THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF COMMUNICATION, SCIENCE AND TECHNOLOGY

THE NATIONAL RESEARCH AND DEVELOPMENT POLICY

2010

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ABBREVIATIONS AND ACRONYMS

CBOs	Community Based Organisations
CCM	Chama Cha Mapinduzi
COSTECH	Commission for Science and Technology
ESRF	Economic and Social Research Foundation
FBOs	Faith Based Organizations
GDP	Gross Domestic Product
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immuno Deficiency Syndrome
IHI	Ifakara Health Institute
IPR	Intellectual Property Rights
LGAs	Local Government Authorities
MDGs	Millennium Development Goals
MKUKUTA	Mkakati wa Kukuza Uchumi na Kupunguza Umaskini Tanzania
NEMC	National Environmental Management Council
NFAST	National Fund for Advancement of Science and Technology
NGOs	Non-Governmental Organisations
NIMR	National Institute for Medical Research
NRA	National Research Agenda
NRF	National Research Fund
R&D	Research and Development
REPOA	Research on Poverty Alleviation
S&T	Science and Technology
SMEs	Small and Medium Enterprises

STI	Science, Technology and Innovation
SWAAT	Society for Women and Aids Africa -Tanzania
TaCRI	Tanzania Coffee Research Institute
TAFIRI	Tanzania Fisheries Research Institute
TAFORI	Tanzania Forestry Research Institute
TaTEDO	Tanzania Technology Development Organization
TAWIRI	Tanzania Wildlife Research Institute
TGNP	Tanzania Gender Network Programme
TRIT	Tea Research Institute of Tanzania

FOREWORD

Research plays a very crucial role in the socio-economic development of any society. It can lead to the improvement of the quality of people's life e.g. by increasing life expectancy, enhancing agricultural productivity and food security, and developing technologies that would simplify people's lives. Arguably, research has been responsible for the economic prosperity currently enjoyed by all developed nations. The industrial revolution in Europe during the 18th and 19th centuries was based on extensive scientific research that led to a lot of discoveries by scientists of countries like Germany, England, France and Italy. These discoveries include the steam engine, manufacturing processes, machines and machine tools, textiles, pharmaceuticals, agro-chemicals, industrial chemicals and electricity. Thus, R&D cannot be separated from the development and competitive capacities and capabilities of a nation.

Tanzania has for many years been undertaking significant scientific research albeit in few areas. However, these research results have not been translated into tangible products, processes and services for development purposes. As such, the country is struggling to meet the basic needs of its people such as adequate food, clothing, shelter, health and education so as to substantially raise the living standards of the people. The developmental impact of R&D activities has been constrained by a number of challenges which include weak and uncoordinated leadership in the R&D system, the presence of weak multi-disciplinary interaction and collaboration among R&D institutions, exclusion of socio-economic research, inadequate mechanisms of including new and emerging research areas into the national research agenda, and low participation of the private sector in research activities. The above challenges have also been exacerbated by inadequate human resource; over dependence on foreign funding and

inadequate appreciation of the role of research in national development. Consequently, research has not contributed to the country's development as it should have been.

Pursuant to the above, a clear research policy is necessary to guide stakeholders on effective and efficient resources utilization; strengthening and improvement of research activity; and to continuously address quality and relevance with respect to the problems and needs of the society. This policy is geared to strengthen the country's research capability and capacity so as to bring about increased national competitiveness. This Research and Development Policy, therefore assumes the responsibility for providing guidance on how research should be conducted in all sectors of the economy; to establish an appropriate coordination and management system of research activities in the country; to set clear and realistic priorities for research on short, medium and long term basis; to rationalize the use of the country's natural resources through scientifical and technological research and development activities; to ensure adequate budgetary allocation by the government to research and set a mechanism for increasing the share of the private sector in funding research and development.

It is worth noting that the formulation of this policy involved a number of stakeholders. On behalf of the Ministry of Communication, Science and Technology, I would like to give my thanks to all who contributed to the formulation of this Policy.

Prof. Peter M. Msolla (MP)
Minister for Communication, Science and Technology
October 2010

1.0 INTRODUCTION

1.1 Background

The contribution of research in development cannot be over emphasized. The main goal of research is to serve as an instrument through which to improve people's living standards by stimulating growth and increased productivity in critical productive sectors of the economy. At the level of enterprises, research can bring about product innovations, product improvement, increased service efficiency, effectiveness, and improved performance in the market place.

Policies aimed at guiding research play an important role in planning national economic development. These policies have been changing with time to reflect societal needs. Principally, these policies have moved through three eras. The 1960s and early 1970s was the era of Science Policy whereas the 1970s and 1980s was the era of Science and Technology (S&T) policies. The 1990s to 2000s is characterized by Science, Technology and Innovation (STI). As opposed to the first two previous eras, the STI era emphasizes the role of science in national development, and it fully integrates research into the national development vision and implementation strategies. This ensures that the scientific and technological knowledge generated by research institutions is responsive to the socio-economic needs of the country.

History indicates that countries which have embraced well focused research policies have managed to create competitive economies. Indeed, one of the reasons for the dismal economic performance of many developing countries despite their natural resources endowment, is

their inability to formulate and implement comprehensive Research and Development (R&D) policies on one hand, and their inability to use research results to harness their resources for improving livelihood on the other.

Gauged in this context, R&D activities in Tanzania have been guided through the National Science and Technology Policy of 1996. However, the present policy does not explicitly give guidance on ways to address important gaps which are found in the R&D system. Despite the government efforts to establish a number of R&D institutions as well as training of researchers in the country, the benefits of research have not been fully realized. Only few research results have been converted into tangible products. Lack of adequate incentives too seems to lower Tanzanian firms' interest in investing in R&D. In addition, the system of research management and funding is weak and not properly coordinated. Furthermore, researchers have not been adequately rewarded on the basis of their research results, partly on account of poor marketing and little protection of intellectual property rights. All these shortcomings are to a great extent caused by inadequate guiding policies.

In order to facilitate enhanced research performance within a clear national framework, a well-articulated research and development policy that would match the realities of the 21st century has been formulated. This policy constitutes a milestone geared towards providing a framework through which linkage, coordination and harmonization of existing and new mechanisms will support other policies and initiatives to achieve the national vision of a middle income country by the year 2025. Through the implementation of this policy, Tanzania will be able to address the challenges of technological innovations and globalization which, if not timely and

properly addressed, will continue to marginalize our country in the global scene. This marginalization will relegate Tanzania to a mere supplier of raw materials, reducing her to a shopping mall for goods and services produced elsewhere in the world. In broad terms, this policy emphasizes that research undertaking in Tanzania should be directed towards generating knowledge, and building skills deemed to be of lasting benefit to the country.

1.2 Situation Analysis

1.2.1 Coordination and Management of the R&D System

The ministry responsible for science and technology is mandated to coordinate research and development activities in the country. However, there are ministries that oversee research and development activities in their respective sectors. On the other hand, the National Commission for Science and Technology (COSTECH), which was established by Act No. 7 of 1986 (CAP 226 R.E. 2002), is the principal advisory organ to the Government on all matters pertaining to scientific research, technological development and coordination of research activities in the country.

1.2.2 Research and Development Institutions

In Tanzania, most researches are conducted by public research institutions, higher learning institutions and private research institutions. The rest of the researches are being conducted outside formalized institutions. It should be noted that some of the research institutions have ultra modern laboratories and world class researchers and technicians.

The public research institutions in the country include sixteen (16) agricultural research institutions and stations; six (6) in animal sciences and animal diseases; nine (9) in human health, nutrition and medical sciences; six (6) in natural resources; and seven (7) in industry. All the public institutions operate under their respective ministerial administrations. With the exceptions of the agriculture and livestock research institutions, most research institutions are administratively organized under an umbrella body that enjoys a level of autonomy from the parent ministries. Such bodies include the Tanzania Wildlife Research Institute (TAWIRI), the National Institute for Medical Research (NIMR), the Tanzania Fisheries Research Institute (TAFIRI), and the Tanzania Forestry Research Institute (TAFORI).

In recent years, a number of private organizations have started to engage in research, largely in the social sciences. These institutions include the Economic and Social Research Foundation (ESRF); the Research for Poverty Alleviation (REPOA); the Tanzania Gender Networking Programme (TGNP); the Society for Women and Aids in Africa -Tanzania (SWAAT) and private universities. In addition, there are few private research institutions that are involved in scientific research. These include the Ifakara Health Institute (IHI), the Tea Research Institute of Tanzania (TRIT), the Tanzania Coffee Research Institute (TaCRI); and the Tanzania Technology Development Organization (TaTEDO).

Tanzania is experiencing a fast growth in the number of tertiary institutions. Currently, there are 31 Universities and University Colleges in the country. Nevertheless, most of the newly established universities and colleges have very little research activities in fields of science and technology, partly due to heavy capital investments

needed to acquire the necessary infrastructure (laboratory equipment and reagents) and human resources.

1.2.3 Achievements of R&D Activities in Tanzania

Over the years, R&D institutions in Tanzania have produced a number of research results, some of which have been applied to solve major societal problems. These include:

i. eradication of tsetse flies in Zanzibar;
ii. evaluation of health interventions against major disease burdens through use of drugs and treated nets;
iii. the production of *Boswellia* species and commercialization of *Frankincense* in the dry lands of Eastern Africa;
iv. conservation of indigenous fruits and development of tree biotechnology;
v. development of new drugs and formulations from indigenous plants for treating skin diseases and creating nutritional supplements, immune-boosters and anti-malarial drugs;
vi. breeding of crop varieties that have been fully commercialized;
vii. development of improved breeds of cattle, goats, sheep, chicken;
viii. evaluation of pesticides against various pests and diseases;
ix. introduction and commercialization of seaweed farming;
x. development and dissemination of equipment and machinery for agro-processing, mining, construction, animal traction, transportation, etc;
xi. development of better environment and natural resources management methods.

1.2.4 Challenges of R&D in Tanzania

Notwithstanding the above achievements, a number of challenges still remain. These include inadequate use of multi-disciplinary approach to researchers among R&D institutions; inadequate appreciation of socio-economic aspects in research and development; lack of emphasis on socio-economic research into the national research agenda. Furthermore, there is inadequate supportive environment for private sector involvement in research; inadequate mechanisms for technology transfer and commercialization of research results. Also, there has been inadequate funding for research activities, and where funds have been available, research has not been focused towards addressing societal problems.

Other challenges on R&D activities include inadequate mechanism for training and hiring researchers, and lack of a national framework for identifying research priorities and strengthening coordination of the roles of different ministries, government departments and agencies. The administrative and legal framework to govern the equitable sharing of research benefits between foreign researchers and local researchers is still far from adequate. Finally, there are challenges related to research ethics.

Whereas this situation can be attributed to historical factors, a look at the extensive reforms that have occurred in other areas such as those in the central and local government system over the last three decades can explain the lack of commensurate reforms in the R&D. With exception of a few that were established during the colonial period and the ones established recently, most of the R&D institutions in the country were established

in the late 1970s and early 1980s. These were aimed at providing technological support to government managed productive entities in various sectors such as industry, agriculture, livestock, fisheries, health, housing, water, energy and the military.

With the government relinquishing its role in production activities, many of these organizations suffered a prolonged period of inadequate funding, and consequently lost their active links with the sectors they once supported. As a survival strategy, these institutions embarked on activities of little research relevance but which aimed at supporting their own operational budgets. In certain cases, they were involved in international funded research that did not necessarily focus on national priority themes.

2.0 RATIONALE, SCOPE, VISION, MISSION AND GENERAL OBJECTIVE

2.1 Rationale and Justification

Socio-economic reforms of the 1990s in Tanzania resulted into the formulation of various policies which embraced a liberalized socio-economic system. These policies focused on the promotion of the private sector as a major contributor to the national economy, singly or through public-private partnership. Unfortunately, the socio-economic reforms have not been undertaken in tandem with the required reforms in the R&D systems.

On the other hand, the increasingly globalised world requires nations to create an enabling environment that will facilitate active participation of the private sector in improving their respective economies. Given the significant role of R&D in national development, it is imperative that Tanzania formulates an R&D policy and fully integrates it into its National Development Vision. This will ensure that the scientific and technological knowledge generated by research institutions is relevant and responsive to the socio-economic needs of the country. In addition, as a response to its economic reform, the National Development Vision 2025 commits Tanzania to build a strong, dynamic, resilient and competitive national economy. It aims to develop a competitive knowledge economy which is skill-based, knowledge and innovation driven, and thus capable of generating and sustaining dynamic development.

The above social objectives are noble, and achieving them will improve the well being of the vast majority of Tanzanians. It goes without saying, however, that achievement of a steady and dynamic growth of the

national economy will require enhanced knowledge and understanding that underlie new technologies and skills that can only be attained through well guided research undertakings. This policy therefore aligns R&D activities to the aspiration of the nation as spelt out in the Tanzania Development Vision 2025; the Tanzania Mini Tiger Plan, 2020; the MKUKUTA, 2005 and the Chama Cha Mapinduzi (CCM) Election Manifesto of 2005.

Finally, the formulation of an R&D policy is necessary due to the fact that the National Science and Technology Policy of 1996 that addresses issues of research was formulated based on the old policy model that puts more emphasis on the supply side of R&D at the expense of the demand side that involves the role of innovation and market forces. This policy further emphasizes on innovation and commercialization of research results which are key in bringing about economic growth while at the same time solving societal problems.

2.2 Scope of the R&D Policy

The Research and Development policy is central to national development. Its implementation embraces elements of particular interest and relevance, and it applies to the following:

i. The Government ministries, departments and agencies;
ii. The private sector, NGOs, CBOs, FBOs, professional associations and development partners;
iii. All infrastructure, research resources, governance/ institutional set up, information dissemination structures and social amenities belonging to the government;
iv. All staff, temporary and permanent, who are active in research, administration and provision of any form of

support to the core functions of R&D institutions;

v. All development partners as well as the diaspora.

2.3 Vision

To be a nation with a strong, dynamic, resilient and competitive economy that is both knowledge based and innovation driven.

2.4 Mission

To develop a research system that will increase the outcome and efficiency of R&D, leading to sustainable socio-economic development.

2.5 General Objective

The general objective of the National Research and Development Policy is to provide guidance to researchers in the public and private sector, policy and decision-makers, as well as development partners in addressing present and future national research challenges for socio-economic development.

3.0 POLICY ISSUES, SPECIFIC OBJECTIVES AND POLICY STATEMENTS

The Research and Development Policy of 2010 seeks to address the challenges of Research and Development as discussed in the introduction. Its purpose is to increase the contribution of research to the development of the country. In the light of the vision and mission presented above, the following ten focal areas of policy have been identified for articulation:

i. Strategic R&D leadership and institutional framework;
ii. Prioritization of research areas;
iii. Enhancement of research capacity in ICT and socio-economic disciplines;
iv. Commercialization and dissemination of research results;
v. Human resource development and management;
vi. Financing of research and development;
vii. Research ethics and intellectual property rights;
viii. Collaboration, partnership and networking;
ix. Regional and international cooperation; and
x. Cross cutting issues (gender, environment, and occupational risks e.g. HIV/AIDS)

3.1 Strategic R&D Leadership and Institutional Framework

Issue: Inadequately harmonized leadership and institutional capacity to manage and guide R&D activities

In a number of developed and emerging economies the

typical leadership and governance of the R&D system is structured under four levels. The first level constitutes a *High-level mechanism for R&D policy foresight and national strategic positioning.* This is a mechanism which is often placed within the planning unit of the government. It carries out oversight functions such as developing a forward-thinking culture about market and technology opportunities and threats; establishing a vision of the future strategic research areas; and providing a platform where R&D budgets get their priority within the overall government budget.

The second level is constituted by the *government ministry responsible for* R&D *governance.* This forms the government instrument which, in collaboration with other sectoral ministries, formulates policies, facilitates implementation of R&D programmes, regulates the sector, and monitors and evaluates performance. At the third level is the R&D *central coordinating and regulatory bodies.* These include organizations that are often not directly within the government. Their roles include coordinating, promoting and regulating the R&D sector in the country. *Performers of* R&D *activities* constitute the fourth level. These include public and private firms, organizations, institutions and communities, which are responsible for carrying out research activities.

In the light of the above, the current R&D coordination and management lacks this unified outlook and foresighting mechanism. The ministry responsible for R&D plays a marginal role in relation to research activities conducted in other ministries. COSTECH in its present structure, level of funding and staffing has inadequate capacity to discharge its mandate. As such, there is a need to review the existing legal framework which established different R&D institutions and put in place a new legal and

regulatory framework that will enhance research activities, fore sighting, effective coordination, dissemination and commercialization of research findings and monitoring and evaluation of research activities at national level. The proposed review should include reforming and financially supporting COSTECH to effectively discharge its mandate.

Objective

Establishing effective R&D coordination, guidance and foresight mechanism through a harmonized institutional framework

Policy Statements

The Government in collaboration with other stakeholders shall:

i. Establish foresight mechanisms in the national planning unit for R&D policy foresight and national strategic positioning;
ii. Harmonize the roles of different ministries, departments and agencies in coordinating research matters;
iii. Carry out a review of sectoral policies and legislation establishing the existing R&D institutions in order to foster efficiency and productivity;
iv. Reform COSTECH so that it can effectively discharge its mandate of research coordination, promotion, monitoring and evaluation, R&D performance audit, as well as data and information management.

3.2 Prioritization of Research Areas

Issue: Ineffective mechanism for setting up priority research areas that have direct benefits to national economic growth, societal and human welfare

The R&D system in the country comprises most of the elements required to contribute to technological and economic development. In spite of this, the effectiveness and efficiency of the R&D system in the country is low due to, among other things, ineffective mechanism to prioritize and guide the R&D agenda that responds to national development needs and priorities.

The government, through this policy initiative has established a mechanism that will be used to identify and set up priorities, and put in place implementation strategies of the National Research and Development Agenda (NRDA). Apart from ensuring efficiency and effectiveness of R&D, the mechanism will provide for a system of reconnaissance, fore-sighting, planning, implementation, monitoring and evaluation within the national R&D institutional and regulatory framework. In accomplishing these, the mechanism will adopt participatory approaches that guarantee inclusiveness and ownership across all levels of society.

The priority setting will take into consideration the available human, physical and financial resources, natural resource endowments, areas of competitive advantage, impact of interventions on economic development as well as on societal and human welfare.

Objectives

i. Creating a mechanism for setting up and periodically reviewing research priority areas and identifying

strategic research areas which are important to national security and economic growth.

ii. Aligning research planning, implementation, monitoring and evaluation as well as reporting to the national development agenda.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Establish mechanisms for setting up short, medium, long-term and strategic research priorities in line with the national development agenda;

ii. Ensure that priority setting is inclusive and based on the societal needs; and

iii. Support and fund research activities that enhance societal and human well-being as well as those which are of national importance.

3.3 Enhancing Research Capacity in ICT and Social Economic Disciplines

Issue: Weak and low socio-economic research and use of ICT in research undertaking

Much as Tanzania has a large number of R&D institutions and centers, it is worth noting that these institutions are mainly concentrated in the agricultural, health and industrial sectors and to a lesser extent on socio-economic and ICT research. However, with the changing global economic landscape and the entry of new technologies in the market, there is a need for Tanzania to create research capacity in socio-economic disciplines including areas of policy, finance, administration, security, transport, crime and ICT. Results from socio-economic discipline areas and ICT (i.e. making use of ICT in research) will complement

the enormous amount of research outcomes from the physical and biological sciences in promoting economic growth and societal well-being.

In addition, most R&D institutions in Tanzania do not have adequate capacities to address issues through the use of ICT. Therefore, there is a need to create an enabling environment to facilitate effective exploitation of ICT in all sectors of life. This can be done through capacity building and investment in terms of ICT infrastructure in R&D institutions.

Objective

i. Increasing the contribution of research in socio-economic disciplines and ICT for national development, and
ii. Increasing the use of ICT in research.

Policy Statements

The Government, in collaboration with other stakeholders shall:

i. Facilitate the establishment of R&D institutions and centers of excellence in ICT and socio-economics disciplines;
ii. Facilitate and encourage the R&D establishments to expand their research areas into ICT and socio-economics fields; and
iii. Facilitate R&D institutions to increase the use of ICT in research.

3.4 Commercialization and Dissemination of Research Results

Issue: Ineffective mechanism for ensuring that research results and developed technologies are commercialized and disseminated

While Tanzania's R&D undertakings have produced convincing results, only few have been converted into tangible products, processes and services to-date. The failure to utilize research results can be attributed to several factors, including inadequacy of important elements for accelerating their uptake. These elements include the absence of an adequate number of incubation centres and clusters; science and engineering entrepreneurship centers; venture capital; management of Intellectual Property Rights (IPR), and mechanisms for standardization of research products. Other factors are inadequate participation of local industries into research activities.

Pursuant to the above, the R&D policy needs to provide guidance and spell out mechanisms as to how industries will be linked to R&D institutions in order to permit the diffusion of new technologies and increase efficiency. Furthermore, it is important that mechanisms to allow and facilitate researchers (including public research institutions) to market their research results are instituted. Currently, such activities are considered to be outside their mandate. Researchers and research institutes are to be encouraged to form commercial (spin-off) companies,

or partner with other players from the private sector. It is possible for Tanzania to accelerate the development of its local industries and create a vibrant private sector through such an initiative. In the long term, this will enable the country to not only reduce dependency on imported goods, but also create employment opportunities for its citizens.

Objectives

i. Establishing effective mechanisms that will ensure the identification and translation of innovative research results into products, processes and services;
ii. Establishing an efficient management system for commercialization and dissemination of innovative research results;
iii. Ensuring that R&D institutions collaborate with local industries (including small and medium enterprises) in up-scaling the local technologies and skills in order to produce quality products and services; and
iv. Ensuring that COSTECH takes a lead in gathering and dissemination of research results in the country.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Facilitate putting in place institutions required for commercialization of research results like incubation centers, clusters and engineering entrepreneurship centers and venture capital;
ii. Develop and enforce mechanisms for setting standards for different technologies;
iii. Establish legal mechanisms for the development and enforcement of IPR;
iv. Facilitate development of mechanisms that allow researchers and research institutes/centers to market

their technologies and continuously benefit from the their work;

v. Promote local industries to establish linkages with R&D institutions;

vi. Develop incentive mechanisms to attract industries to engage into R&D activities.

3.5 Human Resource Development and Management

Issue: Ineffective mechanism to develop, motivate and retain adequate and competent human resource

Research activities by their nature require highly specialized manpower that is not readily available in the labour market. Development of such manpower requires a long term well thought and coordinated training, a deployment programme and motivation. Research activities also need to set targets in line with existing and future requirements and have comprehensive succession plans to address staff attrition (retirements, demise, turnovers, etc).

Currently, planning for human resource is one of the weak areas within the R&D system as the decision in relation to human resource development is vested with ministries responsible for labor and public service management. Besides, development of human resource needs to go in tandem with the development of necessary infrastructure such as provision of communication facilities, power, water and well equipped laboratory facilities. Consequently, a conducive working environment will be created to retain and attract competent staff.

Objectives

i. Establishing and implementing a human resource development programme focusing on short, medium

and long-term research needs;

ii. Creating a conducive working environment through provision of necessary infrastructure, better remuneration and incentives.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Put in place a mechanism for strategic research staff training and retraining, deployment, and a succession plan;

ii. Provide optimal motivation to research staff through promotion and recognition of their achievements.

3.6 Financing of Research and Development

Issue: Low funding of research activities

Over the years the government has been allocating funds to R&D activities through ministries and local government authorities, and only a proportionately low amount was allocated to the national R&D coordination body through the National Fund for Advancement of Science and Technology (NFAST). Although this 'decentralized' funding approach is desirable in some ways, the practice had a number of short comings, including:

i. Not fostering competition and peer reviewing in the allocation of funds to particular activities;

ii. Not being able to make clear evaluation and monitoring of the effectiveness of the allocated funds; and

iii. Difficulty to quantify the overall government budgetary spending on R&D activities and assess the economic impact.

In order to overcome these shortcomings, most of the government funding needs to be concentrated and focused through a creation of the National Research Fund (NRF) from which national research programmes will be financed. Some mechanism should be established to attract development partners and private sector to contribute to the National Research Fund. The allocated funds will mainly be used for human resource development, national research programmes and commercialization of viable research results.

Objectives

i. Ensuring adequate funds are allocated to research activities;
ii. Motivating private sector/industry, development partners and individuals to contribute to research funding.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Create a National Research Fund (NRF) and allocate to this fund not less than 1% of the GDP annually;
ii. Create conducive environment to attract research funding from the private sector, development partners and individuals.

3.7 Research Ethics and Intellectual Property Rights

Issue: Inadequate mechanism to ensure that researchers adhere to research ethics and uphold intellectual property rights

Research activities are carried out in accordance with acceptable ethical requirements. Ethics in research take into account such matters as protection of research subjects and safeguarding the environment; acknowledging sources; copyrights and patents; integrity in connection with fabrication of data, cheating and non-transparency; disclosure of confidential information; plagiarism and falsification. Currently, there is variation in the extent to which research ethics management is institutionalized in the country. Furthermore, management of ethics is uncoordinated, fragmented, and accompanied by a weak ethical review system. While certain sectors such as the health sector maintain a research ethics management system up to the national level, other sectors do not. Some higher learning institutions have internal research ethics guidelines. Yet others have internal guidelines that are not necessarily comprehensive. Therefore there is a need to strengthen and formalize collaboration between institutions/countries and individuals in conducting the research, sharing research results, as well as strengthening research review mechanisms.

Objectives

i. Strengthening ethics management;
ii. Fostering equitable sharing of research resources and benefits/IPR, particularly with local researchers/ institutions/research communities.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Establish research ethics review mechanisms in all sectors;
ii. Strengthen local capacity to monitor compliance with national intellectual property rights and legislations governing copyrights in Tanzania;
iii. Ensure equitable sharing of research resources and benefits.

3.8 Collaboration, Partnership and Networking

Issue: Inadequate collaboration among researchers from different disciplines/institutions and the private sector so as to optimize the use of resources and increase efficiency

Researchers in the R&D institutions have limited interaction and collaboration between each other. This trend has led to inefficient use of research equipment and human resource as well as poor sharing of knowledge and experiences. In order to optimize the use of these resources, it is important that a legal and administrative framework is put in place to foster collaboration as well as sharing of some critical resources among research institutions. This will reduce inefficiency in R&D activities, such as purchasing the same type of expensive scientific equipment for different R&D institutions which are located in close proximity. In addition, where commercialization of research results requires a multi-disciplinary team and involvement of the private sector, there should be a mechanism to easily assemble such a team.

Objectives

i. Establishing and institutionalizing an efficient system of partnership, networking and collaboration among researchers and private sector;
ii. Creating a favorable environment for cooperation and partnership for R&D institutions in the country.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Establish legal and administrative framework to promote partnership, networking and collaboration across disciplines, the private sector and R&D institutions;
ii. Promote R&D activities which are carried out by conglomerates of R&D institutions;
iii. Encourage R&D institutions to formulate their own research policies that will promote collaboration in line with the national research policy.

3.9 Regional and International Cooperation

Issue: Inadequate participation of Tanzania in strategic international R&D systems

There is a need to develop strategic partnership and collaboration between the government and R&D institutions at regional and international levels including the diaspora. Despite the government's efforts to foster collaboration between R&D institutions and development partners, the involvement of the diaspora has been minimal. As a result, Tanzania has missed out on critical opportunities, such as capacity building in terms of human resources and facilities; rational utilization of resources; and transfer of knowledge, technology and materials at the national and international levels.

Given the above circumstances, there is need to facilitate local researchers' network with foreign researchers and the diaspora in order for them to harness their expertise and experience for national development. Nevertheless, in order for the country to benefit fully from such cooperation, the current internal regulatory mechanisms for external researchers need to be strengthened. This is aimed at ensuring that external researchers obtain proper permits for carrying out any research activity in Tanzania. Furthermore, it is important to ensure that external researchers do not take away research materials and outcomes without authorization.

Objectives

i. Promoting strategic partnership and collaboration between research institutions, the government, regional and international development partners, including the diaspora;
ii. Strengthening collaboration between the national research coordinating body, research institutions and other regional and international coordinating bodies.

Policy Statements

The Government, in collaboration with other stakeholders shall:

i. Promote strategic partnerships, collaborative partnerships and working relationships between local researchers, R&D institutions and regional and international development partners and the Diaspora;
ii. Strengthen regulation and monitoring of internal and external research activities in the country; and
iii. Develop a mechanism for continuous popularization of research activities and outputs through various fora.

3.10 Cross Cutting Issues

3.10.1 Gender and Other Factors of Inequality

Issue: Un-equitable participation and benefits in respect to R&D activities

The government has put in place policies, laws and action plans for equitable distribution of social and economic opportunities including those related to research resources, opportunities, education and training. Currently, there exist a number of policies aimed at promoting gender issues. Notwithstanding, there are still wide disparities within the population in terms of research opportunity, access to research resources, and the benefit of research results. Resources and opportunities have tended not to benefit rural peasants, women, and people with disabilities, orphans, and some ethnic groups. There is therefore a need to redress these disparities.

Objectives

i. Taking affirmative action in promoting research that addresses challenges facing disadvantaged groups of people;
ii. Empowering all segments of the population to benefit from research results.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Ensure that research activities and benefits accrued from research do not discriminate against disadvantaged groups;
ii. Ensure equitable access to research funds, education and training.

3.10.2 Environment

Issue: Inadequate protection of the environment during research undertakings

Human actions have been environmentally destructive, leading to concerns about sustainable development despite a number of policies formulated by the government on environment issues. However, considerable global and national efforts towards redressing the effects of human actions on the environment have been undertaken. These efforts have yet to bear lasting impact. Research, like any other human action, has to be undertaken such that its negative impact on environment is minimized.

Objectives

i. Minimizing the effects of research undertaking on the environment;
ii. Promoting research that is beneficial to the environment.

Policy Statements

The government, in collaboration with other stakeholders shall:

i. Ensure that research undertakings abide by environmental policies, laws and regulations;
ii. Ensure regular assessment and monitoring of research undertaking with regard to their impact on environment; and
iii. Facilitate and promote research that has positive impact to the environment.

3.10.3 Occupational Risks Including HIV/AIDS

Issue: Increasing occupational risks and HIV/AIDS among research staff

Researchers and their supporting staff are exposed to various occupational risks which are associated with their activities. These include contracting HIV/AIDS and other infectious diseases. Contracting HIV/AIDS and other infectious diseases is more likely for researchers working in bio-medical research that involve handling infectious materials. This risk also applies to researchers in other disciplines and their supporting staff who conduct long field trips or attend conferences that keep them away from their families for long periods. Other occupational risks from research activities can result into severe injuries, disabilities, and loss of life, which will have significant impact on the productivity of R&D.

Objective

Mitigating the risks associated with research activities to research staff.

Policy Statements

The government in collaboration with other stakeholders shall:

i. Create awareness of HIV/AIDS in relation to research activities, and prevention measures;
ii. Create awareness of the occupational risks associated with R&D activities;
iii. Encourage R&D institutions to take precautionary measures to reduce risks associated with research activities.

4.0 INSTITUTIONAL FRAMEWORK

The implementation of the National Research and Development Policy is vested in the hands of various stakeholders. It is important to note that the common and shared vision, mission and objectives as clearly defined in the policy will be realized only if the various actors play their roles effectively. In this section, roles and responsibilities of various stakeholders including the government, the private sector, and civil society organizations have been articulated as follows:

4.1 Roles and Responsibilities of the Central Government

(a) Ministry responsible for research and development

The ministry responsible for Research and Development has the mandate for the implementation of the National Research and Development Policy and ensuring that national strategic goals are set and achieved. The Ministry will determine policy orientation and implementable strategies, and from time to time, review the policy and legislation, prepare conducive environment for sectoral coordination and integration. It will also take into account the availability of financial resources as well as different legal and regulatory frameworks for Research and Development activities.

This policy recognizes different sectoral policies, as they are important in achieving its objectives. For the implementation of this policy, the ministry responsible for research and development will ensure that this policy is harmonized with other sectoral policies, and that other stakeholders interested in Research and Development are fully involved.

(b) Ministry responsible for national economic planning

As the strategic think-tank in managing the economy on long term basis, the body responsible for national economic planning (currently President's Office-Planning Commission) will play a strategic role in reviewing and assessing the impact of R&D policy with a view of identifying strengths and weaknesses; hence, supporting the implementation process. In addition, it will be involved in identifying national strategic and priority research areas and research lines.

(c) Ministry responsible for environment protection

The National Research and Development Policy has to be implemented closely with the Division of Environment for issues requiring integration of environmental and social concerns in executing different research activities. In collaboration with the National Environmental Management Council (NEMC), research activities will be carried out in conformity with the set laws and regulations on environmental and social issues to ensure environmental sustainability.

(d) Ministry responsible for regional administration and local government

The regional secretariats have a role of making sure that using evidence in decision making becomes a norm at all levels of governance. In addition, the Ministry is responsible for ensuring that funds are budgeted by Local Government Authorities for R&D activities. Furthermore, in some instances, the districts are responsible for procurement of services for the implementation of Research and Development projects.

(e) Ministry responsible for finance

The role of the ministry is to provide short and medium term development planning at macro level, and coordinate sectoral development plans including those of research and development. It is also responsible for timely mobilization of adequate financial resources for implementation of research and development activities.

(f) Ministry responsible for public service management

Successful implementation of this policy is dependent on the availability of human capital in terms of quantity and quality. This will be achieved through proper recruitment and remuneration of staff by the Public Service Management.

(g) Ministry responsible for industries, trade and marketing

One of the important issues in this policy is to link research and industries by ensuring that there is a close participation of local industries in generating new technologies and/or taking up locally developed technologies. The ministry is therefore responsible for aligning different policies with the aspiration of R&D policy. It is also responsible for encouraging industries to invest in R&D activities, promoting standard handling of locally produced technologies in terms packaging etc. and identifying opportunities of markets locally, regionally and internationally. Furthermore, the Ministry is responsible for registration of patents and enforcing the IP legislation.

(h) Ministry responsible for constitutional affairs and justice

The ministry responsible for constitutional affairs and justice has a vital input in the implementation of this policy through reviewing and providing legal opinions related to the review and formulation of different

legislation and regulation as may be required in the course of implementing this policy.

(i) Ministry responsible for education and vocational training

The ministry responsible for education and vocational training has a stake in the implementation of the National Research and Development Policy. It has a responsibility of introducing curricula which promote innovativeness to pupils and students right. Furthermore, it has the responsibility of building human resource capacity in strategic disciplines where the country does not have enough manpower to engage into research and development activities.

(j) Other ministries

The responsibility of other ministries in implementing this policy shall be to supervise R&D activities in institutions under their respective mandate and to use results from research for formulation and review of sectoral policies, as well as making various administrative decisions.

4.2 At the Local Government Authorities Level

According to the local government reforms, the local government authority (LGA) shall play an increasingly important role in the implementation of the National Research and Development Policy. This is because LGA has been given responsibilities of developing and implementing various developmental projects. LGA has a major role in identifying areas which require further research and in the overall process of priority setting and implementation of research projects. Thus, the LGA will be responsible for the preparation and enforcement of by-laws to guide research and development at the district level. Furthermore, the LGA will be responsible for setting

aside funds for R&D to address local challenges including popularizing new technologies to end users.

4.3 At the Ward and Village Level

The ward and village levels have an important role in the implementation of the National Research and Development Policy as the two will be responsible in identification of innovative ideas and participating in priority setting. The ward and villages will also be responsible in popularizing new technologies to end users.

4.4 Other Key Stakeholders

4.4.1 The R&D Coordination Body

The national R&D coordinating body is the principal advisory organ to the government on all matters pertaining to research activities and their application for socio-economic development of the country. In this case, it has a key role of advising the government on all matters relating to research activities in the country. Specifically, its mandate includes to advise in monitoring and evaluation of scientific research and technological development; acquisition, storage and dissemination of scientific and technological information; examination and promotion of R&D programmes; mobilization and disbursement of funds for R&D; fostering regional and international cooperation; facilitation of the commercialization of research results; initiation, formulation and implementation of research priorities and programmes.

4.4.2 R & D Institutions

The roles of R&D in this case will include:

(a) Providing skills and knowledge that is more responsive to market demands to cope with challenges of globalization including aspirations of the National Development Vision 2025 as well as the United Nations Millennium Development Goals for combating poverty;

(b) Reviewing priorities from time to time so as to exploit indigenous knowledge and technology innovations, creative productions of sufficient levels and guarantees of intellectual ownership and right; an

(c) Undertaking researches that meet the demand of market needs including commercialization of research results coupled with establishment of spin-off firms from research results.

4.4.3 Development Partners and the Diaspora

For over the years, development partners have been intensively involved in supporting R&D in Tanzania. It is therefore expected that development partners will continue to support development of the research and development in the country. There should also be a deliberate move to network with researchers in the Diaspora to harness their expertise and experience for national development.

4.4.4 Tanzania Investment Centre

The Tanzania Investment Centre has an important role to play in the implementation of this policy as an entry point for those intending to invest in R&D. The centre maintains data and information on the opportunities available and

modalities for such investment. It will also play a role in the process of promoting and advertising our strength and readiness to accommodate investors in R&D-related activities.

4.4.5 NGOs and Professional Associations

The implementation of this policy also requires the complementary input from Non-Governmental Organizations (NGOS) including Faith Based Organizations (FBOS) and Community Based Organizations (CBOS). They play an important role particularly in the provision of knowledge, information, capacity building and mobilization of resources at the grass-root level. They will also play a crucial role in setting research priorities. They similarly play a crucial role in popularizing new technologies.

4.4.6 The Private Sector

The private sector has an important role in the implementation of the policy. It is expected to engage in R&D activities through industries and SMEs. The private sector will also take up responsibility by marketing and utilizing the developed technologies.

5.0 IMPLEMENTATION PLAN FOR THE R&D POLICY

5.1. Policy Implementation

The implementation of this policy requires developing a plan that will identify strategies for addressing each policy statement, activities to be performed, the time frame and the responsible stakeholders. Key stakeholders in the process of implementation of this policy include government ministries, departments and agencies. Others are the private sector, NGOs, CBOs, FBOs, professional associations and development partners. It should be noted that the coordination for the implementation of the policy remains with the ministry responsible for research and development.

5.2 Policy Monitoring and Evaluation

The national R&D coordinating body will make annual evaluations and submit progress reports on the implementation of the policy to the Ministry responsible for research activities. Research and development indicators shall be developed and be made available to enable stakeholders at all levels monitor and assess R&D activities on a regular basis.

5.3 Review and revision of the National R&D Policy

An evaluation of the outcomes of this policy will provide information on the extent to which the policy is being implemented, and the progress being made in achieving the National Research and Development Policy objectives. An overall policy review will be undertaken after every five years. Overall review is assigned to the ministry responsible for research and development matters.