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FINANCING THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY IN AFRICA

FINANCING THE DEVELOPMENT OF SCIENCE AND TECHNOLOGY IN AFRICA

1. Over the past three decades there has been a growing recognition at senior government and other levels, of the fact that science and technology play a crucial role in the socio-economic development of their countries. However, despite such awareness and the programmes for making science and technology contribute to socio-economic development, the stark reality is that their realisation is dependent on the availability of substantial financial resources backed by relevant policies. This is underscored by the Lagos Plan of Action (LPA) 1/ which, in its Science and Technology chapter, calls upon governments to take measures to improve the financial resources, devoted to science and technology. Furthermore, the LPA cites the low priority accorded to science and technology with regard to available material financial resources as one of the shortcomings affecting the development of the scientific and technological base for development at the national level.

2. In order to bring about a science/technology led development, member States will be required to make substantially bigger investment in the development of their scientific and technological capabilities. In this regard, financing should be provided for a broad range of science and technology activities and not only for research and development, as has been traditionally done. Thus, besides research and development, other important activities such as the search for technology, assessment, transfer and adaptation of technology, disagregation of technology packages, consulting and design services, standardization and quality control, science and technology information networks, popularization of science and technology, development of scientific and technological manpower , among others, should feature in a comprehensive scheme for financing endogenous science and technology development 2/.

3. Programme 7 of the Science and Technology chapter of the LPA specifically calls upon member States to improve existing funding mechanisms, and create new ones in order to bring about a substantial increase in the resources required for the development of their scientific and technological capabilities on a more predictable and continuous basis. Besides increasing the government budgetary allocations for science and technology, it proposes new mechanisms e.g.the establishment of a National Science and Technology Development Fund (NSTDF) as well as several other schemes which could be instituted to broaden the sources of funding at the national level - percentage of taxes derived from imported items; levies on gross income/turnover of enterprises engaged in production; percentage of total expenditure by firms with foreign equity holding, etc.

4. When the LPA was adopted, member States were urged to aim at mobilising locally 1 % of their GDP for the development of their scientific and technological capabilities. Adequate information is not readily available on the extent to which this target has been achieved in the last eleven years. However the decade following the adoption of the LPA has witnessed worsening economic conditions in the African region and many countries may have fallen short of the target. A recent study 3/ on research resources devoted to Research and Development(R&D) in five countries of Eastern and Southern Africa revealed that research funding had improved in the institutions surveyed, but overall national funding was still below 0.5 % of GDP. In another report 4/ Africa's R&D expenditure as a percentage of GNP was estimated at 0.36 in 1980, which is low compared with other regions: America (1.94), Asia (1.08), Europe (1.79) and Oceania (1.11).

5. As pointed above the LPA advocated the establishment of a National Science and Technology Development Fund among the measures advocated to boost the level of local resources available for the development of national capabilities in science and technology in the member States. The secretariat, aware of the initiatives taken by a number of countries in setting up such special funds, circulated a Questionnaire (Annex 1) by which specific information was sought on the their main features. In its letter to the member States issued in March and April 1991, the secretariat requested for completed questionnaires to be returned by 31 July 1991. However only a few countries had responded by that date and at the end of September 1991 ten questionnaires had been received from seven countries. The information and data from the questionnaires is presented in Annex 2.

6. On the basis of those responses, the following observations can be made:

(a) The special Funds are fairly new institutions; the oldest having been set up in 1974/75;

(b) **Their establishment:** Several funds were established by the national governments through the ministries/organs responsible for policy-making in science and technology or by research and development institutions in specific sectors. In three cases the initiative was taken by the Heads of State;

(c) **Sources of finance:**The most dominant form of financing is through annual allocations by the Government. Financing from private sources has been indicated in two cases:- (i) voluntary contributions by foreign donor agencies in combination with local firms, e.g. in the case of the Agricultural Research Fund (Kenya); (ii) assessed contributions, by private and public enterprises,

based on their gross income or turnover e.g. in the case of the National Science and Technology Fund (Nigeria);

(d) **The objectives of the Funds:** The objectives of individual funds vary in detail, but they incorporate some of the following features:-

(i) To focus research on new/emerging areas of knowledge

(ii) To support specific industrial/sector activities

(iii) To extend research to areas currently not covered by existing research institutions

(iv) To commercialize research results

(v) To support industrial scale R&D

(vi) To generate interest in and expand opportunities for innovative R&D

(vii) To popularise science and technology and stimulate inventiveness

(e) **Eligibility to use the resources in the various Funds:** This varies considerably but includes the following categories: individual scientists or groups of scientists having defined basic academic qualifications/skills/or proven innovative capacity; research institutions; universities, etc; relevancy of the proposed research/project to the priority areas of the individual Fund; possession of viable research results which can be exploited for the benefit of the national economy; etc

(f) **Operation of the Funds:** Requests/proposals for utilisation of the resources are assessed and screened by Special Committees set up by the various Funds. The execution of funded activities is subject to regular monitoring including submission of progress reports. In some cases funds are released by instalments subject to satisfactory progress in the execution of earlier stages of the activity. In the case of Funds receiving annual grants from Governments, unutilized resources are surrendered to the Treasuries at the end of each Financial Year;

(g) **Types of activities supported by the various Funds:** Research is the most dominant activity supported by the various Funds. Research ranges from basic research, applied research, product development; reflecting the matching of interests of the researchers and the funding institutions. Other activities include: promotion of public awareness of science and technology;

promotion of innovation and inventions; printing of scientific publications, conduct of colloquia; and prizes.

7. From the foregoing it can be seen that the Funds covered by the present exercise are relatively new and small. Except in very specific cases, the Funds support a very wide range of activities and provide an alternative source of funds for research which is the most dominant activity. As pointed out in the LPA, a much wider financial base is required to support the various programmes and activities for building up a viable indigenous capability in science and technology. The existence of the special funds reported on by the various countries is only a beginning, and much more diverse system of funding is necessary to ensure adequate and predictable source of funding.

8. It is worth noting that the failure of the Global U.N. Financing System for Science and Technology for Development, launched at the Vienna conference, its eventual conversion to a mere U.N. Fund for Science and Technology within the UNDP, as well as the failure of attempts by UNESCO to have a separate African Fund for Scientific Research and Development as called for by CASTAFRICA 1, all point to the necessity of creating viable local funding sources for science and technology in the African region. It cannot be overemphasised that national efforts to have a separate fund for science and technology is a significant step towards the strengthening of the local capability. Hence the need for this present exercise to guide us in our future moves.

9. It is hoped that the facts revealed by the present exercise, however limited in scope, will serve as an inspiration to those countries which have not yet set up such funds; and will provide a basis for discussions and the formulation of appropriate conclusions and recommendations.

REFERENCE

1/ OAU, Lagos Plan of Action for the Economic Development of Africa, Geneva, 1982.

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3/ Z. M. Nyiira, Research resources in national research institutions in Eastern and Southern Africa, IDRC, Ottawa, 1991.

4/ UNESCO, Science, technology and endogenous development in Africa; trends, problems and prospects (SC-87/CASTAFRIC/II/3), Paris, 1987

COUNTRY REPORT ON SPECIAL FUND FOR SCIENCE AND TECHNOLOGY

Name of Country: . . . . . .

Name of FUND: . . . . . .

When was the FUND started (year?) 19 . . . . . .

By Whom . . . . . .

. . . . . .

Total amount of money collected by the FUND . . . . . .

Method of collecting money into the FUND . . . . . .

(1) . . . . . .

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(2) . . . . . .

. . . . . .

(3) . . . . . .

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Objectives of the FUND:

(1) . . . . . .

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(2) . . . . . .

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(3) . . . . . .

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(4) . . . . . .

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Programmes/activities already supported by the FUND (list them, indicate amount given and year)

(1) . . . . . .

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(2) . . . . . .

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(3) . . . . . .

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(4) . . . . . .

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(5) . . . . . .

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Who is eligible to obtain support from the FUND? (individuals, institutions, etc.)

(1) . . . . . .

(2) . . . . . .

(3) . . . . . .

(4) . . . . . .

(5) . . . . . .

Operation of the FUND (indicate key features such as: processing of requests, monitoring of use of resources provided by the FUND etc.)

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SPECIAL FUND FOR SCIENCE AND TECHNOLOGY

NIGERIA: NATIONAL SCIENCE AND TECHNOLOGY FUND

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1987 Federal Ministry of Science and Technology/ Federal Government of Nigeria 15.1 Million Naira (as at 30/4/91)	Percentage of gross income or turnover of major public and private enterprises (collected as yearly levy) Interest from short term deposits	To attract moneys into the fund in order to engender higher level of activities in the fields of science and technology To participate in the capitalization of research organizations formed by public and private enterprises, industrial firms or groups To make grants for the furtherance of research and development in science and technology in accordance with the National Policy on Science and Technology	1988:- Design and construction of portable rice and wheat harvester (Naira 39,930) - Formulation and preparation of a weaning food from local raw materials (Naira 376,750) - Fabrication of RAIDS (Rural Agro Industrial Development Scheme) Cassava processing plant (Naira 1,000,000) - National Root Crops Research Institute (NRCRI) Multiplication of improved cassava planting materials and production of Breeder Seeds, storage and processing of yams (Naira 650,000) 1989:- Development of sheer box for prediction of wall pressures for storage and conveyance of agricultural seeds (Naira 17,185) - Development and standardization of instant "fura da Nono" beverage (Naira 55,030) 1991: Commercialization of a "Biology Game" educational aid equipment (Naira 120,000) - Commercialization of a ceramic machine (Naira 320,000) - Commercialization of Electro-hydraulic system for surgical operating table and other hospital products (Naira 200,000) - Commercialization of obstetric-gynaecological couch (Naira 300,000) Annually:-Inventors/innovators day- a day set aside during the national science and technology week to stimulate interest of Nigerians in creative capacities (Naira 600,000)	1) Individuals with inventing and innovating capabilities to develop local raw materials into valued products 2) Research institutes with research results that can be developed to benefit the country 3) Support awards of prizes to inventors and innovators yearly during National Science and Technology week	- Requests processed by Project Assessment Committee whose members have varied background and experience covering industrial, educational, medical, agricultural etc. - Monitoring of projects by experts drawn from universities and project consulting companies

KENYA: AGRICULTURAL RESEARCH FUND

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1991 Board of Management - Kenya Agricultural Research Institute (KARI) US$0.5 Million	USAID (US$0.42m); Agricultural Research Foundation (US$0.1m); Kenya Seed Co. (US$0.03m) Government Treasury (initial amount - no figure given)	Increased broaden agricultural scientific community Improve collaboration between KARI scientists and those in public and private institutions Generate interests and expand opportunities for innovative independent research Focus agricultural research on problems and opportunities in Kenya's agriculture	Farm credit and risk development of small scale farming ... (US$6,522 - 6 months project) Role of women in small holder production marketing and utilization of milk (US$6,520-4 months project Effect of precooling on ripening and self life of some Kenya fruits (US$20,000 - 3 year project) Search for maize genotypes resistant to Striga Hermonthica (US$8,000 - 18 months project) Caseons Lymphadenitis in goats, pathogenic and community (US$12,114 - 24 months project) Genetic and Phenotypic trends of growth and and reproduction of Boran cattle (US$5,000 - 20 months) Prevalence, economics and control of Borone Fascidiasis in Kenya (US$20,000 - 36 months project)	Research scientists outside KARI to conduct (a) innovative and independent research (b) research which supplements and complements the work of KARI In the near future KARI scientists will be eligible to obtain support from the Fund KARI published a list of subjects where it need supplementation	Applicants submit Research proposals to KARI Secretariat. Proposals are first subjected to inhouse technical and administrative review them by a selected group of peer scientists. Ratings and recommendations of the peer scientists submitted to the Research Fund Management Committee which awards research grants Researchers submit progress reports every three months

KENYA: NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY RESEARCH FUND

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1980 National Council for Science and Tecnnology (NCST) US$80,000 - 100,000	Through Treasury issues through Government Notes	To build a research capacity in scientific research in Kenya To improve collaboration and co-operation amongst Kenya scientists	Since 1980 NCST has spent well over KShs.20 Million for funding research (Agriculture, Health, National, Physical, Industrial, Social, Information sciences)	Any local scientist with at least Bachelor's degree or person with sub-degree qualifications having a supervisor of proven research record	Processing through Specialists Committees to determine viability Monitoring through on-site evaluation by experts

SUDAN: SCIENCE AND TECHNOLOGY DEVELOPMENT FUND

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1982 The National Council for Research 3 Million Sudanese Pounds ($650,000) annually	Allocated by the Ministry of Finance and Economic Planning	1) To support science and technology research projects especially in areas not handled by research institutions 2) Enhancement of capabilities and training of researchers through the implementation of such projects 3) Initiate the establishment of research units in the emerging and new fields of science and technology 4) Realize economic development	1) Nitrogen fixation 2) Honey bee keeping 3) Initiation of Genetic Engineering and Biotechnology Research Unit 4) Establishment of national centre and application of remote sensing technology 5) Renewable energy (solar, wind, biomass, biogas, agricultural residues) 6) Cellulose chemistry and Technology research unit (pulping, paper making, animal fodder from agri-residues)	1) Government research institutions 2) Universities	1) Fund is financed by the government annually 2) Screening and selection of projects undertaken by a technical committee 3) Money is paid to projects in instalments against satisfactory interim reports 4) Final report and dissemination of results

MALAWI: RESEARCH FUND

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1982 Government of Malawi MK 55,000	Annual allocations by the Treasury through Parliament	1) To support R&D activities that are directed towards areas that will propel and sustain industrial activities as well as facilitate the adaptation of imported technology for local use 2) To support activities aimed at popularisation of science and technology as tools for development	1985: Construction and Dissemination of Stoves to Rural Communities (K3,348) 1986: Technology and Related Needs Surveys(K2,500) An Assessment of the Characteristics of Credit Defaulting and Non-defaulting in Chinguluwe Area of Salima ADD (K3,500) 1987: Anaemia Study in Ntcheu (K,1500) Animal Utilization for Carting in the LLDP (K3,000) Management of Goats (K3,000) Epidemiological Study of Diabetes Mallitus (K1,728) 1988: Epidemiological Study of Hypertension and Associated Risk Factors" in African Population in Malawi (K15,118) Clinical Evaluation of Glass-inomer/amalgam alloy mixture and cement conomer in porterior teeth mixture and cement using hand instrument only (K650) Factors influencing Job Satisfaction Among Registered and Enroled Nurses in Malawi (K2,296) 1989:The Validity of the Malawi National Examination Board's Aptitude Tests for 1986/87 T2 and T3 Teacher Training Programme (K2,816) Cross-validation of the Malawi National Examination Board's Aptitude Tests Used for National Apprenticeship Programme (K1,935) Product Development and Quality Improvement for Soap Production (K3,412) 1990: Production Development and Quality Improvement: Production and Processing of Juices Crushes, Preservers, Pickles and Sauces from Fruits and Vegetables (K5,410) Survey of Mycotoxin Prevalence in Cereal and Leguminous Agricultural Products with Export Potential in Malawi (K10,000) Soil Fertility Maintenance Under the Alley Cropping System (K6,000)	1) Individual research scientists 2) Groups of research scientists on collaborative projects	1) Research project proposals are submitted to the Department of Research and Environmental Affairs for scrutiny (consonance with national S&T policy, development goals and aspiration) and approval 2) Researchers required to submit quarterly progress reports 3) Balance of unutilized funds is returned to the Treasury at the end of every financial year (K1,728)

SPECIAL FUND FOR SCIENCE AND TECHNOLOGY

BURUNDI: RESEARCH SUPPORT FUND

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1987 Government of Burundi 200,000 Francs	Allocation from the general budget of the State	1. Promote scientific research by supporting a priority research project 2. Support activities of isolated researchers 3. Support and encourage scientific associations	1. Research programme 1990 - 861,745 FBU 2. Support to the Pharmacopoeia and traditional medicine research Center 1989 - 1991 - 1,390,000 FBU 3. Support to coordination of scientific research (equipment, missions) 1988 - 1991 - 4,000,000 FBU 4. Publication of a document on Burundi public debt 1990 - 250,000 FBU	1. Any national researcher 2. Any national research institution	- Researcher ask for funds to the minister responsible for S&T with details of their utilization - The department of scientific research advise the ministry as to which researchers will get the fund

REPUBLIC OF CENTRAL AFRICA: GRAND PRIZE (STIMULATION)

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
30/1/1985 Decree 85-015 President of The Republic 250,000 F. CFA/year	Budget of the State	Stimulate taste for S&T and the spirit of S&T creativity of the students at secondary levels	Better scores in the S&T subject	5 students who have scored best in S&T subject	The 5 price-winners are selected on the basis of their overall scores by a commission of teachers appointed by decree

REPUBLIC OF CENTRAL AFRICA: GRAND S&T PRIZE (INVENTION)

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1981 President of the Republic 20% of a teacher's salary 25,000,000 (1990)	Budget of the State	Support efforts of the teachers/ researchers in their works and publications	NA	1. Teachers 2. Professors 3. Lecturers 4. Assistants	Beneficiaries must justify the funds received by the results of their works or their publications

REPUBLIC OF CENTRAL AFRICA: RESEARCH FUNDS

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
30/1/85 Decree No. 85-015 President of the Republic 1,000,000 F.CFA/year	Budget of the State	1. Reward authors of scientific inventions and technological innovators 2. Reward authors of works or publications of international value	1. Technical study for the setting-up of a windpump in the North of Bangui 2. Improved mechanism for crushing cereals	1. Scientific inventors 2. Technological innovators 3. Authors of works or publications of international value	1. Applications are processed by experts at the Direction of scientific and technical research 2. Secretary of State for S&T research convene an Ad-hoc commission composed of national or international scientists to recommend winners

RWANDA: **FUND HABYARIMANA FOR THE PROMOTION OF RESEARCH AND HANDICRAFT**

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1987 President of the Republic	1. General budget 2. Donations 3. Subsidies and various sources	1. Research: finance initiatives and research incentives (scientific prizes and publications) 2. Handicraft: finance acquisition of equipment and study of projects Support participation of craftsmen to exhibitions and grant prizes to the best ones	- Funding of research projects - Financing of a scientific publication - Financing of a dozen of handicraft projects - Financing of a publication on a handicraft association - Financing of and international seminar on research and production of medicinal plants drugs in Kigali February/March 1990 - Contribution to the financing of the 8th scientific day of Rwanda - Two prizes in 1989, one to a research center and one to a handicraft association	Individuals (researchers, craftsmen) Organizations (associations, institutions of researchers and craftsmen)	The fund has a permanent Secretariat managed by a committee of 9 persons chaired by the Minister of Higher Education and Scientific Research. The Committee - Look for funds - Grant funds - Suggest conditions and terms of the prizes The Minister of Finance control the use of funds

SENEGAL: **FUND TO STIMULATE S&T RESEARCH**

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1974/75 Financing act on the initiative of the General Delegate to S&T research 100,000,000 FCFA/year	General budget amount transferred to the Ministry of S&T research	Encourage and support - S&T publications (written or audovisual) - Actions and policies for the diffusion or popularization of S&T publications	Publications of theses, magazines works of research centers	1. Private or public research institutions 2. Isolated researcher supported by an institution 3. Physical or moral person, public or private, senegalese or foreigner living in Senegal	1. The Commission which allocate the Credits of the fund is composed of representatives of research institutions and concerned ministries. It examines applications and formulates the annual programme 2. The administrator of the fund is responsible of the management of the credits and the execution of the proposals

SENEGAL: **FUND OF S&T PUBLICATIONS**

Year/Established by Total amount collected	Source of Funding	Objectives of the Fund	Programmes/activities Supported by the Fund	Who is eligible to Secure support from the Fund	Operation of the Fund
1974/1975 Financing act on the initiative of the General Delegate to S&T research 100,000,000 FCFA/year	Transfer to the ministry responsible for S&T from the general budget	1. Promote fundamental and applied research initiated by a Senegalese researcher 2. Support Senegalese research organizations whose work concur to socio-economic development and technological improvement 3. Valorize research results and enable a social utilization 4. Support activities which promote sensitization of researchers and research institutions on technological innovation and protection 5. Support foreign researchers and research institutions which improve life conditions of the Senegalese	1. Institutional support (ITNA, CERER,...) 2. Stimulation of scientific activities (financing of seminars, symposium, ...) 3. Support to priority programmes	1. Private or public research institutions 2. Isolated researchers supported by a research institutions 3. Physical or moral person, public or private, Senegalese or foreign living in Senegal	Fund is composed of two organs: 1. S&T Commission which is an advisory institution formed of representatives of ministries and research institutions examines applications, their conformi to objectives and formulate annual programme on the basi of the selected applications 2. The administrator of th the Fund appointed by the minister responsible for S& matters is responsible for the credits. After the approval by the minister he controls the execution of t programme.