ETHIOPIAN SCIENCE AND TECHNOLOGY COMMISSION

NATIONAL SCIENCE AND TECHNOLOGY POLICY

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INTRODUCTION

The peoples of Ethiopia are still victims of the problems of drought and famine, scarce employment opportunities, shortage of energy and other pressing needs. Hence, in order to bring about massive social and technical changes; to accelerate agricultural and industrial productivity; to facilitate the means for a rational conservation and use of natural resources and the provision of basic necessities of life (food, clothing, shelter, education, energy, health, etc.); to modernize communication networks and to generally improve the standard of living of the peoples and to keep abreast with the technological advancement of the 21st century, extensive, popular participative and sustained Science and Technology (S&T) capacity building is a requirement.

The scientific and technological advances of the past years have made most third world governments well aware of the important role of science and technology for national development. However, least developed countries like Ethiopia have limited resources to allocate for their S&T capability building. This leaves no choice for these countries other than to plan & commit a share of their limited resources for a long term S&T capability building. Such a long term undertaking, however, can only succeed if it is guided by a clearly enunciated S&T policy.

According to an assessment conducted on the prevailing S&T situation in Ethiopia, lack of a clearly articulated policy has handicapped the growth, and application of S&T for national development. Hence, the situation is characterized by unnecessary duplication of efforts, programme redundancy, uneconomical/wasteful/ use of limited resource, continued dependency on foreign technology and above all, absence of national capability to bring about sustained, self reliant and popular-based socio-economic development.

Thus, to reduce the level of dependency and to increase the supply of locally required technology, the development of a planned technical infrastructure becomes a necessity. In view of this, therefore, and based on the Charter and the Economic Policy, the Transitional Government of Ethiopia (TGE) has issued this Science and Technology Policy in order to build the country's S&T capability, to coordinate related activities and to enhance their contribution to national economic development.

The policy document will serve as a spring board to initiate the formulation of detailed policies & prioritized action programmes for the different economic and service sectors. Some of the elements requiring capability building, according to the policy are research and development, development of traditional technologies, technology transfer and application, engineering design and consultancy, technology adaptation, science and technology (S&T) manpower training and development, collection and dissemination of S&T information and capacity building for effective & extensive S&T popularization.

The policy will help government bodies and private organizations, Research and Development (R&D) Institutes in the planning of their respective S&T activities. Furthermore, it will serve as a basis for international cooperation on scientific and technological matters. The major chapters in the policy document include: objectives of the national S&T policy, directives, strategies and priority sectors and programmes. It also determines the national S&T organization and structure, sources for financial support and the kind of international collaboration deemed appropriate.

OBJECTIVES OF THE POLICY

1. To build national capability to generate, select, import, develop, disseminate and apply appropriate technologies for the realization of the country's socio-economic objectives and to rationally conserve and utilize its natural and manpower resources.

2. To improve and develop the knowledge, culture and the scientific and technological awareness of the peoples of Ethiopia, and promote the development of traditional, new and emerging technologies.

3. To make Science and Technology (S&T) activities more productive, efficient and development oriented.

POLICY DIRECTIVES

The following are the policy directives intended to help realize the set objectives and to build S&T capabilities in the priority accorded areas of the economic and service sectors.

1. Build the capacity to search, select, negotiate, procure, exchange and introduce technologies suitable to Ethiopia's socio-economic conditions.

2. Establish and/or strengthen S&T institutes, Research and Development (R&D) centres and support services as necessary and appropriate in the various administrative regions.

3. Establish responsible bodies/organs in every economic and service sector for the execution of S&T development activities.

4. Facilitate conditions for the wider participation of women in S&T activities.

5. Establish a system to encourage young scientists and technologists.

6. Establish a system for a wider popularization of science and technology amongst different nations and nationalities utilizing their languages in order to improve and enrich the S&T culture of the Ethiopian peoples.

7. Create a conducive working environment to encourage scientists and researchers for better productivity.

8. Ensure rapid dissemination and application of Research and Development (R&D) results.

9. Encourage the private sector and its capital to participate in the promotion and development of scientific and technological activities.

10. Build trained manpower in Science and Technology (S&T) both in quality and quantity.

11. Promote the mutual support between S&T education, research and production.

12. Encourage the improvement, wider diffusion and application of traditional technologies.

STRATEGIES

1. Formulation and implementation of S&T plans, programmes and projects to accelerate the country's socio-economic development; self-sufficiency in food production and satisfying the need for other basic necessities with due attention to environmental protection.

2. Application of science and technology for awareness and control of environmental conditions and for the conservation and rational utilization of the natural resources of the country.

3. Develop, strengthen and modernize the country's engineering and technology base to build a strong national economy and to assist the chemical, textile, agro-industry, mineral and other production sectors which are necessary to meet the demand for basic consumer goods.

4. Expand and raise the quality and understanding of science and technology education at all levels of the educational establishments in all regions.

5. Facilitate conditions to create favourable & supportive relations between S&T education, R&D, and the production activities.

6. Promote, encourage and support the participation of urban and rural women in Science and Technology (S&T) education, application, employment, management and in the decision making processes of policy matters.

7. Establish a national S&T information network capable to acquire S&T information relevant to national development needs and suitably process it for dissemination to potential users in government and private sectors.

8. Develop the capacity and the mechanism to search, choose, negotiate, procure, adapt and exchange technologies that are appropriate and environmentally sound to the Ethiopian socio-economic conditions.

9. Ensure that technologies transferred are appropriate and that the necessary material inputs and manpower resources are available and when deemed necessary develop capacities to modify/alter and adapt the technologies to make them suitable to the natural endowment of the country.

10. Establish a system to encourage and support applied and basic S&T research in areas appropriate to the needs of the country.

11. Encourage and support the publication of books, research results, journals and periodicals of Science and Technology interest in the different languages of nations and nationalities as appropriate.

12. Build capability and methodology to identify the scientific content of traditional technologies; improve & change those that are useful for wider dissemination and diffusion.

13. Establish efficient mechanisms for a speedy dissemination and application of Research and Development (R&D) results.

14. Develop a conducive working environment and an appropriate career and promotion structure for scientists and researchers and encourage & support the establishment of professional and amateur associations.

15. Encourage and support the participation of Ethiopian scientists and researchers in national, regional and international conferences, symposia and workshops.

16. Prepare awards and prizes for outstanding innovations and productive achievements in the fields of Science and Technology (S&T).

17. Establish an efficient national patent and technology transfer system to promote and support local technological innovations and creative achievements.

18. Promote locally developed material inputs.

19. Encourage the private sector and its capital to participate in S&T development activities through the provision of tax and other incentive mechanisms.

20. Mobilize resources for S&T development and strengthen international cooperations.

PRIORITY SECTORS AND PROGRAMMES

Although the intent of the government is to promote balanced and integrated development, it is difficult to build all the necessary Science and Technology capability owing to limitations for investment. Therefore, based on the country's development policy directives and in view of the need to alleviate the basic and urgent problems of the peoples, the S&T policy accords priority to the following sectors and programmes. Sectoral S&T policies and programmes will be formulated by the respective sectors on the basis of this national Science and Technology Policy.

A. AGRICULTURE

1.0 To support activities for self-sufficiency through improved food supply.

1.1 Support and encourage research to raise the productivity of crops, animal resources and production implements in kind, quality and quantity, taking into account environmental protection as well as people's tradition and culture.

1.2 Encourage the use of irrigation schemes of different scales and forms to secure reliable production.

1.3 Encourage and support research on methods of reducing pre and post harvest loss during agricultural production employing appropriate technologies for prevention, handling & processing.

1.4 Encourage and support techniques for the development of appropriate and productive fish species in rivers, lakes and artificial /manmade/ ponds and encourage its wider and sustained availability for consumption.

1.5 Facilitate the application of technologies for large scale food storage and conservation in all localities as far as it is feasible.

2.0 Promote and support Science and Technology (S&T) activities that would facilitate the supply of agricultural raw materials for industrial use in sufficient quantity & quality.

3.0 Develop and support S&T methods that upgrade the quality, quantity and variety of exportable agricultural products.

4.0 Support and strengthen strategies that would promote the dissemination of appropriate rural technologies for integrated rural development by studying and developing the long standing cultural knowhow and methodology.

B. NATURAL RESOURCES DEVELOPMENT & ENVIRONMENTAL PROTECTION

1. Develop a system that would help to map out the country's eco-system/ecology to identify and register the diverse biological resources and to collect, store, protect and utilize the plant and animal genetic resources contained therein.

2. Support studies that would help to design and implement appropriate land use, practical and sustainable soil conservation methods.

3. Encourage mechanisms that would help to maintain the natural forest, and in general control deforestation and ecological imbalance.

4. Facilitate research and development programmes that would help to discover, popularize and develop fast growing, drought resistant and multi-purpose tree species so as to rehabilitate and develop degraded environments.

5. Facilitate studies and research to reduce and control the polluting effects of agricultural and industrial chemicals on environmental air, soil and water.

6. Establish a system of educational and social programmes/methods to enhance the awareness, knowledge and participation of the public on environmental protection and rehabilitation.

7. Strengthen technologies/methods that would help to follow up changes in the environment and to forecast, prevent and minimize the effects of natural disasters.

C. WATER RESOURCES DEVELOPMENT

1. Support research that would help to improve the quantity, quality, conservation, and utilization of ground and surface water.

2. Support the efforts towards a multi purpose water resource development for an integrated provision of water resources for agriculture, energy, transport and private use.

3. Encourage appropriate techniques for the supply of reliable and clean water for urban and rural dwellers.

4. Support efforts to develop public awareness on the control of sedimentation, watershed management and use of rain water.

D. ENERGY

1.0 To promote activities that would facilitate the use of different and coordinated methods to ensure the supply of sustainable and reliable energy.

1.1 Support research on the development and utilization of fast-growing tree species and strengthen bio-mass energy development.

1.2 Facilitate conditions for the expansion and utilization of water as a source of energy.

1.3 Encourage research that would promote the supply and use of petroleum, natural gas, coal and geothermal energy resources.

1.4 Support techniques that would help the search and use of alternative and renewable sources of energy.

2.0 Encourage and support strategies for efficient and economical use of energy in all sectors.

3.0 Support research on the development of equipment for the generation and utilization of energy.

4.0 Encourage research, development and utilization of energy technologies suitable to the rural population and their wide popularization and dissemination.

E. INDUSTRY

1.0 Encourage efforts to build and develop the capacity to produce essential inputs for the development of the agricultural sector.

2.0 Support measures and activities that would help to produce basic consumer goods, implements and equipment.

3.0 Encourage Research and Develpempent (R&D) activities that would help to manufacture implements to promote small scale and rural industries.

4.0 Support techniques for the production of industrial raw materials and other inputs locally.

5.0 Support research to make traditional and handicrafts technology modern and productive.

6.0 Encourage technological activities that would help to prevent environmental pollution arising from industrial processes and by-products and also promote the appropriate utilization of by-products.

7.0 Encourage and facilitate ways and means to build capacity in basic design and manufacturing, project engineering and technology transfer.

F. CONSTRUCTION

1.0 Facilitate and support conditions suitable for the production, use, and popularization of appropriate and local-specific construction materials, equipment and technology which do not aggravate the deterioration of the forest resources of the country.

2.0 Build the necessary capability in construction design, management, execution and follow-up in priority accorded economic sectors particularly in water works, dams, and irrigation; transport and communication systems (roads, ports, airports etc) and industry.

3.0 Support research activities geared towards the generation and development of technologies for a labour intensive and speedy over-all development of the construction sector.

4.0 Encourage and support research activities leading to the improvement and wider application of traditional construction technologies.

G. TRANSPORT AND COMMUNICATIONS

1.0 Support capability building in the selection, utilization and repair of modern as well as alternative transport means.

2.0 Support research programmes for capability building in the production, utilization, repair and maintenance of appropriate public and freight transport services for rural areas.

3.0 Encourage and support research for the production and application of simple telecommunication equipment to expand, develop and disseminate modern communication services in the different parts of the country.

H. MINERAL RESOURCES

1.0 Support the expansion of appropriate techniques and modern technologies that would help to prospect and identify the country's mineral resources.

2.0 Support the preparation and dissemination of simple techniques and strategies that promote the exploration, study and utilization of mineral resources through the involvement and participation of the massive rural community.

3.0 Support capability building to study, explore and develop petroleum, natural gas, coal, iron, and other industrially useful minerals.

4.0 Help to strengthen Science and Technology (S&T) activities in the fields of hydrology and seismology.

I. HEALTH AND POPULATION PLANNING

1. Support Research and Development (R&D) activities on the prevention & control of communicable and parasitic diseases.

2. Promote activities that would improve and sustain maternal & child health and techniques helpful for family planning.

3. Encourage and support research and studies on the causes and solutions of urban and rural community health problems.

4. Promote and strengthen methods for essential food supply and appropriate nutrition.

5. Encourage and support research on traditional medicine and on health related beliefs and attitudes.

6. Support studies and research on environmental pollution and health problems associated with industry, agriculture, transport, etc.

7. Strengthen research on clean water supply and environmental sanitation.

8. Support studies and research on the prevention of newly emerging disease.

9. Encourage and support research on health service systems.

10. Support research on the control of population dynamics.

J. EDUCATION

1. Search for ways to strengthen Science and Technology (S&T) education at all levels of the educational establishments.

2. Support ways for the domestic production and maintenance of S&T educational equipment and materials.

3. Encourage ways whereby research results from higher educational institutions can be applied.

4. Encourage basic research and support the development of the appropriate professional manpower.

5. Encourage techniques whereby education can be linked and made complementary to peoples' every day living.

K. NEW & EMERGING TECHNOLOGIES

1.0 Assist appropriate methodologies for the application of bio-technology in the fields of agriculture, health and industry.

2.0 Organize and support the development of facilities, manpower, workshops, support centres, and the publication of journals in order to promote and coordinate bio-technology activities and their diffusion.

3.0 Support training and skill development in micro-electronics especially in computers and the establishment of institutes to back up the effort.

4.0 Support the effort to promote awareness, knowledge and application of new and emerging transport and communication technologies specially of those of telecommunications and new materials.

ORGANIZATION & STRUCTURE OF SCIENCE AND TECHNOLOGY

In line with the envisaged role of Science and Technology (S&T) in the national development, a functional organizational structure for the coordination, promotion and development of S&T activities is required. To this end, the organizational structure of the S&T system in Ethiopia shall have the following four functional levels.

- A. National S&T Council
- B. Technical Advisory Committee of the National S&T Council
- C. Ethiopian Science and Technology Commission
- D. S&T operational Institutes and Centres

The Commission shall be the Secretariat of the National Science and Technology Council.

A. NATIONAL SCIENCE AND TECHNOLOGY (S&T) COUNCIL

The National S&T Council is the highest decision making body for S&T policy and plan of action. Based on the National S&T Policy, it establishes and directs the general framework and strategy for S&T development and determines the role of S&T in the national economy. The Council shall be chaired by the Prime Minister with the Commissioner of S&T as its Secretary. The Council shall have the following members.

The Prime Minister Chairman Commissioner of S&T Member & Secretary Minister of Planning and Economic Development Member Minister of External Economic Cooperation Member Minister of Health Member Minister of Natural Resources Development & Environmental Protection Member Minister of Industry Member Minister of Mines and Energy Member Minister of National and **Regional Administration Affairs** in the Prime Minister's Office Member Minister of Women Affairs in the Prime Minister's Office Member

Three Prominent Professionals Members

The Professionals will be nominated by the Commissioner of the Ethiopian Science and Technology Commission (ESTC), to be appointed by the Prime Minister.

The Council meets once every three months and evaluates the performance of S&T activities on the basis of which it issues guidance, directives and decisions. Additional meetings can be held as and when necessary.

B. TECHNICAL ADVISORY COMMITTEE OF THE NATIONAL SCIENCE AND TECHNOLOGY (S&T) COUNCIL

The Committee is composed of renowned and experienced scientists and engineers drawn from different branches of S&T; chairpersons and secretaries of Science and Technology Councils and three professionals who are also members of the National S&T Council. The Committee is chaired by the Commissioner of S&T. Its main objective is to undertake the necessary preliminary work and consolidate matters that will be submitted to the Council and to advise the Council on any technical matters.

C. SCIENCE AND TECHNOLOGY COMMISSION

The Ethiopian Science and Technology Commission is a government institution, headed by a Commissioner and governed by its own regulations. The Commission is accountable to the Prime Minister. It is the central organ empowered with responsibilities and mandates to plan, promote, coordinate, finance and oversee science and technology activities of the country. It is also responsible to advise the government on issues of S&T, implement the government's S&T policy and follow up the appropriate and immediate application of Research and Development (R&D) results.

The Commission shall have the mandate to organize different S&T Councils composed of renowned professionals, R&D representatives from the economic and service sectors, to assist in the formulation of S&T policies and priorities and to screen projects that are eligible for research grants.

The Sectoral Science and Technology Councils will be chaired by the elected members of the Councils with the sectoral Department Heads of the Commission acting as secretaries. The Councils prepare detailed policies and guidelines, set priorities of R&D plans, determine the financial assistance for research programmes and projects submitted to the Commission and follow-up their implementation. They will also study ways of application of research and development results generated from various sectors and present these to the National Science and Technology Council through the Commissioner. The respective sectoral Departments of the Commission shall act as their Secretariats.

D. SCIENCE AND TECHNOLOGY (S&T) OPERATIONAL INSTITUTES AND CENTRES

There shall be research institutes, technology centres, design enterprises, and various S&T support services in various sectors and higher educational establishments which would be responsible for the actual performance of S&T activities. Each economic and service sector shall have research and development representatives who will help to coordinate S&T programmes and projects and work closely with the Commission.

In addition, the Commission shall establish under it science and technology support services, centres and Research and Development (R&D) units as deemed necessary particularly in areas requiring special attention. The Commission shall assist and support those establishments which reach the stage of maturity either to merge with other relevant organizations or function as autonomous bodies.

FINANCING OF S&T

1.0 In order to support and sustain the different S&T activities, build up S&T capability in all sectors and apply generated research results, up to 1.5% of the country's Gross Domestic Product (GDP) shall be allocated annually for S&T development.

2.0 In addition to the funds raised from domestic sources, the government shall permit the flow of S&T finance from bilateral and multilateral sources.

3.0 Resources for R&D may also be generated through active participation in bilateral and multilateral research projects and through participation in regional and international S&T programmes.

4.0 Furthermore, private and public firms, interested individuals and other nongovernmental donors shall be encouraged to provide funds for the advancement of S&T activities.

5.0 S&T institutions shall be encouraged to generate funds by commercializing their services and outputs. Funds thus generated shall be utilized by the institutions for the promotion and expansion of their S&T activities.

6.0 Equipment and materials imported for R&D activities shall be exempted from all taxes. In addition, tax incentives shall be provided for the resources committed to R&D by the private sector.

ALLOCATION OF FINANCE TO SCIENCE AND TECHNOLOGY (S&T) ACTIVITIES

1.0 S&T activities, plans and research projects to be supported from government funds and from bilateral and international assistance received by the government shall be duly submitted to the Commission for approval.

2.0 Approval & the level of support shall be determined:

a. on the basis of the S&T policy of the government.

b. in line with the priority accorded sectors.

c. taking into consideration their contribution to national economic development.

d. weighing their potential in promoting appropriate technology.

e. considering their contribution in mitigating dependence on foreign technology.

3.0 Even though the usefulness of basic research results cannot be pre- determined, the necessary assistance shall be accorded to basic research for their contribution to the development of knowledge and in anticipation of their prospect for future use.

INTERNATIONAL COOPERATION IN S&T

1.0 Cooperation in S&T at sub-regional, regional and international levels shall be accorded due consideration for the mobilization of resources, exchange of information and experience as well as to carry out joint S&T programmes.

2.0 Active S&T cooperation shall be fostered with developing countries particularly with neighbouring countries with a view to exchanging appropriate technologies and for the sharing of resources for collaborative research programmes.

3.0 Active S&T cooperation shall be pursued with developed countries to build national S&T capability and foster its application for development.

4.0 An effective Science and Technology (S&T) cooperation shall be promoted between Ethiopia and the United Nation (UN) system.

5.0 Conditions shall be created to encourage regional and international financing institutions to participate in the mobilization of resources to fund S&T projects that assist development activities.

6.0 Planned and productive study tours and participation of Ethiopian scientists and technologists in international conferences, symposia, workshops and seminars shall be implemented.

7.0 Steps will be taken to ensure that regional and international S&T cooperations initiated locally as well as externally are based on mutual understanding and legal agreements.