'s are proposed over a 5 year period.)
- (2) Regional Workshops for Teaching Resource Material Development. One in each area per year (15 workshops over 5 years)
- (3) Interdepartmental collaboration programmes with department of Physics and Chemistry, Zoology (Fisheries and Genetics) and Botany.
- (4) Joint research fund in the three areas within the department.
- (5) One Regional Conference per year for presentation of scientific papers
- (6) Enhancement of facilities (computers& Software, Books & Journals etc)

Present Facilities:

- *Library:* The department has a collection of over 10,000 books in its departmental library used mainly for reference. However we do not have recent Journals in Mathematics and our collection of advanced books is very limited.
- *Email/Internet Service:* The department has a computer lab of 10 PC on a LAN and has access to the internet. We would like to get 2 workstations and 10 X-terminals.
- *Offices:* 10 Rooms mostly shared on a LAN but only 3 have computers
- *Academic Staff;* 2 Professors, 3 Senior Lecturers, 13 Lecturers, 2 Teaching Assistants.

A budget of \$100,000 per year is envisaged.

Appendix 11a

Answers to questionnaire

Udsm Physics Department Report University of Dar Es Salaam Physics Department

1. Availability & State of Facilities, Research Groups etc.

Teaching Laboratories (undergraduate)	Research facilities (Labs & equipment)	Library	Staff Offices	Computing facilities	Meeting facilities
<p><u>LAB.1</u> (year)</p> <ul style="list-style-type: none"> - moderately equipped - needs additional eqpt in type and numbers because of expanded enrolment. - Needs modernization <p><u>LAB 2& 3</u> (Year II & III):</p> <ul style="list-style-type: none"> - Poorly & under equipped - Outdated equipment & experiments - Needs modernization <p><u>LAB 4</u> (electronics):</p> <p>Inadequate number of equipment for expanded enrolment Needs additional equipment & modernization.</p> <p><u>NB:</u> Over space not enough</p>	<p><u>Solar Energy/Materials Science:</u></p> <ul style="list-style-type: none"> - well equipped coating & sputtering unit, etc.) - can be improved. <p><u>Nuclear Physics (Applied):</u></p> <ul style="list-style-type: none"> - XRF & Mossbauer spectrometers - X-ray generator faulty. <p><u>Agricultural/Environmental Physics:</u></p> <ul style="list-style-type: none"> - Meteorological instruments - Data loggers <p><u>Seismology:</u></p> <ul style="list-style-type: none"> - Seismometers - Needs upgrading <p><u>Electronics:</u></p> <ul style="list-style-type: none"> - Circuit board etching unit - Electronic test equipment. <p><u>N.B:</u> Central facilities:</p> <ul style="list-style-type: none"> - TEM - AFM - Liquid N, plant 	<ul style="list-style-type: none"> - No formal departmental library. - books kept in staff offices. 	<p>12 rooms</p> <ul style="list-style-type: none"> - enough for staff on post. 	<p>*</p>	<p>One 25 sitting capacity room as:</p> <ul style="list-style-type: none"> - Seminar room - Lecture room - library <p><u>N.B:</u> Future computer lab.</p>

*16 pc's in research labs.

Viable research areas (Recent).

- Applied Nuclear Physics: & Nuclear Science
 - On environmental pollution; (heavy metal), & analysis of iron sulphide from Lake Victoria Gold fields, using XRF & Mössbauer spectroscopic methods & EXRD.
 - Output: ♦ 1 PhD, 1 Msc. several publications completed; ♦ 1 M.Sc. (submitted), 1 M.Sc. (new)
 - Medical/Health Physics

- Agricultural/Environmental Physics:
 - On physics of grain storage & Renewable energy (Solar & Wind).
 - Output: 1. PhD completed; 1 PhD (New)
2. M.Sc. completed; 1 M.Sc. (New) and few publications
- Solar Energy/Materials Science: Condensed matter Physics
 - On selective coatings, electrical characterizations, Solar cell fabrication and PV applications.
 - Output: 1 PhD completed; 1 PhD (new)
Several M.Sc. completed
Three M.Sc. (on-going)
A number of publications
- Seismology
 - On earthquake monitoring
 - Output: 2 M.Sc. completed; Geophysics
1 PhD (abroad), ongoing. }
- Electronics:
 - On electronic simulation of weather and its prediction; speech recognition; tomography; signal processing.
 - Output: Several M.Sc. completed; 2 M.Sc. (ongoing);
A number of publications.

(4) Assessed Training Needs

- Scholarships and fellowships; a number of qualified applicants not taken currently.
- Additional research equipment and support in fields operational costs; there little or no government support
- Staff development programme & training.

(5) Knowledge on Programmes:

- All people (in the department) know through pamphlets received and displayed.

(6) Usefulness of Programmes

- Useful; has enabled staff to attend and participate in colleges, workshops, conferences, seminars and regional meetings.

(7) Processing of scholarships applications:

One or a combination of the following:

- advertisement (in newspaper & notice-boards), best applicant(s) selected. UDSM Postgraduate Training Assistantship scheme; department recommends
- names to the university, based on final overall performance (GPA) (for prospective academic staff)

7. Recent Postgraduate Training (Completed and On-going)

S/N	NAME	PhD	M.Sc.	M/F	Source of funding
1.	Mwabora	•		M	DAAD-ANSTI/IPPS
2.	Mwamburi	• (thesis submitted)		M	
3.	Koleleni	•	•	M	UDSM,ISP,DAAD
4.	Mwambela	•	•	M	JEPP
5.	Rashidi	•	•	M	TTMI
6.	Nsimama	• (on going)	•	M	ISP/Sida-SAREC
7.	Mwalembe		•	M	JEPP
8.	Mbalase		•	M	JEPP
9.	Kasasi		•	M	JEPP
10.	Najati Mohammed		•	F	Sida/SAREC
11.	Mdoe		•	M	JEPP
12.	Banzi		•	M	NRC
13.	Alfayo		•	M	JEPP/Sida-SAREC
14.	Mwanyika		•(on going)	M	Sida/SAREC
15.	Mtongori		•(on going)	F	IPPS
16.	Simba		•(on going)	M	DAAD-UDSM
17.	Ikwaba		•(on going)	M	IPPS
18.	Mlyuka		•(on going)	M	UDSM.Sida/SAREC
19.	Sung'ita		•(on going)	M	NRC
20.	Nduganda		•(on going)	M	Sida/SAREC
21.	Rutakomozibwa		•	F	IPPS
22.	Samiji		•	F	IPPS
23.	Mkiramweni	•(on going)	•	M	JEPP/DTI (PhD)
24.	Garigo		•	M	MoE&C
25.	Kalugendo		•	M	JEPP
26.	Hamza		•	M	JEPP
27.	Muhogora		•	M	NRC

Annex 1: Physics staff list for 2000/2001

(i) Academic Staff

1. Prof. E.C. Njau (Professor) B.Sc., M.Sc., Ph.D.
2. Prof. R.T. Kivaisi (Professor) B.Sc. M.Sc., Ph.D.
3. Prof. P. Msaki, (Associate Professor) B.Sc., M.Sc., Ph.D.
4. *Dr. C.A. Kiwanga (Sen. Lecturer) B.Sc., M.Sc., Ph.D.
5. **Dr. J.W. Kondoro (Sen. Lecturer) B.Sc., M.Sc., P.D.
6. ***Dr. S.P. Kashinje (Sen. Lecturer) B.Sc., M.Sc., Ph.D.
7. Dr. C.B.S. Uiso (Sen. Lecturer) B.Sc., M.Sc., Ph.D.
8. Mr. Y.I.A. Koleleni (Sen. Lecturer) B.Sc., M.Sc.
9. Dr. R.M. Kainkwa (Sen. Lecturer) B.Sc., M.Sc., Ph.D.
10. Dr. E.E. Mhamilawa (Lecturer) B.Sc., M.Sc., Ph.D.
11. Dr. H.N. Kundacli (Sen. Lecturer) B.Sc., M.Sc., Ph.D.
12. Dr. I.N. Makundi (Lecturer) B.Sc., M.Sc., Ph.D.
13. Dr. G.W. Mbise (Sen. Lecturer) B.Sc., M.Sc., Ph.D.
14. Dr. A.N. Mwambela (Lecturer) B.Sc., M.Sc., Ph.D.
15. ****Ms. N,K, Mohammed (Assistant Lecturer) B.Sc; M.Sc.

(ii) Technical Staff members

1. Mr. Sewando, M.S.A. (Principal Laboratory Scientist I) B.Sc., (Ed.), Dip. Ed., Cert.
2. In Nuclear Electronics
3. Mr. Mnyabwilo, A.M., (Principal Laboratory Engineer II) B.Sc. Sc., Eng.
4. Ms. Aloyce, A. (Principal Laboratory Engineer II) Advanced Dip.
5. In Telecommunications.
6. Mr. Mchomvu, J.O.B. (Principal Technician III) Grade Test I
7. Ms. Nyenyembe, A. (Principal Technician I) F.T.C.
8. Ms. Kazimili, B. (Principal Technician II) F.T.C.
9. Mr. Mtelela, Kh. (Senior Technician III) F.T.C.
10. Malungula, M.A. (Senior Lab. Assistant Trade Test III)

(iii) Administrative/Secretarial Staff Members;

1. Joyce Mkali (Office Management Secretary I) - from March, 2001
2. Amina Yusufu (Personal Secretary III) - from March, 2001.

* Staff member up to June 2001.

** On secondment to the Dar es Salaam Institute of Technology since July 1999

*** On leave of absence since January, 2001

**** Joined the Department in March 2001.

Annex 2: Physics staff list and their areas of competence

Staff Member	Areas of competence
E.C.NJAU	<ul style="list-style-type: none"> • Weather electronics • Process tomography instrumentation • Atmospheric / ionospheric radio communication
R.T. KIVAISI	<ul style="list-style-type: none"> • Selective absorbing coatings • Photovoltaic systems and applications • Smart windows • Obliquely deposited films • Thin films
P.K.MSAKI	<ul style="list-style-type: none"> • Medical imaging • Acceptance tests and quality assurance of medical imaging equipment • Health physics and radiation safety • Writing and evaluation of science research proposals.
J.W.A. KONDORO	<ul style="list-style-type: none"> • XRF systems and techniques • Environmental pollution
C.B.S. UISO	<ul style="list-style-type: none"> • Grain storage and the environment • Agrometeorology/Meteorological instrumentation • Physics education
S.P.KASHINJE	<ul style="list-style-type: none"> • MOS Solar cells • Obliquely deposited thin films • Photothermal solar appliance
R.M.KAINKWA	<ul style="list-style-type: none"> • Renewable energy sources • Solar energy devices • Meteorological instrumentation
H.N.KUNDAELI	<ul style="list-style-type: none"> • Optical fiber and computer communication • Microcomputers and microprocessors • Informatics
G.W.MBISE	<ul style="list-style-type: none"> • Solar energy applications • Smart windows • Obliquely deposited thin films • Renewable sources of energy
I.N.MAKUNDI	<ul style="list-style-type: none"> • XRF systems and techniques • Environmental pollution • Mossbauer spectroscopy
E.E MHAMILAWA	<ul style="list-style-type: none"> • Electronic speech recognition • Electronic instrumentation

Y.I.A. KOLOLENI	<ul style="list-style-type: none"> • Radiation detection and monitoring • Environmental pollution • Nuclear analytical techniques
A. MWAMBELA	<ul style="list-style-type: none"> • Process and medical tomography systems development. • Multi-Sensor data fusion • Data communication and networking • Software development using OOP (C++, Java and C#)
M.S.A. SEWANDO	<ul style="list-style-type: none"> • Design and fabrication of electronic instruments • Computer aided design and printed circuit board services • Troubleshooting and repair of electronic equipment
A. MNYABWILO	<ul style="list-style-type: none"> • Computer software installation and networking and microprocessor. • Repair PC and printers, all electronic, communication and electrical systems. • Design and fabrication of electronic and electrical systems. • Computer Aided Design Programs. • Troubleshooting and repair of Nuclear and Medical instruments.
A. ALOYCE	<ul style="list-style-type: none"> • Computer Software Installation. • Computer Troubleshooting. • Design and Fabrication of Electronic Systems. • Computer Aided Design Programs. • Desktop Publishing.
B L KAZIMILI.	<ul style="list-style-type: none"> • Repair of electrical and electronics instruments. • Installation of meteorological instruments.. • Repair of data loggers and environmental sensors. • Fabrication of physics equipment
A. NYENYEMBE	<ul style="list-style-type: none"> • Repair of electronics and electrical instruments. • Basic skills in computer & desktop publishing. • Installation and servicing seismograph stations. • Analysis of seismic data and bulletin production.
MTELELA. KHALFAN	<ul style="list-style-type: none"> • Repair of electronic equipment • Rewinding of motors and transformers • Installation of solar power systems • Installation of communication systems
JOSEPH MCHOMVU	<ul style="list-style-type: none"> • Repair of electrical and electronics equipment • Installation of Earthquake instrument and repair. • Interpretation of seismograms. • Designing simple power supply for laboratory use • Rewinding transformers.

Appendix 11b

Answer to questionnaire

University of Dar Es Salaam Chemistry Department

Facilities and Activities of the Chemistry Department

Prepared by Dr. G. S. Mhinzi

Head, Chemistry Department

21st March 2002

Table 1. Facilities available in the Department

FACILITY	TOTAL NUMBER	REMARK
1. Undergraduate laboratories	3	(i) Inorganic, (ii) Organic and (iii) Physical chemistry
2. Staff offices	12	Two academic staff share one office
3. Research laboratories	6	These labs are shared by more than one research group
4. Library	1	
5. Computing facilities	8	These computers are in a computer room and are used by postgraduate students. These computers are old and need to be replaced.
6. Meeting facilities	None	

Table 2. Staff profile in the department

Academic Staff	Qualif.	Specialization	Rank
G.S. Mhinzi	PhD	Organometallic chemistry, analytical chemistry and chemometrics.	Senior Lecturer and Head
M.H.H. Nkunya	PhD	Organic synthesis, natural product chemistry, chromatography	Chief Academic Officer/Professor
D.M.S. Moshia	PhD	Coordination/analytical, aquatic/salt lake chemistry; traditional brews	Professor
A.M. Mulokozi	PhD	Inorganic chemistry, kinetics, solid state chemistry	Retired Professor
M.A. Kishimba	PhD	Organic synthesis, environmental chemistry	Senior Lecturer
G.L. Mhehe	PhD	Organic synthesis, industrial organic chemistry	Senior Lecturer

O.C. Othman	PhD	Inorganic analytical chemistry, environmental chemistry	Senior Lecturer
S.A. Mbogo	PhD	Inorganic and organometallic chemistry	Senior Lecturer
F. Ngassapa	PhD	Inorganic chemistry and crystallography	Senior Lecturer
E.H.J. Lugwisha	PhD	Inorganic chemical spectroscopy, gender and science	Senior Lecturer
L.L. Mkayula	PhD	Physical chemistry/catalysis, activated carbons from agro-wastes	Senior Lecturer
T. Forester	PhD	Physical/Theoretical chemistry, computers in chemistry	Lecturer/Expatriate
S.M.J. Mdachi	PhD	Organic synthesis, semiochemicals	Lecturer
Y. Makame	PhD	Polymer chemistry	Lecturer
J.Buchweshajja	PhD	Electrochemistry	Lecturer
C.C. Joseph	PhD	Carbohydrate and natural product chemistry	Lecturer
L. Akwilapo	PhD	Solid state inorganic chemistry	Lecturer
J. Mdoe	PhD	Catalysis and surface chemistry	Lecturer
J. Makangara	PhD	Natural products chemistry	Lecturer
C. Mgina	MSc	Synthetic Organic/carbohydrate chemistry	Assistant Lecturer

Table 3. Teaching and research equipment in the Department

INSTRUMENT	MAKE	STATUS
Amino Acid Analyzer	SHIMADZU	Functioning. Needs a Xenon lamp
Atomic Absorption Spectrophotometer (HPLC type)	PERKIN ELMER	functioning
Electrolytic silver recovery equipment		functioning
FTIR 8201 PC	SHIMADZU	Defective
UV/VIS PC	SHIMADZU	functioning
IR (conventional)		Defective
Thermal analyzer		Defective
Gas chromatograph	VARIAN	functioning
Nitrogen Generators (2)	Peak	functioning
Hydrogen Generators (2)	Varian	functioning
Autolab + PC	Autolab	functioning
Minor teaching equipment eg. ovens, hotplates/stirrers water distillers, pH meters, Rota Vaps, etc.		functioning

Table 4. Postgraduate students trained in the Department

Degree	Name	Gender	Source of funding
MSc	Mwaluko, M.P	M	NORAD
MSc	Sadala, D.V.	M	NORAD
MSc	Mdoe, J.E.G	M	NORAD
MSc	Mbulanya, G.N.	M	NORAD
MSc	Mbulumi, D.L.	M	NORAD
MSc	Mrosso, H.D.J.	M	NORAD
MSc	Kadio, C.D.	M	NORAD
MSc	Mubofu, E.D.	M	NORAD
MSc	Malebo, H.M.	M	NORAD
MSc	Martin, C.	M	NORAD
MSc	Mtega, S. L.	M	NORAD
MSc	Makangara ,J.J.	M	DAAD/NAPRECA
PhD	Makangara ,J.J.	M	DAAD/NAPRECA
MSc	Mbogo, G.P.	F	NORAD
MSc	Juma, S.R.	M	NORAD
MSc	Mdee, L.K.	M	NORAD
MSc	Mwalongo, G.C.J.	M	NORAD
MSc	Maro, A.O.E	M	NORAD
MSc	Mafumiko, F.M.S.	M	NUFFIC
MSc	Tesso, H.	M	DAAD
MSc	Mbuna, J.J.	M	NORAD
MSc	Henry, L.	F	NORAD
MSc	Msagati, T.A.M.	M	NORAD
MSc	Muhie, S.	M	DAAD
MSc	Abdullah, A.M.	M	NORAD
MSc	Mussa, L.M.	F	NORAD
MSc	Chiza, B.M.R.	M	NORAD
MSc	Saria, J.A.	M	NORAD
MSc	Baraza, L.D.	M	DAAD/NAPRECA
MSc	Kyobe, W.B.P.	M	NORAD
MSc	Masabo, M.K.J.	M	NORAD
MSc	Machari, J.M.	M	TPDF
MSc	Wachira, S.W.	F	DAAD/NAPRECA
MSc	Mghweno, A.R.	M	NORAD

MSc	Mlungwana, S.M.	M	KEKO PHARMACEUTICALS
MSc	Momburi, S.W.	M	NORAD
MSc	Magadula, J.J.	M	DAAD/NAPRECA
MSc	Said, S.A.	M	NUFFIC
MSc	Mwamtobe, L.	M	NORAD
MSc	Killaghai, J.H.	M	NORAD
MSc	Kejo, J.Z	M	TPDF
MSc	Irungu	F	DAAD/NAPRECA
MSc	Pombe, J. J.	M	NORAD

Table 5. Research Groups (Areas) in the Department

	Research group	Research Topic	Journal/Conference publications, 1995-2001
1.	Natural Products Chemistry (Nkunya, Joseph, Makangara)	A search for antimalaria, anti-HIV and other chemical constituents from Tanzanian plants	9
2.	Natural gum exudates (Mhinzi)	Chemical investigation of Tanzanian <i>acacia</i> and other tree exudates gums	8
3.	Synthetic chemistry (Mhehe, Kishimba)	Chemical control of striga in Tanzania	4
4.	Pesticide chemistry (Kishimba, Mhinzi)	Agrochemical pesticides in the environment	None (New research area)
5.	Clays and Ceramic chemistry (Lugwisha, Akwilapo)	Analysis of Tanzanian clays and their potential in industries	4
6.	Salt Lakes/Traditional brews chemistry research (Moshu)	Salt lakes research	12
7.	Environmental chemistry (Othman, Mbogo)	Studies on drinking water, foods and the environment	11
8.	Applications of Cashew Nut Shell Liquid (CNSL) (Mkayula, Makame, Buchweishaija)	1.Suspension/Emulsion polymerization of CNSL 2. CNSL as an alternative corrosion inhibitor for steels in aqueous carbon dioxide solutions.	8
9.	Solid state chemistry (Mulokozi)	Kinetics of thermal decomposition of solids	2

Appendix 11c

Answer to questionnaire

Sida Report – Basic Sciences. Updated Information On Research Facilities, Department Of Geology, Faculty Of Science, UdsM (Year 2000).

1. Physical Resources

I) Laboratory Facilities

- a) *Rock preparation laboratory*: Facilities for crushing and grinding of rock samples, rock cutting, and preparation of thin section.
- b) *Mineral separation and sedimentological Laboratory*: Magnetic separator, sieves, Heavy liquid separator unit.
- c) *Optical laboratory*: Microscopes
- d) *Geophysics laboratory*: Various equipment for biophysical studies, earthquake monitoring, and radiometric and susceptibility studies of rocks. Most of the equipment are portable and can be easily used in the field.
- e) *Geochemical Laboratory*: This laboratory has the facilities to carry out major and trace element analysis of rock and soil samples using ICP – OES, Atomic Absorption Spectrophotometry (AAS) and wet chemical analysis. The laboratory has Mercury analyser, and Hach spectrophotometer.

II) Computer Facility

The Department has recently acquired and set up a modern computer laboratory and scanners for teaching, research and data interpretation since they come with a myriad of software for different geological work The laboratory is connected to the inter-net for communication with the rest of the world.

III) Other facilities.

Library, Class rooms and offices.

2. STAFF IN THE DEPARTMENT.	
NAME AND QUALIFICATIONS.	AREA OF COMPETENCE
Prof. A. H. Mruma (Ph.D.) Associate Professor. (HEAD OF DEPARTMENT)	Structural Geology and Petrology.
Prof. J. Ikingura (Ph.D) Associate Professor	Economic Geology
Prof. S. Muhongo (Dr. rer. nat) Full Professor	Precambrian Geology
Prof. M. Maboko (Ph.D) Associate Professor	Geochronology
Dr. I. Marobhe (Dr. Techn.) Senior Lecturer	Geophysics
Dr. E. Mbede (Dr. rer. nat.) Associate Professor	Petroleum Geology
Dr. E. Malisa (Ph.D) Senior Lecturer	Geochemistry
Dr. C. Kinabo (Dr. Ing.)	Mineral Processing
Dr. C. Kaaya (Dr. Rer. nat) Senior Lecturer	Stratigraphy
Dr. S. Kapilima (Dr. Rer.nat.) Senior Lecturer	Paleontology
Dr. H. Nkotagu (Dr. rer nat) Senior Lecturer	Hydrogeology
Dr. K. Msindai (Ph.D) Lecturer	Engineering Geology
Dr. M. Mutakyahwa (Dr. rer nat.) Associate Professor	Sedimentology
Dr. S. Mnali (Ph.D) Lecturer	Economic Geology
Mr. J. Mataragio (M.Sc.) Assistant Lecturer	Geochemistry
Mr. S. Many [M.Sc] Assistant Lecturer	Geochemistry

TECHNICAL STAFF <i>Ms. J. Mujumba</i> (M.Sc.)	Analytical Chemistry
Mr. S. Ngasala [B.Sc]	Mineralogist and Petrologist
Mr. C. Messo [B.Sc]	Analytical Chemistry
Mr. P. Lufungulo (B.Sc.)	Physics/Chemistry
Mr. M. Songo (FTC)	Geophysics/Hydrology
Mr. A. Sembo (Cert.)	Mineral Investigation

3 Teaching and Research Facilities (As Listed In No 1 Above).

4 Research Groups

- Basement Analysis – Precambrian Geology
- Basin Analysis – Stratigraphy, Sedimentology and Palaeontology
- Geopysics
- Geochemistry
- Hydrogeology and Engineering Geology.
- Economic Geology

5 Viable Research Areas

- Basement Analysis – Geology of the Archaean Greenstone Belt of Tanzania
 - Sida-SAREC Supported Project.
 - students are being trained.
 - Several publications.
- Strengthening of Clay based industry in Tanzania
 - Norad Supported Project.
 - Several publications.
- Curriculum Development
 - NUFFIC Supported Project.

B.Sc curricular have been revised

6 POST GRADUATE TRAINING

PhD Training – One Candidate – Male – Sida SAREC Support

M.Sc Training – Three Candidates – Male – Sida SAREC and DAAD Support.

7 TRAINING NEEDS TO SUPPORT RESEARCH

- Advanced and specialized training for Technical staff
- Advanced training for scientists

All staff are aware of the above mentioned programs.

Academic staffs have benefited by acquiring more experience

Programs are advertised to the public and applicants are selected basing on their academic performance.

Appendix 11d

Answers to questionnaire

University of Dar Es Salaam
 Department of Botany
 Sida/SAREC support to basic Sciences
 Answers from Department of Botany to questions

1. Available Facilities in the Department

Facility	Details
Laboratory	<ul style="list-style-type: none"> Two large teaching laboratories present Three Research laboratories available (Botanical, Microbiological and Molecular Biology Research) A Herbarium is also present
Research	<ul style="list-style-type: none"> Three Research laboratories available as specified above Research equipment present as specified in Item 3 below Three Glass houses present Controlled environment plant growth chamber present
Library	<ul style="list-style-type: none"> Present for Botanical and Microbiological books
Staff Offices	<ul style="list-style-type: none"> 15 Staff Offices present
Computing	<ul style="list-style-type: none"> 12 computers for Staff and 10 for Postgraduate Students.
Meeting	<ul style="list-style-type: none"> Two Seminar Rooms present

2. Staff present in the Department of Botany

Name	Academic Qualifications	Rank	Specialisation
Prof. A.K. Kivaisi (Mrs)	B.Sc., M.Sc. Ph.D.	Associate Professor	Solid waste Biodegradation and biomethanation
Dr. F.S.S. Magingo (Mr.)	B.Sc. (Ed.), M.Sc., Ph.D.	Senior Lecturer	Mycologist (Yeasts & Mycorrhizas)
Dr. Z.K. Rulangaranga (Mr)	B.Sc. (Ed.) M.Sc. Ph.D.	Senior Lecturer	Plant Ecologist
Dr. F. Elia (Mr.)	B.Sc. (Ed.), M.Sc. Ph.D.	Senior Lecturer	Cell Biology & Genetics
Dr. M.S.T. Rubindamayugi (Mr)	B.Sc. (Ed.), M.Sc. Ph.D.	Senior Lecturer	Waste water treatment and biomethanation
Dr. Jim Friedericks (Mr.)	B.Sc., M.Sc., Ph.D.	Senior lecturer	Soil Science
Dr. M.H.S. Muruke (Mr)	B.Sc., M.Sc., Ph.D.	Senior Lecturer	Microbial Metabolism
Dr. H.V.M. Lyaruu (Mr)	B.Sc., M.Sc., Ph.D.	Lecturer	Seed bank dynamics

Dr. Z.K. Kanyeka (Mr.)	B.Sc., M.Sc., Ph.D.	Lecturer	Plant Breeding
Dr. A. Nyomora (Mrs)	B.Sc., M.Sc., Ph.D.	Lecturer	Plant Physiologist & Propagation
Dr. S. Eliapenda (Mr.)	B.Sc. (Ed.), M.Sc., Ph.D.	Lecturer	Ecologist
Dr. G.Y.S. Mtui (Mr.)	B.Sc., M.Sc., Ph.D.	Lecturer	Microbial Biochemistry
Dr. T.J. Lyimo (Mr.)	B.Sc., M.Sc., Ph.D.	Lecturer	Microbial Physiology
Mrs. F. Ismail (Mrs.)	B.Sc., M.Sc.	Assistant Lecturer	Plant Metabolism & Propagation
Mrs. A. Buriyo (Mrs.)	B.Sc., M.Sc.	Assistant Lecturer	Phycology
Mr. M. Manoko (Mr.)	B.Sc., M.Sc.	Assistant Lecturer	Plant Taxonomist (conventional & Molecular)

3. Teaching and Research Equipment

Equipment/ Facility	Quantity	Status	Equipment/ Facility	Quantity	Status
Incubators Gallenkamp	5	✓ (2) ✗ (3)	Microscopes Vickers Monocular	2	✓
Warburg manometer	1	✓	Microscopes Wild Monocular	29	✓
Balances Mechanical precision	2	✓	Microscopes Binocular Leitz	11	✓
Balances mechanical analytical	3	✓	Illuminated Cooled Incubators	5	✓ (2) ✗ (3)
Oven GFL	1	✓	Herbarium	1	✓
PH Meters Digital	1	✓	Glass houses	3	✓
Wax Machine BTL	1	✓	Plant Growth Chambers	4	✓ (1) ✗ (3)
Deep Freezer 300 L	1	✗	Flame photometer	1	✓
Kjeldhatherm Digester	1	✗	Bench centrifuge - micro	2	✓
LCC machine	1	✓	Bench centrifuge -normal	4	✓
Percival environmental chamber	1	✓	Ultra centrifuge	1	✗
Microscopes student Watron	42	✓	Water Bath	2	✓
Microscopes student Neopta	15	✓	Electronic precision balance	1	✓
Microscope Dissecting Olympus	39	✓	Electronic analytical balance	1	✓
Microscopes Compound Olympus	19	✓	Muffle Furnace	1	✓
pH meter-analogue Metrohn	1	✓	Fluorescence microscope	1	✓
pH mater-digital Sentron	1	✓	Autoclaves	2	✓ (1) ✗ (1)
Sprectophotometer	2	✓	Portable Pressure cookers	3	✓ (1) ✗ (2)
TV-Philips+Video Deck	1	✓	Dish washers	1	✓
Deep freezer (-20°C)	1	✓	Fume Cabinets	2	✓
Deep freezer (-80°C)	1	✓	Overhead Projectors	3	✓
Refrigerators	8	✓ (6) ✗ (2)	Slide Projector	1	✓

Equipment	Quantity	Status	Equipment	Quantity	Status
Illuminated Refrigerators	1	✓	Normal Incubators	3	✓
Carbon analyser	1	✓	Cooled Incubators	1	✓
Gas Chromatograph	3	✓	Hot air oven	1	✓
Shaking Incubators	4	✓	Polaroid camera	1	✓
Water Purifier (Millique)	1	✓	UV table with UV protective filter	1	✓
Water Distillers	2	✓	Power suppliers (electrophoresis)	5	✓
Sonicator	2	✓	Electrophoresis set-up	5	✓
Bioflows	2	✓	Microwave oven	1	✓
Shaking Water baths	3	✓	Avometer	1	✓
Shakers	2	✓	Light meter	1	✓
Lyophilizer	1	✓	Cryopreservation system (liquid nitrogen Dewar)	1	✓
Ultra freezer (-45°C)	1	✓	Telescopic handle	1	✓
Laminar flow cabinets	3	✓ (2) ✗ (1)			

NB: ✓ = in good working condition

✗ = malfunctioning

4 Research Groups in the Department

4.1 *Microbial Ecology, Metabolism and Taxonomy*

4.2 *Plant Biology, Propagation and Taxonomy*

5 Viable Research areas, Publications and number of students trained

5.1 *Microbial Ecology, Metabolism and taxonomy*

Publications

Buyck, B., Eyssartier, G. and A. Kivaisi (2000). Addition to the inventory of the genus *Cantharellus* (Basidiomycota, Cantharellaceae) in Tanzania. *Nova Hedwigia* **71**(3-4): 491 – 502

Muruke, M.H.S., Danell, E., Kivaisi, A. and F.S.S. Magingo (2001). Identification of mushroom mycelia using DNA techniques. *Tanzania Journal of Science (Accepted – to appear in Volume 28)*

Kivaisi, A.K., Magingo, F.S.S. and M.H.S. Muruke (2002). Biodiversity and domestication of indigenous mushrooms of Africa. *Tanzania Journal of Science. (Accepted – to appear in Volume 29)*

Number of students: 2

5.2 *Plant Biology, Propagation and Taxonomy*

Publications

Ezekiel, A. and J. Friedericks (1999). Propagation of the economically important plant *Dalbergia melanoxylon* (Papillionaceae). *Poster presented during “Basic Sciences Workshop. Faculty of Science, March 2001*

Number of Students: 1

6 Trained Postgraduate Students

Group	Student name & (Gender)	Degree & Year completed	Title of thesis	Source of funding
Micro-biological	Tibuhwa, D.D. (Female)	M.Sc. in 2002	Taxonomy of <i>Termitomyces</i> mushrooms from Tanzanian coastal areas	Sida/SAREC (ISP)
	Ndekya, O. (Female)	M.Sc. in 2002	Cultivation and nutritive value of an edible mushroom <i>Oudemansiella</i> sp.	Sida/SAREC (ISP)
Plants	Ezekiel, A. (Male)	M.Sc. in 2001	Propagation studies of economically important plants: <i>Dalbergia melanoxylon</i> , <i>Swartzia madagascariensis</i> (Papilionaceae) and <i>Prunus africana</i> (Rosaceae)	Sida/SAREC (ISP)

7 Training needs to support the Research areas

7.1.1 *Molecular Techniques for identification of yeasts, mushrooms, and higher plants.*

7.1.2 *Microbial culture collection and management*

7.1.3 *Techniques for establishing and managing an arboretum*

7.1.4 *Databases softwares and management for a Plant biodiversity database*

8 Knowledge on the Programmes

Every member of Staff in the Department of Botany knows about the programmes ISP, ICTP, TWAS and TWOWS

9 Use of the programmes by Academic Staff members

So far, only 6 members of Staff in the Department of Botany have participated in researches under the ISP. No member of Botany Department has so far participated in the other programmes (ICTP, TWAS and TWOWS).

10 Selection of scholarship or grant holders into the Programme activities

Through advertisements in mass media and at notice boards at the University of Dar es Salaam. Applicants are then screened and selected by the Departmental and Faculty Higher Degrees, Research and Publications Committees.

Appendix 12a

Faculty's answer to questionnaire

Sida's Support to the Basic Sciences in a National Context Response to the Faculty Level Questionnaire University of Dar Es Salaam

Describe the existing plans and strategies for the development of institutional capacity, research capacity and research priorities in basic sciences:

At the Faculty level, plans and strategies for the overall development of institutional capacity, research capacity and research priorities are summarized in the Faculty Five Year Rolling and Strategic Plan a copy of which was availed to you. In the area of research, the blue print for action is the Faculty Research Agenda a copy of which was also availed to you. The Agenda lists our priority areas of research in both basic and applied sciences as well as providing an over view of our institutional strengths both in terms of human resources and research infrastructure. The Agenda also stresses that the balance between basic and applied science research should reflect the relative balance in the undergraduate teaching curricula.

An action plan for the operationalization of the Research Agenda is currently being developed.

Is the Faculty aware of the activities of the Programmes.

In general yes. A number of members in the Departments of Physics and Mathematics have been, mostly in the 1980's and early 1990's, active participants in the activities of the ICTP. The Physics Department has had a long and fruitful relationship with the IPPS whereas there is some informal relationship between the IPCS and some members of the Chemistry Department.

Other programmes like TWAS and TWOWS have not been very active in the faculty although brochures for fellowships are often received and circulated to members. A particular problem with the TWOWS fellowships has been their restriction to PhD fellowships only. Given the relatively low number of females with MSc degrees, there are not many eligible applicants for PhD fellowships. Relaxing this requirement such that support is also extended to MSc fellowships would considerably increase the pool of eligible applicants from the faculty.

How has the faculty helped steering the basic sciences activities of the Programmes?

This has mostly been left to the individual researchers or research groups who benefit from the programmes. The faculty has had very little input if any at all.

What benefits have the faculty received from the Programmes?

Mostly support to procure research equipment and literature from IPPS to the Physics Department and in the past, short-term training/sabbaticals for some of the staff members in Mathematics and Physics through the ICTP. Some of these equipment are, however, faculty-wide assets.

What role does the faculty play in the selection of scholarship/grant holders and/or areas of research?

None.

Does the faculty have a peer reviewed and competitive selection process of scholarship/grant holders?

Not applicable.

Define the scientific areas of basic sciences in chemistry, biology, physics and mathematics as opposed to applied sciences.

This is best tackled by specialists in the respective departments.

Appendix 12b

Answers from Faculty of Science, Makerere University

Makerere University Faculty of Science

Proposed Sida Support for Basic Sciences

2. *Answers to questions at Faculty level*

Present plans and strategies for development in terms of institutional capacity, research capacity and research priorities in basic sciences

In the Faculty of Science Strategic Plan 2000/1 -2004/5, the following are reflected:

i) Strategies for development of:

a) Institutional Capacity

- Innovativeness and ingenuity
- Increasing capacity for teaching Science
- Staff exchange programme with other institutions within or outside Uganda
- Establishment of a Faculty Central Laboratory with modern scientific equipment for use by a cross section of researchers
- Training of Technical staff in equipment operations and maintenance

b) Research Capacity

- The Faculty of Science has a good number of staff at PhD level who are engaged in research and supervising graduate students in their respective disciplines,
- There is a modern Molecular Laboratory in an Institute of Environment created out of the Faculty of Science and whose senior member of staff are seconded by the Faculty of Science
- Faculty members attempt to attract incremental governmental allocation and donor and private sector support by increasing and promoting collaborative research, writing and marketing project proposals

c) Research Priorities in Basic Science

- These are set according to the following needs:
 - Capacity building needs of each Department in the Faculty
 - Individual academic or scientific interests of individual Faculty members
 - Availability of staff to supervise graduate students
 - Interests of some agencies/NGOs for finding solutions to specific societal problems
- The need to increase interdisciplinary research in environment, natural resources, energy and extension activities
- The need to promote and strengthen links with industries, institutions, business and grassroots

- d) Knowledge of activities of the Programmes
- The Faculty members are aware of the programmes because they participated in the preparation of the Faculty's Strategic Plan for 2000/2004/5 where reference is made to all programmes inside and outside the country which promote research in basic sciences.
 - Some Faculty members started participating in some of these programmes especially ICTP in the 1970s, 1980s. Others became beneficiaries of ISP, TWOWS later on in the 1990s till now for supporting their PhD research.
 - The programmes have also helped a few MSc students who responded to advertisements.
- e) Perceptions of possible benefits of the Programmes
- Faculty members look at these programmes as good avenues for getting fellowships for further studies and research for the sake of advancing scientific knowledge
 - Faculty members also see these programmes as incentives for them to go out of the country, to present results of their research and gain experience for enhancing their chances for promotion in the University
 - Faculty members also see these programmes as some of the ways by which they can acquire the much needed scientific equipment for research
- f) Influence on selection of scholarship/grant holders and/or areas of research
- The Faculty does not have much influence on the selection of potential grantees other than giving reference letters by individual academic members of staff on individual applicants
 - The Faculty only forwards the advertisements to the concerned academic Department(s)
 - The Faculty may however determine the areas of research so as to fulfill the needs for capacity building

ii) How the Faculty Helped in Steering Basic Science Activities of the Programmes

- Faculty members have participated by way of carrying out their own research work especially for their Ph.D degrees, or just doing research for knowledge.
- Faculty members have also supervised higher degree students who do research for their degrees in basic sciences.
- Faculty members have organized individual or group project work for undergraduates where scientific data are generated.

iii) Benefits the Faculty Received from the Programmes

- Faculty members got higher degrees
- Faculty members have been able to publish scientific papers in journals
- The Faculty has received many experienced academic staff from other universities with Africa and beyond
- Linkages have been established with other universities and new ones being sought
- Faculty members got scientific equipment for research
- Faculty members got exposed to more modern laboratories and scientific techniques

iv) Role Played by the Faculty in Selection of Scholarship/Grant Holders and Areas of Research

- The Faculty selects students according to performance at undergraduate level
- The Faculty also reviews project proposals and selects the best candidates

- The review of projects is done by peers at committee level both at Departmental and Faculty levels
- Research areas are quite often selected according to specialization of staff on the ground or according some societal problems identified by staff or students

The following are some of the research areas in each Department in the Faculty:

a) Biochemistry

- Molecular biology,
- Animal nutrition,
- Enzymology,
- Carbohydrate, lipid and protein biochemistry,
- Biotechnology,
- Cell biology,
- Food chemistry,
- Albinism,
- Endocrinology,
- Microbiology,
- Industrial biochemistry,
- Immunology,
- Medicinal plants.

b) Botany:

- Higher and lower Plant taxonomy,
- Microbiology,
- Plant ecology,
- Plant Physiology and Biochemistry,
- Mycology,
- Plant Pathology,
- Limnology,
- Genetics,
- Ethnobotany,
- Biostatistics,,
- Biotechnology,
- Conservation biology,
- Algology,
- Herbarium curation,
- Plant diversity.

c) Chemistry:

- Analytical Chemistry,
- Environmental Chemistry,
- Food Chemistry,
- Organic Chemistry,
- Industrial Chemistry,
- Inorganic Chemistry,
- Physical Chemistry,
- Geochemistry,
- Environmental Science.

d) Geology:

- Geomorphology,
- Structural Geology,
- Remote Sensing,
- Sedimentology,
- Petrology,
- Palaeontology
- Hydrogeology,
- Geophysics,
- Mineralogy,
- Geoinformatics,
- Stratigraphy,
- Economic Geology,
- Environmental Geochemistry
- Engineering Geology
- Geochemistry

e) Mathematics:

- Applied Mathematics,
- Pure Mathematics,
- Biomathematics
- Statistical Mathematics

f) Physics:

- Solid State Physics,
- Material Science,
- Seismology
- Theoretical Physics
- Nuclear Physics
- Geophysics,
- Solar Energy,
- Electronics,
- Radiation Physics,
- Materials Physics,
- Optics.

g) Zoology:

- Parasitology,
- Ecology,
- Entomology
- Mammalogy,
- Histology,
- Animal Physiology,
- Fishery Biology,
- Limnology
- Museum Curation.

a) Postgraduate Courses Development and Provision

- Presently, all Academic Departments have MA/MSc. programmes by coursework and dissertation.
- MA/MSc. by research and thesis is still practised in some Departments where students through their sponsors demand.
- It is now University policy that all Faculties should develop coursework programmes for PhD.
- Already, some common courses such as the “philosophy of research” and “statistical methods’ are being taught to all PhD students at Makerere University.
- Some Faculties have developed courses for PhD programmes.

b) Research Coordination

- At Makerere University, the overall coordination of all research activities is undertaken by the School of Postgraduate Studies
- Research proposals received at the School of Postgraduate Studies are approved by the Board of Postgraduate Studies
- The other two levels of coordination of research are the Faculty and Academic Departments.
- Research proposals are first received at the Departmental level and considered by the Departmental Higher Degrees and Research Committees which make recommendations to Faculty Higher Degrees and Research Committees.
- The Faculty Higher Degrees and Research Committees make recommendations to the Board of Postgraduate Studies for approval.

c) Research Laboratories

- Currently, Faculties do not have central laboratories which could be used for research.
- Some individual Academic Departments may however have research laboratories
- It is University policy that Departments establish research laboratories
- Faculties are also encouraged to establish central laboratories.

Appendix 13

Comments on meetings with departments/offices in Makerere University

1 DEPARTMENT OF BOTANY

Prof. Remigius Bukenya – Ziraba – Head of Department

The department does not have a strong post-graduate programme as the Uganda Government does not provide funds for such studies. Funding of post-graduate has relied on donor funding with various priority areas. Examples of donor-funded projects in the department include NORAD funding on Biodiversity, Taxonomy and Herbarium, NUFU – Ecology and Biodiversity, WWF – Ethnobotany, IDRC – Amaranthus agronomy and uses.

The department research priority areas are:-

1st Priority: Biodiversity:- Propagation and Biotechnology plant issues culture.

2nd Priority: Ethnobotany

3rd Priority: IT connectivity, Funds for field work.

The department has one TWOWS awardee. The knowledge about Programmes activities are limited, secondly, time allowed for application is short.

2 DEPARTMENT OF ZOOLOGY

Prof. J.B. Kaddu – Head of Department.

Prof. B. Makanga

The existing research groups have been established based on availability of funds, political direction and will. The following are the research areas:

- b) Fisheries, Limnology and aquatic sciences
- c) Entomology
- d) Parasitology and
- e) Ecology

Funding for the research groups come from various donors such as

- i) Norwegian Research Council – Limnology
- ii) Lake Victoria Environment Management Programme – Fisheries
- iii) McArthur Foundation – Ecology
- iv) Voca Funded Professor Tew from U.S.A – Entomology.
- v) National Council for Science and Technology - Parasitology

The department proposed the following research priorities which are subject to confirmation after further discussions:

General

First Priority: Staff development and strengthening of infrastructure such as IT connectivity, library, materials for field work, transport and equipment purchase.

Research Priorities

- 1st Priority: Fisheries, Limnology and aquatic sciences
2nd Priority: Entomology
3rd Priority: Parasitology
4th Priority: Ecology

The department has established linkages with Bergen University, University of Florida, ICIPE and a university in South Africa. One other project being conducted jointly with Faculty of Technology and other departments in Faculty of Science is biogas from various plants. The department is considering writing multi-disciplinary courses for the future.

3 DEPARTMENT OF PHYSICS

Prof. Nyamboyisonga – Head of Department

Prof. Yusto Kaahwa

Prof. E. J. K. B. Banda

Dr. Florence M. Dujanga

Dr. M. Seeti

Dr. P. Kivizera

Dr. Tom Otiiti

Dr. E. M. Mulunguzi

Mr. E. K. Drani

Mr. A. Kisolo

Mr. D. Okello

The Programme has had impact in the department in training 3 MSc and 1 PhD students. The existing research groups include the following:

- Condensed Matter
- Materials science
- Electronics/Optics
- Radiation Physics
- Geophysics

The department receives advertisement of ICTP activities. However, their participation at such activities has been hindered by lack of local inputs needed. They felt that ICTP could reduce costs by holding some of its courses at regional or national institutions. By so doing ICTP will be training many at the cost of a few people attending courses at Trieste. It was recommended that ICTP should decentralize its programmes and involve local experts in training.

The priority areas identified by the department were:

- Computational Physics
- Post-graduate Programmes

Hoever, further discussion was called for to reach consensus. The department felt that the recruitment policy of the University hinders expansion and recruitment of new academic staff.

4 DEPARTMENT OF GEOLOGY

Dr. Erasmus Barifaijo – Head of Department

The priority of the department, we were informed, depends on qualified academic staff. The department has four recent Ph.D. staff members. The department gave the following research areas as priority:

1st Hydrogeology: Research on ground water development which is also a government priority. Three academic staff are involved. Most communities in West Uganda depend on ground water.

2nd Environmental Geochemistry: Identification of sites with appropriate geomorphology, for example for waste disposal, clays and minerals for industrial processes.

Overarching Priority: Development of post-graduate programmes for MSc. and Ph.D. levels and offer of fellowships. The government does not provide postgraduate fellowships.

3rd Geophysics: Requires capacity building to enables research of a multidisciplinary nature.

URGENT NEED The department needs to have a Local Area Network

The department has knowledge about the Programmes activities but has never benefited. He was aware of the impact Programmes beneficiaries like Tom Otiti and Ezzra Twasigomwe have had on the society. He suggested that the Faculty should develop a central laboratory for expensive research equipment and the university should centralize grants to enable their fair distribution and utilization of resources.

5 DEPARTMENT OF BIOCHEMISTRY

*Dr. Fred Kironde
Head of Department*

A new head of department has been recently appointed. Biochemistry Department is both in Medicine and Science Faculties. Research areas presently include anti-malaria vaccine development, with 2 post-graduate students supported by Sida/SAREC, trypanosomiasis and molecular biology. The research priorities of the department are:

- 1st Capacity Building in order to purchase research equipment and launch post-graduate programmes.
- 2nd Nutrition research is a second area with a staff member requiring training.
- 3rd Cell Biology and Metabolism or Endocrinology is a third area where an HPLC is required for training.

6 DEPARTMENT OF CHEMISTRY

Prof. Henry Ssekaao – Head of Department

The department would like to develop research priority in the following areas:

- Natural Products
- Environmental Chemistry
- Coordination chemistry
- Theoretical chemistry
- Industrial chemistry

At present the department would like to have capacity building in purchasing equipments like infrared spectrophotometers, nuclear magnetic resonance spectrometer, high performance liquid chromatograph, etc. In the past, the department has received some training grants from NAPRECA. However, the Uganda NAPRECA branch is dormant and is only restricted to organic chemistry. The department would like to see NAPRECA also involved in the study of non-organic natural products. The department receives a NUFU support in Environmental Chemistry and Carnegie/Rockefeller support in industrial raw materials.

On the IPICS project the departmental chair would like to see more and open interaction with other members of staff in order to know what is happening. The department appreciates the training of one or two postgraduate students by the project. Selection of students grantees meets the approval of departmental and Dean's selection Committee. However, advertisement of the grant would be useful.

The group leader of the IPICS project informed the evaluation team that IPICS funds has been used to train one MSc student and support one PhD and MSc students in 2000/2001. In addition, a critical gas chromatography was rehabilitated, separate laboratory established and a GPC, rotary evaporators, solvents, reference standards and spare parts bought

7 DEPARTMENT OF MATHEMATICS

Dr. Fabian Nabugoomu – Head of Department.

Mathematics evolved at Makerere University from teaching of general Education mathematics that solve real problems and improve the discipline. The following research groups exist in the department.

- a) Analytical mathematics – Has three academic staff involved.
- b) Financial Mathematics – Has greater application
- c) Forecasting Mathematics – } Is the area of first priority.
- d) Dynamical mathematics – } There are 3 people involved, one of them a professor and the other have Ph.Ds.
- e) Biostatistics -The Head and one postgraduate student have specialization in this area. The university has an institute of Statistics. However the department has not played a role in its research.
- f) Industrial Modelling – This is the third priority area. It has usefulness in optimisation and numerical techniques.

The department has an academic staff capacity of 20 people, 40% of whom are women. It has a very heavy teaching load with very large first year classes. It has very small post-graduate students and would like to see post-graduate programmes strengthened by external funding

8 PAST PROGRAMMES GRANTEES

Prof. Ezra Twasigomwe

Prof. Yusto Kaahwa

Dr. Tom Otiiti

Dr. Florence M. Dujanga

Ms. Mugisha Kamatenesi

The following remarks/comments were made at the meeting:

- IPPS has enabled Physics department to have trained personnel, and kept interest in Geophysics alive. Participation of Geology Department in Geophysics was not possible because IPPS does not support earth sciences. One joint proposal prepared by Geology and Physics was submitted to IPPS but was turned down.
- ICTP Associateship enabled Prof. Kaahwa to make five trips to Trieste to attend workshops, conferences, use of library and consultation with experts. Proposal research on study of Uganda clays was written during such visits. The proposal has been supported by granters including Norwegian agencies. A second project on vegetable oils – determination of impurities has developed an identification techniques that determines impurities at 5 ppm. The impact has been publication of scientific papers, 2 PhD and 6 MSc students trained. Research results are used in undergraduate courses.
- TWAS assistance to Prof. Kaahwa was used to purchase computer and internet interface.
- Constraint has been lack of students travel grants.
- ISP-IPPS support for thin films started in 1989. About USD 300,000 has been spent on fellowships and purchase of equipment.
- Several papers have come out of the research project which have been published in journals and in conference proceedings. Some of the constraints stated were lower DSA than regular students at Uppsala University. Lack of Social-cultural sensitivity, payment of tax by the university on imported equipment which strains the non-available university resources. One grantee found good hospitality at host institutions.
- One, grantee was able to attend ICTP short conferences three times. He indicated that ICTP DSA has gone down and limitation has been placed on photocopying.
- TWAS assisted one grantee by paying for the air fare to the conference.
- The impact has been the availability of research equipment in one department that is used by post-graduate and final year students. The grantee has assisted in the design of solar water heater for a Uganda company.
- TWOWS fellowship does not pay local or host tuition fees. This has created problem of supervision, purchase of laboratory consumables or field work support. Child support nor travel allowance is not provided. This gives problem for young mothers.
- ICTP 1982 college helped launch Prof. Twasigomwe into his professional carrier. He found the ICTP library useful and was granted Associate membership. He was able to buy journals and textbooks with the grant.
- Through personal contact he got an IPPS grant which enabled him to go to University of Bergen for his Ph.D. The Programme has also trained M.Sc. students at the Uganda Geological Survey Department.
- The Seismological monitor worth USD 40,000 was bought by IPPS and UNESCO each contributing equally \$20,000. Additional 4 new digital seismic monitor equipment have been bought by IPPS and installed. The stations are run by the Department of Geological Survey who pays for the running costs.

- The country has benefited through creation of awareness of earthquakes. A national building and dams codes are presently being established. The seismic data is shared regionally. However, so far this project has only one professor in the department. The absence of junior academics and the limit to expansion of academic establishment raises questions of sustainability.

9 INSTITUTE OF ENVIRONMENTAL SCIENCE

Prof. Panta M.B. Kasoma – Director

Dr. Frank Kansime

The institute started in 1978/88 academic year as a UNESCO project in Geology, Zoology and Chemistry. Today it offers post graduate course on GIS – remote sensing, water resources and biodiversity. It has externally funded programmes on biodiversity data bank, conservation genetics laboratory and molecular biology laboratory. Since 2001 the Institute received full university recognition and autonomy. It offers multidisciplinary masters courses of 15–20 students per year. So far 6 PhD students have finished their studies. Most Uganda students find fees payment a problem and this causes some to drop out of the course. Graduates find employment with Uganda Wildlife Authority, Uganda National Environmental Management Authority, Non-Governmental Organizations, Forestry and Geography Departments.

Appendix 14

Comments from meeting with departments in UDSM

1 DEPARTMENT OF MATHEMATICS

Dr. C.B. Alphonse – Head of Department

Prof. Mshimba – ICTP Associate Grantee

Dr. Alphonse stated that at present the department does not have enough academic members of staff. The teaching load is heavy and there are few post graduate students. He indicated that recruitment of additional staff is difficult due to lack of qualified people and filled establishment. Support for post-graduate students is not given by the government, but has relied on private or donor sponsorship. Priority was given to establishment of a post-graduate programme in the department. The department requested time to discuss research priorities and groups and submit their decision before 5th April.

Prof. Mshimba indicated that he had benefited from ICTP Associateship. He has made visits to ICTP and used its facilities to do research. He also made useful contacts with other mathematicians. He also find it useful to collaborate with Germans through DAAD programmes. He has been a single author to papers which were required by the university evaluation system.

2 DEPARTMENT OF PHYSICS

Dr. C.B.S. Uiso – Head of Department

Prof. E.C. Njau

Ms. A. Nyenyembe

Dr. I.N. Makundi

Dr. H.N. Kundadi,

Mr. Ramadhani Kitwana (PRO).

It was indicated that in order to strengthen postgraduate training it was necessary to improve undergraduate laboratories. It was explained that the Sida bilateral support for the Faculty of Science does not include strengthening of undergraduate laboratories.

It was further indicated that the department has received from TWAS the Journal of Modern Physics. However, it was regretted that the journal was not current but five to six years old. The department requested time to consider their research priorities.

Experiences of ICTP grantees were positive. Dr. Uiso had attended an ICTP training college. The course benefited him in improving his teaching. Dr. Kundaeli benefited from attending an ICTP programme. The group felt that good ideas were generated by participants at ICTP activities. However, they felt that post-graduate training and research were missing in ICTP programmes. This feeling was contrary to our findings at ICTP. The Evaluation team was given information that they presently conduct M.Sc courses in Physics and Mathematics and Climate Modelling. It was also apparent that staff from Physics Department have not participated in ICTP activities recently. The department indicated that lack of young members of academic staff has hindered attendance at ICTP programmes. They also had difficulty finding local support for travel. They felt that some of the projects offered at ICTP were not relevant to their

needs. Dr. Makundi attended the 1989 ICTP workshop. He was able to purchase and transport books with ICTP grants. The department felt that they were disadvantaged by not having links with prominent physicists. Such links sometimes assist in obtaining additional support. They also felt that feedback on ICTP applications should be sent irrespective of the decision taken.

The department has been a beneficiary of the IPPS projects and support. We were given to understand that the IPPS seismology project could only train short-term students. That the equipment bought from Belgium were old and out of date. That the group leader died and there has been difficulty replacing him. That the project is now run by a technician with some assistance from an academic staff from Department of Geology. That data analysis is a problem. The department indicated that seismology is not a high priority area of research. The IPPS Applied Nuclear Physics project trained Dr. Makundi, several M.Sc. and one Ph.D. students have been trained. That XRF machine is old and gives problems from time to time. Broken defective parts have to be shipped out for repairs.

3 DEPARTMENT OF CHEMISTRY

Dr. G.S. Mhinzi – Head of Department

Dr. M.A. Kishimba

Dr. J. Makangara

The department gave its support to the enhanced Sida support to basic sciences concept. It was explained that the department has not benefited from the programmes activities. IPICS support to chemistry has been outside the department though some use of equipment at Tanzanian Food and Nutrition Centre has been made and vice versa.

The department coordinates two Regional Networks – Natural Products Research in Eastern and Central Africa (NAPRECA) and Africa Network of Chemical Analysis Pesticides (ANCAP). NAPRECA has trained several students in the department. ANCAP has just been formed. The presence of a NORAD grant in the department in the past might have influenced IPICS decision not to support it.

4 DEPARTMENT OF BOTANY AND APPLIED MICROBIOLOGY

Dr. F.S.S. Magingo – Head of Department

Prof. A. Kivaisi

Dr. Muruke

Details of the mission were presented to the department. General support for enhanced Sida support to basic sciences were expressed. The department requested for time to consider research priorities and submit the same to the team.

5 DEPARTMENT OF GEOLOGY

Prof. A.H. Mruma – Head of Department

Details of the mission were presented by the Head. Prof. Mruma enthusiastically endorsed the enhanced Sida support to basic sciences concept. He indicated that his department will discuss areas of research priority. For instance, he sees the department participating in an enhanced Geophysics research that would include other areas like ground water, tectonics, etc. research. The team waits to receive research priority areas from the department.

6 Visit to Tanzania Food and Nutrition Centre, TFNC

Dr. W. Lorri

Dr. Ms. Generose Malokozi

The evaluation team made a visit to TFNC, in order to follow-up some of the activities financed by IPICS. Interesting projects on nutrition of infants were discussed, and laboratory facilities displayed. Due to lack of time on the part of the TFNC staff it was, however, not possible to form any opinion on the impact of the support on society as a whole. The impact on UDSM was not very large.

Appendix 15

Example of what a project profile for a new initiative could contain.

PROJECT PROFILE

1. Project Number UDSM1/02 and MU 1/02
2. Title of the Project: Strengthening Post Graduate Programme at Makerere University and the University of Dar es Salaam, Faculty of Science.
3. National Executing Agency Faculty of Science, University of Dar es Salaam and Makerere University
4. Duration (10 years)
- 5.
6. Background and Justification
 - a. There is need to strengthen post-graduate programmes at the Faculty of Science, Makerere University and University of Dar es Salaam. Presently at the University of Dar es Salaam, there are 168 M.Sc and Ph.D students in the Faculty. There are eight departments in the Faculty. Some departments have post-graduate students while others have none. Each department has provided research priority areas that would enable it develop critical mass in basic research. Enhancement of basic science support requires injection of additional post-graduate students, sharpening of skills of existing academic members of staff, provision of sabbatical leave to staff for further study, and provision of needed research equipment. The situation at Makerere University, Faculty of Science is the same.
 - b. The teaching load in some departments like Mathematics is too heavy. The presence of post-graduate students reduces the teaching load of academic staff as they offer tutorials and mark scripts. Recruitment of young academic staff becomes difficult when there are no post-graduate students. Establishment of post-graduate programme would improve teaching of under-graduate students.
 - c. For the management of research and post-graduate programmes require trained administrators who can facilitate and provide quality service. There is need for provision of training courses for staff in planning, research evaluation and reporting, research proposal writing, procurement and research funds administration. The Programmes, such as TWAS, ICTP and ISP could offer training of Faculty staff in areas of weakness.
 - d. The secretarial and technical staff need to be trained and upgraded in order to strengthen and expand post-graduate training and research. As far as possible all training should be done locally.
7. Cost and Summary (in US Dollars)

The estimated costs given below are tentative indicators. Details of the needed facilities, post-graduate programmes, staff training and visits will depend on the project proposals to be prepared by each Faculty of Science in consultations with the Programmes.

Category	USD/yr/university
Personnel <ul style="list-style-type: none"> • International staff visits • Training of Technical staff • Training of Administrative and support staff¹ Sub-total	50,000 40,000 40,000 130,000
Post-Graduate Programmes <ul style="list-style-type: none"> • Fellowship for 15 M.Sc students @ \$4375.17 • Fellowship for Ph.D students @ \$6409.89 • Continuing Ph.D. students fees² Sub-total	65,629.05 32,049.41 29,590.84 127,269.30
Infrastructure <ul style="list-style-type: none"> • Purchase of critical research equipment to support research priority areas. Sub-total	150,000 150,000
Research Grant & Coordination <ul style="list-style-type: none"> • Support of small research grants • Projects coordination Sub-total	50,000 50,000 100,000
Grand Total	507,726.93

BUDGET NOTES

1. Technical, administrative and support staff will be done in the first three years. After this \$80,000 should be used to support new identified critical areas.
2. 5 Continuing Ph.D. student fees are estimated to be higher than first year fees by \$40,200. However, the 15 continuing M.Sc students pay \$10609.70 less than the first year of Ph.D. Therefore additional \$29,590.84 is needed to meet the short fall.

Appendix 16

Comments on the evaluation report “Assessment of Sida’s Support to the Basic Sciences in a National Context”.

The report discusses how the Faculties of Sciences at University of Dar es Salaam, Tanzania and Makerere University, Uganda, can improve on their research and postgraduate programmes through a more efficient use of the four organisations ICTP (The Abdus Salam International Centre for Theoretical Physics), ISP (International Science Programme), TWAS (Third World Academy of Sciences) and TWOWS (Third World Organisation for Women in Science).

The International Science Programme, ISP, has the following main comments to give as concerns chapters 1-4 in the second version of the report.

A. Recommendations.

We are positive to most recommendations presented in chapter 1.2. and also discussed in chapter 4. However, according to our view, there is a lack of coherence between discussions and recommendations.

The majority of the recommendations have been discussed for quite some time and many of them are already part of the ISP programme and policy of today. Therefore, we conclude that the ISP is already well prepared to be a partner in the proposed activities. We are convinced that if these recommendations can be fulfilled, the status of basic sciences in Tanzania and Uganda will be definitely improved upon.

We note that some of the recommendations require fundamental changes in the policy of respective government. There are definitely trends in such directions and there seems to be a will as well, but financial means are missing. Of special importance here are the recommendations that concern postgraduate scholarships, discussions on how to finance the coordinators needed, how to improve on the situation for supervisors and introduction of postgraduate courses (hopefully on a regional basis).

We are therefore, most interested in taking part in the continued discussions that are needed to formulate a viable programme. The inputs from the two universities in these discussions will of course be the most important.

B. Background information and assessment.

Background information and assessment is presented in chapters 1-4. In many cases the report brings up the same issues in more than one place and therefore, we have tried to discuss matters we find misleading or difficult to understand under certain headings.

B.1. General.

From our point of view, the dynamics of a research group, or local capacity building were not addressed properly. We find that the questionnaires sent out have been solely used as a basis for chapter three, instead of using them as background information for a skilful analysis of the situation and possibilities, implying that there has in reality been no room for analysis of the ISP

(and partly also the other programmes and the universities/faculties/departments) way of operation. This makes some conclusions about the programmes misleading and difficult to understand, including the one made on the future role of ISP. In chapter 3 we read: “*For TWOWS, TWAS and ICTP, there is still an important function to fulfil in linking different scholars from developing and developed countries together in activities related to recent development of sciences (ICTP), and providing grants for doing research at the home institutions, which otherwise could not be executed (TWAS). How ISP sees its future role was not explicit from the answers received from IPPS and IPICS. ISP should be encouraged to rethink on its future role given the changing patterns of donor relationships with developing world under globalization and democratisation process.*”

There should always be a striving to improve on programme and policies, but in this case, we claim that the assessment made is not deep enough for the conclusions made, or to compare the organisations. We do not understand how it is possible to, on one hand, claim the importance of linking scientists together (ICTP) and providing grants for doing research at home (TWAS), while at the same time being negative towards ISP, since we are involved in both the above mentioned activities! We also want to point at the fact that most recommendations given in the report are already in line with the way ISP operates and that a fulfilment of the proposed actions in the report is merely a question of funding. Thus

- a) we already *work with departments in identifying activities*
- b) we already *assist in obtaining funds from other agencies*
- c) we are already involved in *procurement of expensive equipment together with the counterparts*
- d) we are already involved in *training of both academic and technical staff in handling of advanced equipment*
- e) we already *try to have as much as possible of all training in the south*
- f) we already *ask for main spares to be delivered together with the procurement of more costly equipment*
- g) we already *support networks*
- h) we already *take a regional consideration and support the building up of resource centres in order for the regions to take more responsibilities for MSc and PhD programmes*

Furthermore, building research capacity is a long-term process. This seems to be only partly understood in the report, since the evaluators in their analysis of the development in the respective departments do not take into consideration the situation at the very beginning, the local constraints, possibilities to make use of south-south co-operation, etc. Thus we claim that the departments/universities, within their constraints, have made enormous progress and been able to make use of different organisations in an efficient way.

It is also claimed that: “Furthermore, more graduate students with Upper Second Class or better degrees could have been trained by the respective universities, if training had been done in the South with the same amount of funding. Visits to Northern universities cannot be completely avoided. However, consideration should be given to further uplifting education quality and standards of southern universities”

We completely agree to the importance of south-south co-operation. However, the statement is not entirely relevant, since possibilities for training in Africa south of the Sahara are limited and possibilities to make use of South Africa have only become a reality during the last decade or so.

B.2. ISP.

The ISP has evolved from a fellowship programme in the 1960'ies to the research group support programme it is today. In doing this, there has been, and still is, a gradual transfer of responsibilities/ownership to the supported groups. Today's support from ISP is flexible and

holistic, and working within respective department policies and planning, This makes it easy for the supported group to fully utilise the ISP support according to the need of the group, as a complement to faculty support, and contributing to institutional capacity building.

- *Impact of ISP.*

It seems as if the evaluators have misunderstood the role of the departments with respect to postgraduate programmes at the two universities. Thus the academic responsibilities for the postgraduate programmes are with the departments, and not as yet on the faculty level. This may explain the statement that the ISP impact on institutional capacity has been very modest at the same time as the evaluators say that there has been an impact on the departmental level. At the same time, we note that the report makes the recommendation that “the programmes should work with departments in identifying activities”.

We claim that our support has not been negligible but contributed to the establishment of MSc and PhD programmes at the respective departments. One example is the group on “Materials for Solar Energy Efficiency and Solar Energy Applications” at Dept. of Physics, Univ. of Dar es Salaam, which has developed in a very positive way. Since 1976, the IPPS support to this group amounts to about SEK 6.5 Million distributed according to strengthening local infrastructure about 65%, training 14% and regional co-operation 21%. Since the middle of the 80’s, the group has produced 20 publications in international journals, 6 in regional/local journals, 34 conference reports, 5 PhD theses and 14 MSc theses.

The group functions as a regional resource group, and out of the five PhD theses, two have been awarded to regional scientists (one from Univ. of Nairobi and one from Makerere University) and there are two more ready to present their theses, one from Univ. of Zambia, Lusaka, Zambia and one from Moi University, Eldoret, Kenya. Out of the fourteen MSc theses, six are to scientists from other universities in the region.

Another important activity initiated by the group and financed by the IPPS is the course given in “thin film technology”. This course was initiated in 1990 and runs every second year. It is intended for young scientists and postgraduate students from the region and gives both experimental and theoretical training. Including this year (2002) seven two-week courses would have been given to about 120 young scientists from the region.

- *Organisation, recruitment and structure.*

In chapter 1 it is stated that “*ISP research projects at the two universities have often been chosen in discussion with the departments and been approved – but not initiated – by the faculties and university leadership. Research group leaders have been nominated by the departments. On one occasion initial contracts (should read contact) were (was) established between ISP/IPCIS and an individual researcher, followed by discussion with the department. When opening up for new groups, there is no open advertisement but selected departments at selected universities are approached. While ISP expects the university to put in place a selection process for team leaders and fellowship holders, the two Deans of Faculty of Science stated in their response to the questionnaire that the Faculty was not involved in the process.*

In chapter 3 (page 33) it is stated: “*Since the group leader and the choice of scientific field are both of major importance for the progress of the research group and the development of science in the faculty, one might have expected that at least the position of the group leader should be openly advertised and submitted to scientific evaluation by outside experts. Furthermore, one would expect that the choice of group leader and group members would be made in consultation with the dean and VC at the university in question. This seems, however, not always to have been the case. (The two directors gave different answers to this question both in their written*

statement and at the meeting in Uppsala; one of them speak of “application forms”, but no advertisement seems to have taken place). Thus, it seems that there is no open and transparent recruitment process; It was pointed out to us that the selection process is a responsibility of the department and university. However, the universities did not know this responsibility and it was never exercised in any way.”

In the same chapter on page 36 it is stated : *”Also, in the case of ISP the faculty has not had any influence on either selection of fellowship holders or areas of research”*, and on page 37: *“Both directors at ISP were confident that they themselves could select the country, the research project and the project leader on the basis of their “intuition”, and that this was a good way of getting activities of high quality.”*

We feel that the statements above are very much a consequence of that the evaluators have not understood the role of the departments for postgraduate education.

As further clarifications, we want to point out that:

- Choice of country is a matter for our board.
- New activities and performances of projects supported are regularly discussed in the executive committee and also brought up at board meetings.
- Applications for support and activity reports are reviewed by our reference groups where also representatives from Asia, Africa and Latin America are active.
- Choice of research areas, group leaders and group members is a matter for the departments, and enrolment of MSc and PhD students a matter for the university following their rules. *This is a key point with respect to ownership.*
- However, scientific quality of projects and the qualification of group leaders are also assessed by our reference groups and other scientists. Feasibility (including leadership) and basic needs are also looked into by on-site visits and discussions with departments and other local scientists.
- There has been a detailed memorandum of understanding between ISP and Univ. of Dar es Salaam for the years 1997-1999 signed by the Vice Chancellor, Univ. of Dar es Salaam and one between Uppsala University and Univ. of Dar es Salaam thereafter.

In chapter 1 it is stated: *“Purchase of spare parts and/or equipment has often been done by programmes. The present procedure has led, in some instances, to enormous delays in custom clearance of shipped equipment and spare parts since the university had not planned for payment of duty and taxes.”*

This gives the impression that, in cases where ISP procures equipment etc. for the groups, this may cause problems for the universities with delays in custom clearance etc. Problems of this type have nothing to do with the way ISP handles matters or that it is ISP handling the procurement, but this is a problem in many developing countries simply because of the local regulations.

– *IPPS support*

In chapter 2 it is stated that *“The IPPS programme believes in supporting physics research in Africa because it is important to:*

- a. Only support research in line with the policy of universities/departments;
- b. Identify the key people around whom it is possible to build up research activities;
- c. Establish co-operation based on long-term commitments;
- d. Include MSc and PhD sandwich programmes in the project support.”

The above mentioned points are not the reasons why we support research, but are important ingredients when planning for the building up of research activities in developing countries.

C. Appendix 13.3

There is also a misinterpretation made in appendix 13.3 and related to Dept. of Physics, Makerere University. It is stated that, “ISP-IPPS has been supporting individuals with no departmental involvement”. According to the minutes from a meeting at the department such a statement was never made.

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