IAP workshop: Capacity Building for Academies in Africa
May 16-18, 2001   Trieste, Italy

Session 1: Overview Of Presentations
Chair: E.M. Krieger
Rapporteur: P. Msolla

There were four presentations
- All the speakers agreed on the need to establish National Academies of Science in Africa and that Government could use Academies to solve critical community problems.
- Academies could also advise on the type of people to be hired to do certain jobs if the Academies themselves did not have the capacity.
- Emphasized on the need for Academies to work in partnership with Governments and explore means of being sustainable.

A.   Academies of the World: their distribution, structure and function (M.H.A. Hassan)

1.   • Noted that there were 94 Academies (i.e. with individual member elected on merit the world over with a membership of 600   (80% in the third world countries and 20% in the Developed World).

   • Noted that there were only 10 National Academies out of the 53 countries in Africa
     (Cameroon, Ghana, Kenya, Madagascar, Nigeria, Morocco, Senegal, South Africa, Uganda and Egypt).

2.   • Noted that a number of them were not IAP members

3.   Elaborated on Regional Academies, World academies, structure of Academies, elements of prestige and their functions.

B. Academies and Scientific Communities - C.N.R. Rao

1.   • Academies were established for sociological and academic reasons.
   • Need for scientists to come together to share ideas and/or   experiences.
   • Calibration was an important aspect in science and that in order to   promote   excellence and quality of Academies, calibration has to be used in   electing fellows into academies.
   • Academies need to identify talents both within and outside the academies and reward them.
   • Professional Associations/Societies were narrow and were encouraged to belong to wider bodies such as Academies.

2.   Concerns of Scientific Community

   • Academies were required to promote science education for the community to appreciate
   • Academies were required to work in partnership with the Governments.
• Academies were required to encourage other scientists to join Academies or use them in Committees.
3.   Prestige of Academies was an outcome of:
   • Quality and number of members and recognition by the Public and Government
   • Doing relevant things to the Community (effective programmes).
   • Belonging to a World Community of Scientists
   • Degree of independence and level of funding

4.   Status of Academies in Developing Countries
   • They are weak
• Membership is low and young scientists including women were not easily elected
   • Lack resources (funds)
• Investment in science too low (GDP 0.001% of 1.0%)

C.   Academies and the General Public - Y. Quéré

1.   Links between Academies and the General Public are as old as the Academies themselves.

   • Noted that the Emperor/King of France urged Academies to work for the benefit of   the public and the Glory of the King.

   • Academies took community activities such as:
     - Water and the public
     - Reorganization of Prisons
     - Health welfare
     - Exhibitions - Balloons, etc.
   Thus Academies played a key role in the promotion of Science and the welfare of the society.

2.   Responsibilities of Academies to Society
• Legitimacy - Promote excellence
        - Independence
        - Stability (stable institution)

   • Promote public awareness of what science is all about starting from schools - Teachers and students

   • Public perception of Science
     - Depends on how science is used, viz: Hiroshima - Physics; German - Biology

   • Academies have a unique position to be proactive because they are   independent.

   • Noted that there was a strong link between science and freedom (Human Rights). Science requires writing, publishing and travelling. etc.

D. Science and Government - J. Boright

1.   Wondered what do Academies provide to countries?
   • Academies could play important advisory roles to the Government.

   • Noted that Academies do not have all the expertise required and thus on certain assignments Academies could draw expert committees from a wider community.

2. Relationship of Academies with Government and Independence
   • Noted that Independence of Academies was being demanded by Government
   • On funding
    - noted that there was no regular funding from the Government
   - 80% of funding from Endowment funds
- Foundations - Rockefeller, Ford, Carnegie
   - Advisory Services to Government Agencies, etc. viz. Support to health services - HIV/AIDS report to Government on Control Strategy
   - Education - decentralized responsibility (local, state, national), Setting science   standards

   Academy in Committee of Population Fertility and Family Planning.
   Involvement in National/State Security issues
   Academies are best placed to advise on issues like energy, climatic change, etc.

****
Session 2: African Academies: their strengths, weaknesses and needs
General Discussion
Chair: B.S. Ngubane
Rapporteur: S. Mpuchane

Msolla (Tanzania)   He had 3 comments to make:

- Tanzania had no academy but they were considering setting one up.   Listening to all speakers discussing their strengths and weaknesses he had made the observation that both the autonomous and government funded academies lacked sustainability and inquired as to the best way to make academies sustainable
- There seemed to be a disparity in criteria for admission to academies - on one hand, Nigeria's set up in the early 60s with a low membership and South Africa at the other extreme set up only in 1996 with almost 200 fellows and aiming to recruit another 500
- He raised concern about the use of beetles to destroy the water hyacinth in Uganda because no mention was made of how the beetles were to be eradicated once the hyacinth had been destroyed.

Animalu (Nigeria): His response to the second point was that Nigeria wished they could recruit more but due to constraints in changing the statutes which require a 2/3 majority vote for change, they could not do so.

Lee (Malaysia): He addressed that anyone planning to form an academy had to research thoroughly the various models and that IAP could assist countries wishing to start an academy with working models.

Hon. **Isoun** (Nigeria): He inquired if it was possible to constitute another academy in one country - The problem that Nigeria was experiencing could be overcome by setting up another academy to compete with the existing, exclusive one.

Animalu (Nigeria):The Nigerian Academy had rejected the recruitment of Social Scientists into their academy and efforts to open up had been thwarted.

Kuku (Italy): He wanted academies that exist to help those about to start so that they could avoid the problems experienced by others. He visited South Africa and was familiar with the issue of traditionally white/black/asian universities and that new government policies there dictated an increase in the training of young black scientists. He thought they were expanding their academy too fast and unless they were planning to have numbers of fellows in the thousands, they would saturate too soon.
He inquired what S. Africa was doing about training of young in the area of Science Education (up to PhD) to compensate for discriminatory problems of the past.

Gevers (South Africa): The fundamental principle of their academy's recruitment policy was that good people are better in than out of their academy while he conceded that 500 more members for S.Africa (compared to the US with a much larger population) may be too high. This issue could be brought up at a membership meeting. He acknowledged the fact that S. Africa was in urgent need of training in Science and that there was a huge effort to train teachers through the setting up of a foundation for Education in Science and Technology. Their aim was to set up a strong link between the academy and the Department of Education

Hon. **Ngubane** (S. Africa): S. Africa had to definite plans to improve quality of science education. Already discussions with Cuba, Russia and India had taken place in this line and policies to recruit Africans from the Diaspora to come to S. Africa were in place.
There were plans to accelerate PhD training by shortening the training period from 9 to 7 years (without compromising quality).

Ofosu-Amaah (Ghana): He sought clarification on the Egyptian model which seemed to be a super structure that controlled research and employment of personnel while also involved in determining policy options for government.

Hassan (Italy): In his view, the Egyptian body was not an Academy, but more like a research council. In fact the National Research Council had similar functions. In addition, the Ministry also had some of those functions. The next issue was that no members were being elected (as should be the case with an academy).
He was concerned that in all presentations no mention was made of exchange programmes among African academies eg. Egypt had mentioned interaction with external bodies.
Concern was also raised that the African Academies were leaving out young talented scientists.
TWAS Secretariat had set up a programme for young scientists through the national academies (eg. Through prizes)

Moursy (Egypt): He raised the question of what the definition of 'Academy' was. In his view, this should be decided by the nation and not external persons/bodies. Egypt had studied the Hungarian/Russian model. Their academy had close ties with higher Education institutions that give certification. Hence, three members of University governing bodies were members of the Academy. The Egyptian Academy supports Scientific Research that address National problems. They have several Councils/committees and subcommittees (250) with around 4000 members.
They support young scientists through financing for MSC studies (350 this year). The Universities screen the applications and a contract is entered into between the Academy and the student.
A higher Council exists for the coordination of research institutions is under government control.
16 ministries have research institutions. There were over 350 of these scientific institutions and coordination is by the Ministry of Higher Education and S&T

Hon. **Ngubane** (S. Africa): we need a common vision on how we will support research, government and industry and not to belabour issues such as definitions if we are to overcome the digital divide and challenges of diseases in our countries. We need to marshal academies for quality of life and economic growth. In the case of Egypt, there is another academy anyway.

Wandiga (Kenya): For those countries who want to start there is no prescription that is fullproof, but we can share experiences:
- there is a need to link up with government
- at no time will government provide enough resources to run our activities/academies
- we have academies/professors but many of them are dormant (doing nothing for their academies) - this is an undesirable situation.
We must mobilize younger scientist through projects in which they collaborate with scientists from developed countries. This will stimulate them to be active scientists. I.e. link African Academies with those in the north to work on projects that are relevant to us.

Gevers (S. Africa): He had a different view: for a developing country, we must be an engine for development. We do also need to have properly developed academies to uplift the socio-economic status of our countries. He quoted the Malaysian case where the government had thought that the Academy was sufficiently important to invest in it.

Hon. **Ngubane** (S. Africa): He did not see any contradiction. In his view there was no need to follow the Royal Society model. What was critical was having to interact with the youth.

Lee (Malaysia): It was important for Academies to convince their governments to invest in setting them up as was happening with NGOs. The example of their governments' endowment was cited.

Wandiga (Kenya): He emphasized the point that since governments were not able to adequately fund academies, approaching external help (the Netherlands, Japan, etc.) was essential.

Ashour (Egypt): We assume that governments are good enough to listen to the scientists. Why should they listen to new academies when they have social and political problems to contend with.

How can we force governments that do not listen to its citizens or to scientist ? Let scientists guide governments on projects that they (gov.t) are initiating.

Hon. **Ngubane** (S. Africa): I must defend governments -Scientists are privileged because they are learned and they have contacts with other academies and networks. They are in a position to leverage intellectual resources eg., this meeting. Why don't we use the potential of knowledge eg. By quoting existing research results to direct government on issues of concern. Unfortunately, many scientists engage in ivory tower research which is not applicable. They should do research which can be applied or else outsource.
We need to get together Ministries of S&T (eg. SADC) to discuss common issues. For instance, at the forthcoming Commonwealth Science Council to be held in South Africa we could arrange for Scientists to meet with the ministers.

Hassan (Italy): There was a problem of mobilizing knowledge in Africa that addresses concerns of the continent
Many African scientists do not have respect for their politicians
Scientists must organize themselves eg. As academies to have a forum to discuss issues with politicians and to persuade them to invest in Science. If there is no commitment from government to promote S&T, then that country is doomed.

Diop (Senegal): When their State president addressed them, recently he promised them land, a building and a small amount of money in return for doing research of national interest. Even though he was aware that they needed a lot of money, he could not offer them much but would help them through giving contacts from where they could source for money.

Kuku (Italy)   He supported prof. Hassan.
He thought there was a problem with our countries. He was happy that our ministers were here. He chastised them for not putting their money where their mouths were.
On the point raised by the Minister that scientists should engage in research that could be used in their countries, he disagreed as scientists were trained for international application rather than for local application. Many of the African problems did not require "new research" but application of existing results. Governments needed to marshal these results of clone research eg., electricity, water purification for reticulation. There was no need to reinvent the wheel.
He felt that governments enjoyed blaming scientists when technologies already existed eg. In Europe, gas is piped to homes. Why not in Africa ?
In Africa, we were not doing enough Science, yet the frontiers were moving and we could not catch up (whether there is immediate application or not) eg., for our environmental problems - we lack the capacity to research on those issues. There was a plea to governments to promote Science

Hon. **Ngubane** (S. Africa): He was worried about Kuku's statements. In his view, research should contribute to the economy and status of ones country. Not all students that go through tertiary education will be professors. There was therefore a need to guide all students on engaging in relevant issues such as policies and budgeting. Scientists needed to help governments by bringing together results and applications of Science. Certainly all types of research must go on. But there was a need to improve the research output for relevance in our countries

Obasi (Switzerland): He congratulated all presenters. Many presented their concerns and problems - but we wanted to be told "what should be done". He agreed with Kenya who are tackling national problems by finding resources to do that. There must be a symbiotic relationship between scientists and society. Therefore, national problems should be addressed through science.

Boright (USA): Governments have unavoidable role of dealing with national issues - it is essential to see how science on a self-generated, quality controlled way can assist government.
He commented on the issue of choosing between directed and fundamental research. In his view, countries did not have to make this choice. The report on the beetle/water hyacinth was cited - before application of this biological technology from elsewhere research needs to be done on its impacts in

the importing country - also fundamental research challenged scientists but the scientific community must be relevant.

Chetsanga (Zimbabwe): Zimbabwe is about to start an Academy. He is not clear as to what the various academies were doing particularly what part they were playing in society.

Carlsson (Sweden): He is convinced that when discussing academies for solving infrastructure issues, we need to involve:
• Development specialists
• Economists
• Entreprenirial skills
• Industrialists
Our exclusion of these areas in our academies has led to our poor results. African academies should take this into account.

****
Session 3: Experiences of Other Academies
Chairperson: M.H.A. Hassan
Rapporteur: G.B.A. Okelo
Experiences of other Academies

The main highlights of the Indian Academy are:
• Involvement of the general public through lectures, symposia, etc.
• Support young (< 32 years) scientists who later become fellows
• Support senior scientists
• Science popularization, eg school children programme
• International exchange programme
• Near total government policy

The main highlights of the Brazilian Academy are:
• Overproduction of PhD's that cannot be absorbed
• Considerable contribution by science to agriculture. Impressive impact of S&T on agriculture
• Regional distribution of offices
• Academy advises and influences government's decisions on S&T policies
• Government funded yet independent

The main highlights of the French Academy are:
• Writes reports for government but no feedback
• Public lectures for under 40 yr old scientists
• Has foundation to support foreign exchange programmes
• Little influence on media

For Hungary, the main issues are:
• Academy has many institutes
• Participation in European projects
• Funding: less dependence on government

For Italian Academy:
• It is well recognized by scientific community for its excellence
• Gets private donations as endowments
• Weak linkages with universities
• Less open to younger scientists since most of its fellows are over 60 years old

For Malaysian Academy:

- One time grant by government of USD 5 million
- Supportive role of country's president
- Weak IT
- Poor recruitment: only 30% of fellows are active

For Royal Swedish Academy:
- Some small research institutions
- Restrictive membership. Poor age distribution
- Supports young scientists by paying stipend to bring them closer as future fellows of the academy
- Responsible for Nobel Prizes in Physics and Chemistry
- Lectures to teachers
- Multiple funding resources

For Royal Society:
- All fellows pay subscriptions
- Able to raise money by subscriptions, wills, trusts, publishing. Very strong finance base
- Seen as elitist
- Relations with media poor

For US National Academy:
- Cooperation is mainly bilateral and regional projects with counterpart academies on major substantive issues, rather than general exchange programs
- It raises its funding
- Would like to work with Academies in Africa on sustainable development
- Has frontiers of science programs with Germany, Japan, China and young investigators programme

****
Session 4: Plans by African Scientists to set up new Academies
Chair: M.H.A. Hassan
Rapporteur: Mugambi

Presentations consisted of the following countries: Benin, Botswana, Namibia, Tanzania and Zimbabwe

The countries reported that scientific research is mainly being carried out in universities. This research involves postgraduate training of students. Research is also being carried out in specialized institutes and groups. Research work has led to publications and as in the case of Tanzania, there are local journals in which papers are published.

There are statutory bodies such as Research Councils or Commissions which are concerned with the development and management policy guidelines for scientific research. Science and Technology (S&T) policies have been involved that have recognized the following areas (themes) for S&T:
> Physical sciences
> Natural (Life) Sciences
> Medical/Agricultural Sciences
> Industrial Sciences
> Social Sciences.

There is low investment in research and development in science, all countries reported that are below the recommended 1% of GNP where we note the figure of 0.53% for Tunisia that is planned to reach 1% in 2004. Funding for research competes with critical development demands for water supplies, urban migration, rural poverty, etc.

Except for countries such as Tunisia there is a serious lack of human resources for scientific research due to inadequate training facilities. the countries of Benin, Botswana and Namibia each have one university.

Aspirations for founding academies exist. Discussions are being carried out where in Zimbabwe the process has reached an advanced stage with a Working Group laying down a structure for establishing an academy.

The main mitigating factor against the establishment of academies is the lack of a critical mass of scientists in such countries as Benin, Botswana and Namibia.
For Benin a question is posed whether it would not be more viable to set up subregional academies in the context of the subregional economic groupings.
There are professional societies from which membership may be drawn. In case of Tanzania they can base their efforts on the Commission of Science and Technology (COSTECH) and the defunct Tanzania Association for Advancement of Science and Technology (TAAST).

For Tunisia there exists an Academy of Arts and Letters under the Ministry of Culture which cannot serve the purpose of an academy of scientist. There is therefore a need to establish a suitable academy for involving scientists.

****
Session 5: Ministerial Panel Discussion
Chair: G.O.P. Obasi
Rapporteur: C.J. Chetsanga

The session was addressed by the following Ministers of Science and Technology (S&T):
- Dr. H. Kosgey (Kenya)
- Dr. G.S. Rakotonirainy (Madagascar)
- Dr. T.T. Isoun (Nigeria)
- Dr. B.S. Ngubane (South Africa)

The Minister from Ghana (Dr. D.K. Fobih) could not but had his statement presented by Mr. Kofi-Deh, acting Head of Mission of the Ghana Embassy in Rome.

Dr. H. Kosgey (Kenya)
He gave a list of the objectives of the Kenya Academy of Science (KAS). He indicated the budget support that KAS gets from the Kenya government, including the housing for the KAS offices.
He encouraged the academies in Africa to cooperation with academies in developed countries, and that the academies should help their countries in synthesizing information which is flooding the bureaucracies due to the global explosion of knowledge.
He highlighted the challenges that societies face in achieving food and water security, and the problem of the HIV/AIDS pandemic. He looked forward to seeing scientists assist in developing technology for socio-economic development and for improving the quality of life.

Dr. G.S. Rakotonirainy (Madagascar)
He indicated that his Ministry of Scientific Research oversees the work in 7 national scientific research centres. These centres do work in oceonography, environment, industry and technology, documentation, pharmacology and agriculture.
Some of the priority areas include:
- Poverty alleviation
- Environmental degradation
- Human health
- Food security

Madagascar's political and economic priorities include:
- Cooperation and partnership between universities and research institutions with industrial sector. Cooperation with CIRAD and USA goes on.

- Increased capacity building in new technology and information
- Institutional reforms are planned for the way in which our research system is structured

Dr. T.T. Isoun (Nigeria)

He pointed out the numbers of universities and research institutes in Nigeria. The country has a number of specialists in petroleum and gas technology. The new government is rebuilding scientific institutions which had collapsed during the 15 years of military rule. They are reviewing the S&T policy developed in 1986.

Nigeria's new democratic state is 2 years old. He has established 11 committees to propose new national science policies in biotechnology, information technology, energy engineering materials, etc.

Recommendations of some of the 11 committees have already been implemented. He is considering the idea of setting up an endowment fund for the National Academy of Sciences.

He is interested in setting up an African Technical Cooperation Agency. Nigeria set up an Africa Fund in the African Development Bank (ADB), which gives USD 25 million interest a year. Nigeria plans to avail this interest money towards scientific work across the African continent.

The Minister announced plans by the Nigerian President to set up a Presidential Advisory Council. His Ministry is developing plans to harness technical expertise from young Nigerian professionals in the diaspora.

Dr. B.S. Ngubane (South Africa)

The Minister of Arts, Culture, Science and Technology (ACST) decided to focus on the plan in his Ministry directed at exploiting the good S&T infrastructure in his country. He indicated the percentages of GDP being devoted to R&D and to training institutions.

In a recent White Paper, they put out an S&T policy built around a system of national innovation. He gave a list of specialized R&D institutions.

He drew the attention of the audience to the Cooperation Fund that is administered by National Research Foundation.

He pointed out that the Academy of Science of South Africa will not have a line function, but is to provide overview service across sectors. It should get scientists to focus on innovations in software development.

A National Advisory Council on innovation will provide policy options on the peaceful use of atomic energy.

Paper from Minister D.K. Fobih (Ghana)

It was presented by Mr. Kofi Deh, acting Head of Mission of the Ghana Embassy in Rome.

The paper pointed out the great value that Ghana has placed on S&T since independence. The country ahs 5 universities and a number of research institutions.

The Ministry of S&T was established in 1994 to formulate and coordinate research policy on agriculture, health and manufacturing. The Ministry is currently developing a national S&T policy. The CSIR had developed great strength in agricultural R&D. Part of Ghana's research infrastructure consists of

- CSIR
- Ghana Atomic Energy Agency
- Environmental Protection Agency
- Ghana Academy of Arts and Sciences

Ghana seeks to use S&T capability to make it become a middle income country in the shortest period of time.

****
Session 6: Strategies to strengthen national academies in Africa and to establish new ones
Chair: T.T. Isoun
Rapporteur: S.O. Wandiga

See Recommendations