



FEDERAL MINISTRY OF EDUCATION

**IMPLEMENTATION GUIDELINES
FOR
NATIONAL POLICY ON SCIENCE AND
TECHNOLOGY EDUCATION**



NOVEMBER, 2019



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FOREWORD

Since 1842 when the nation incorporated science into its education curricula, which before then had placed undue emphasis on literacy and numeracy, the country has been without a national policy to specifically direct and propel science and technical education. Given the critical importance of science and the acquisition of technical and vocational skills as tools for driving national growth and development, the absence of a roadmap for science and technical education has been a very costly oversight indeed.

This absence is partly responsible for the type of poverty-breeding education as opposed to a wealth-creating one we have had over the years. It also accounts for Nigeria's inability to achieve a notable technological take-off.

It is, therefore, heartwarming that this costly national mistake has come to an end with the approval granted by the National Council on Education for a National Policy on Science and Technology Education (S&TE) which is now in our hands. This development is, no doubt a significant one, a sort of landmark achievement by the Federal Government of Nigeria. Moreover, it underscores the passion and determination of the present administration of President Muhammadu Buhari to address the challenges facing the delivery of quality science and technical education in Nigeria.

The National Policy on Science and Technology Education (S&TE) was developed in recognition of the fact that S&TE is an effective tool of empowering the citizenry to overcome poverty and limit the incidence of social vices due to joblessness arising from lack of skills among its productive workforce. With it now and a development of a companion action plan tagged Implementation Guidelines, it is my hope that our country is well on its way to building a self-confident, self-reliant nation which will produce more of what it needs without having to rely so much on the creative ingenuity and cunning innovation of other nations.

It is my expectation that all stakeholders in the science and technology education subsector will adhere to the **Policy and the Implementation Guidelines** to ensure that the desired goal is achieved. I, therefore, recommend effective implementation of this Policy for the growth and the development of science and technology education in Nigeria.



ADAMU ADAMU

Minister of Education

PREFACE

The need for a National Policy on Science and Technology Education (S&TE) was informed by the observed gaps and poor synergy among all stakeholders which hindered the effective development of the sub-sector.

The policy is long overdue considering the fact that the technological and scientific advancement of any nation depends on the teaching and learning of science and technology subjects.

The Federal Ministry of Education, therefore, organized consultative meetings and workshops to develop and harmonise the inputs that were submitted by stakeholders which culminated into the draft policy and the final document.

The role of Science and Technology Education is central to the industrial development of any country. There is therefore the need to re-position the delivery of Science and Technology Education in Nigeria to meet the current global technological explosion through an all-inclusive functional policy and the provision of a legal framework to guide the mobilization of appropriate interventions for the sub-sector.

A holistic approach which shall involve sectorial Ministries, Departments and Agencies (MDAs), Institutions of Higher Learning, the Private Sector, Non-Governmental Organizations (NGOs), Media, professional associations and International Partners is projected for the implementation of this policy.

The adoption of this policy will allow the enactment of guiding principles and pertinent strategic options for effective implementation mechanisms for Science and Technology interventions towards addressing unemployment in Nigeria.



Arc. Sonny S. T. Echono
Permanent Secretary
Federal Ministry of Education

ACKNOWLEDGMENT

The National Policy on Science and Technology Education (S&TE) was developed for inclusiveness and to enhance the growth of the sub-sector through the provision of legal framework to guide the mobilization of appropriate interventions.

The collaborative efforts of the Honourable Ministers of Federal Ministries of: Industry, Trade & Investment, Agriculture & Rural Development, Information & culture, Labour & Employment, Environment, Water Resources, Science and Technology and Youths & Sports Development; Representatives from Ambrose Ali University Ekpoma, Federal University of Technology Minna, Federal University of Technology Owerri, Federal University of Technology Yola, Federal Polytechnic Kaduna, Kogi State Polytechnic, Federal College of Education (Technical) Yaba, Lagos, Federal College of Education (Technical) Omoku, Rivers State, Honourable Commissioners of State Ministries of Education and Education Secretary FCT, and other agencies such as NABTEB, NBTE, NUC, NCCE, STAN, NERDC, NATT, MAN, ITF and NGOs are highly commended for their significant contributions and supports.

We equally note with great appreciation, the invaluable technical contributions and supports of the Resource persons from the Academia, Agencies, Retired Directors and other stakeholders in the development of the policy. The support of African Development Bank (ADB) towards the production and dissemination of the policy and its Guidelines is also highly appreciated.

I also wish to commend the leadership support of the Directors of Educational Planning Research & Development and Basic & Secondary Education Departments.

Finally, I recognize the staff of the Technology and Science Education Department, and other FME staff who worked at various stages to develop and perfect the document.



Mrs. Elizabeth O. Adedigba
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ACRONYMS

ADB – African Development Bank
 ATA – Agricultural Transformation Agenda
 ARCN – Agricultural Research Council of Nigeria
 CAADP – Comprehensive African Agricultural Development Programme
 ANCOPS – Association of Nigerian Conference of Principals
 COREN – Council for Regulation of Engineering in Nigeria
 CORBON – Council of Registered Builders of Nigeria
 CRF – Consolidated Revenue Funds
 CSO – Civil Society Organisation
 CPN – Computer Professional Registration of Nigeria
 CVC – Committee of Vice Chancellors
 DFID – Department for International Development
 DPs – Development Partners
 FCT – Federal Capital Territory
 FEC – Federal Executive Council
 FME – Federal Ministry of Education
 FBO – Faith Based Organisation
 FEQAS – Federal Education Quality Assurance Service
 GCI – Global Competitiveness Index
 HETAN – Home Economics Teachers Association of Nigeria
 HR&D – Human Resource and Development
 ICT – Information and Communication Technology
 IEs – Innovation Enterprise Institutions
 ITF – Industrial Training Fund
 JCCE – Joint Consultative Committee on Education
 JICA – Japan International Cooperation Agency
 M.A.N – Mathematics Association of Nigeria
 MAN – Manufacturers Association of Nigeria
 NABTEB – National Business and Technical Examinations Board
 NATT – Nigerian Association of Teachers of Technology
 NARS – National Agricultural Research System
 NBTE – National Board for Technical Education
 NCE – National Council on Education
 NCCE – National Commission for Colleges of Education
 NDE – National Directorate of Employment
 NEC – National Economic Council
 NECO – National Examinations Council
 NERDC – Nigeria Education Research and Development Council
 NGO – Non-Governmental Organisation

NIOB – Nigeria Institute of Builders
NHEP – National Health Education Planning
NMC – National Mathematical Centre
NOTAP – National Office of Technology Acquisition and Promotion
NPE – National Policy on Education

NSE – Nigerian Society of Engineers
NS&TEF – National Science and Technology Education Fund
NSTEC – National Science and Technology Education Council
NTVEC – National Technical and Vocational Education Council
NUC – National Universities Commission
NVA – Nigerian Vocational Association
NV20:2020 – Nigeria Vision20: 2020
PASET – Partnership for Science, Engineering and Technology
PPP – Public Private Partnership
R&D – Research and Development
SMASE – Strengthening Mathematics and Science Education
STEP-B – Science and Technology Education in Post-Basic
STVE – Skills Training and Vocational Education
STVET – Science Technology and Vocational Education and Training
STAN – Science Teachers Association of Nigeria
SMEDAN – Small and Medium Enterprise Development Agency of Nigeria
S&TE – Science and Technology Education
SUBEB – State Universal Basic Education Board
TVET – Technical and Vocational Education and Training
TETFund – Tertiary Education Trust Fund
TRCN – Teachers Registration Council of Nigeria
TTIs – Teacher Training Institutions
UBEC – Universal Basic Education Commission
UNICEF – United Nations Children's Fund
UNIDO – United Nations Industrial Development Organisation
VEIs – Vocational Enterprise Institutions
WAEC – West African Examinations Council

CHAPTER ONE

INTRODUCTION

Background

There is a growing disconnect between the demand for skills and talent in the Nigerian economy and the number of young Nigerians emerging from our education system, especially in the Science and Technology Education (S&TE) disciplines. This disconnect represents a threat to the job prospects of our people, the prosperity of our country, and the competitive capacity of our economy. According to the Economic Recovery & Growth Plan 2017-2020 of the Federal Republic of Nigeria, "the shifts in the global economy, the emergence of new sectors and the digital revolution have changed the skills required of the work force. Nigeria has to reposition its education sector to prepare its young people to cope with the changing technological and economic environment".

As things stand, limited access to education especially in science and technology disciplines, coupled with insufficient capacity and sub-standard infrastructure at the tertiary level, mean that the work force lacks the critical skills needed to develop the economy. Indeed, a large number of employers cite lack of skills as a major obstacle to hiring personnel. Other constraints are inadequate financing, insufficient number of skilled teachers and lecturers, and outdated and obsolete educational policies and practices."

The fact that there is mass unemployment in Nigeria is no longer news. The S&TE Policy gave priority attention to Technical and Vocational Education and Training (TVET) because TVET has been identified by the government as a veritable tool to solve the problem of unemployment, hence the need to ensure its implementation in Nigeria. TVET is the type of education which provides individuals with skills, knowledge and attitudes for effective employment in a specific occupation. The high unemployment rate in Nigeria is the result of the inability of the academic institutions to bridge the gap in the skill requirement of the industries. The youths who lack technical, vocational and entrepreneurship skills for self-employment find it extremely difficult to survive the frustrations and pains of joblessness. This makes them take up menial jobs. Many individuals have difficulties in translating their business ideas to realities and creating new business ventures because of inability to access necessary information and skills needed to achieve their targets.

The school curriculum is oriented towards making graduates suitable mainly for white-

collar jobs. This underscores why millions of Nigerian youths and graduates of tertiary institutions roam the streets of the major cities and towns in search of white-collar jobs. For S&TE in Nigeria to become meaningful and profitable, curriculum review must be carried out periodically in order to make S&TE more learner-centred and more relevant to addressing national challenges.

The role of S&TE Teachers in the implementation of the National S&TE Policy cannot be over-emphasized. Therefore, S&TE Teacher Education should be a continuum that starts at the enrolment of Post-Basic school students into the Teacher Training Institutions (TTIs) and runs through their service years in the profession. The teachers who manage to develop students' skills in searching for answers to questions about materials and phenomena in the environment, and those who empower their students to grow to become innovators, entrepreneurs, informed decision makers in society, are considered effective teachers. These teachers are also able to evaluate their own practice and use these insights to develop challenging learner-centered experiences. In effect, a committed S&TE teacher should be reflective, collaborative, and a lifelong learner.

In 2016, the process for the formulation of a National Policy on Science and Technology Education was initiated. After months of consultations and brainstorming, the document was presented to the Joint Consultative Committees on Education (JCCE) and finally forwarded to the National Council on Education (NCE) for approval. The main goal of the policy is the production of the critical S&TE workforce in Nigeria that can transform the nation into a world-class economy.

The National Science and Technology Education Policy stipulates a plan to improve the quality of Science and Technology Education at all levels of our educational system. The effective implementation of the policy will help to attract and retain quality educators, enhance scientific literacy in teachers and students, develop national science and technology standards for each level, and ensure that continuity in learning exists as learners move from one level to another.

CHAPTER TWO

GOALS AND OBJECTIVES OF THE S&TE IMPLEMENTATION GUIDELINES

2.1 Introduction

The S&TE Policy stipulates the philosophy, goals, objectives, standards, structures, strategies and management for achieving the National S&TE goals in Nigeria. The policy should be operated within the framework of the National Policy on Education (NPE), National Policy on Science, Technology and Innovation, bilateral agreements and all international treaties and protocols that directly or indirectly affect S&TE, to which Nigeria is a signatory. Hence, the implementation guidelines shall be within the context of the National Policy on S&TE.

2.2 Purpose of the Guidelines

The purpose of the guidelines is to ensure that the goals and objectives of S&TE policy are achieved. In this context, the guidelines will help to articulate strategies for:

- I. strengthening S&TE in schools at all levels;
- ii. pre-service training and continuous professional development of teachers;
- iii. mobilization, deployment and management of S&TE resources, such as instructional materials, laboratories, workshops, Information Technology infrastructure, equipment, consumables, power supply, water, etc;
- iv. mobilization, deployment and management of financial resources for S&TE;
- v. initiation, designing and development of appropriate, demand driven and world class S&TE programmes and projects;
- vi. practical works, experimentations, product development, fabrication, commercialization and other innovations that address national needs;
- vii. establishment and operations of Science and Technology parks, incubation and production units, entrepreneurial centres, S&TE resource centres, museums among others;
- viii. reviewing and reforming S&TE curricula at the basic, post-basic and tertiary levels of the educational system;
- ix. involving and specifying the roles of various stakeholders such as public and private sectors, industries, development partners, NGOs, associations, communities and individuals;
- x. monitoring and evaluation of the implementation of ST&E policy in line with set goals and objectives;

- xi. achieving an enrolment quota of 70% of candidates in science and technical institutions;
- xii. achieving inclusive and gender balance in learners' participation in Science and Technology disciplines at the basic, post-basic and tertiary levels.

2.3 Structure of the Science and Technology Education Implementation Guidelines

The Guidelines begin with ideas on Enabling Conditions for implementation, while the main body of the document is patterned after seven Thematic Areas and other major chapters as arranged in the policy.

Thematic Area 1: In order to promote Agricultural education, there is need to develop appropriate innovative technologies for crop production, animal production, post-harvest loss preservation and entrepreneurship in agricultural education.

Thematic Area 2: In order to strengthen and provide effective, efficient, accessible and affordable health education that will improve the health status of Nigerians, there must be an effective linkage and collaborations among knowledge institutions and industries engaged in the health education sector.

Thematic Area 3: To produce appropriate human resource to address the need of energy sector, there is need for the teaching of skills and knowledge for R&D in the areas of fossil fuel, nuclear, solar, wind, biofuels, hydro and other renewable energy technologies.

Thematic Area 4: In order to train citizens who can initiate, create and develop innovative micro and macro industrial system, there is need to ensure that R&D activities are directed towards the learning of appropriate technologies for the production of industrial goods and services in small, medium, and large-scale firms.

Thematic Area 5: To produce citizens with basic knowledge and skill in coping with and managing the physical environment, there is need for the integration of environmental concerns to ensure public understanding of the scientific basis of their action on the environment.

Thematic Area 6: In order to provide training and exposure that will impact the necessary skills for the production of craftsmen, technicians, technologists and other skilled personnel who shall be enterprising and self-reliant, there is need to train TVET teachers in pedagogical and practical skills to update their knowledge and competencies.

Thematic Area 7: In order to promote Information and Communication Technology Education for socio-economic development, there is need for aggressive and intensive capacity building in ICT usage and application in S&TE.

2.3 Enabling Conditions

In order for Nigeria to make remarkable progress in institutionalization and effective

implementation of S&TE policy, there is the need for all stakeholders to be involved and right conditions provided at all levels including public and private sectors, development partners, civil society organisation and individuals. In this respect, the following conditions have to be fulfilled:

- Strong political will: The Federal, States, FCT and Local Governments should demonstrate strong political will and commitment in supporting the implementation of the policy document through appropriate legislations and policies, recruitment and deployment, training and retraining of personnel, provision of necessary incentives for S&TE personnel and effective monitoring mechanism.
- Sustainable funding: All tiers of government should demonstrate in concrete terms commitment to S&TE sub-sector by providing leadership through adequate budgetary allocations and timely release of funds.
- Strong synergy amongst educational institutions, labour market and the industries: There should be strong linkage between the industries and the institutions in terms of hands-on experience, research and development, curriculum relevance, etc.
- Multi-sectorial and multilateral cooperation, collaboration and partnerships: All stakeholders should co-operate, share information, resources and ideas and avoid undue duplication of efforts.
- Private sector participation: S&TE is capital intensive and should not be left with government alone. Therefore, there is a need for private sector participation in mobilising resources for S&TE research, work-place experience, infrastructural development, commercialization of products, scholarship awards, competitions, awards for excellence, endowments, etc.
- Advocacy, sensitization and mobilization: There is a need to enlist buy-in, ownership and co-operation of stakeholders for further policies and legislation to enhance effective implementation of S&TE policy. There is also the need for periodic national, zonal, states and grassroots sensitisation programmes for the citizens to be well informed and kept abreast of developments in S&TE subsector. Moreover, it is imperative for stakeholders at various levels to be actively and responsibly involved in the implementation of S&TE policy to achieve result.

CHAPTER THREE

THEMATIC AREAS

3.1 Agricultural Education

3.1.1 Objectives

- To reposition Nigerian Agricultural Education System and its programmes to be industry-driven to meet societal needs.
- To guarantee sustainable partnership and funding.

3.1.2 Implementation Guidelines

- I. Regulatory agencies such as NUC, NBTE, and NCCE should ensure that Agricultural Education institutions adhere strictly to their statutory mandate to offer only agricultural courses.
- ii. Government at all levels, private sector and other stakeholders should be involved in the provision of incentives such as grants, scholarships, research funds to attract first rated candidates into agricultural education system and promote development and infusion of new technologies into agricultural subsector.
- iii. Agricultural Education Institutions should develop their entrepreneurial agricultural programmes as prescribed by tertiary regulatory agency such as NUC, NBTE, NCCE in collaboration with relevant agencies such as SMEDAN, TETFund, Bank of Agriculture, among others.

3.2 Health Education

3.2.1 Objectives

- To strengthen health education processes at all levels.
- To provide effective, efficient, accessible and affordable health education that will improve the health status of Nigerians.

3.2.2 Implementation Guidelines

- i. The Federal Ministry of Education in collaboration with Federal Ministry of Health, National Bureau of Statistics, and Development Partners shall conduct baseline survey on health-related issues to guide national health education.
- ii. Education Institutions should ensure the inclusion/infusion into their health education curricula the teaching of current and emerging health issues and carry out periodic training and retraining of research scientist, technicians and other support staff in the priority discipline where there are marked shortages.

3.3 Energy

3.3.1 Objective

- To produce appropriate human resources to address the needs of the energy sector.

3.3.2 Implementation Guidelines

- i. Educational Institutions should intensify effort in imparting knowledge, skills, competence and attitude on research and development for the generation and development of alternative source of energy, especially on renewable energy technologies. This should be done in partnership with relevant industries for the purpose of commercialization.

3.4 Industrial Research, Development and Production

3.4.1 Objectives

- To train citizens who can initiate, create and develop innovative micro and macro industrial systems.
- To train scientists, technicians and engineers that are capable of manning micro and macro industrial systems and processes.

3.4.2 Implementation Guidelines

- i. Education institutions should ensure establishment and operations of functional production units and their activities directed towards the learning of appropriate technologies for the production of industrial goods and services in small, medium and large-scale forms.
- ii. Education institutions should establish functional and mutually beneficial collaborations

with industries and investors for the purpose of generating innovations and capacity building in the design and fabrication of machines, tools and spare parts for a more rapid industrial growth and development.

3.5 Environmental Science and Technology

3.5.1 Objectives

- To produce citizens with basic knowledge and skills in coping with and managing the physical environment.
- To develop appropriate human resource with adequate knowledge on environmental protection and conservation.

3.5.2 Implementation Guidelines

- i. The Federal Ministry of Education shall interface with the Federal Ministry of Environment and other relevant agencies to promote global learning, mitigation, monitoring and prediction on environmental issues.
- ii. Curriculum Development agencies such as- NERDC, NUC, NBTE, NCCE and others will develop and ensure delivery of relevant curricula in waste management, environmental protection, conservation and mitigation of adverse effect of natural phenomena.

3.6 Technical and Vocational Education and Training (TVET)

3.6.1 Objectives

- To provide training and exposures that will impact the necessary skills for the production of craftsmen, technicians, technologists and other skilled personnel who shall be enterprising and self-reliant.
- To teach and prepare individuals who can apply scientific knowledge to solve environmental problems for the convenience of mankind.
- To promote knowledge, skills acquisition and positive attitudes through continuing education in technical and vocational trades towards creating wealth and employment generation.

3.6.2 Implementation Guidelines

- i. Government should ensure that Technical Institutions and Departments are manned by STEM professionals.
- ii. Relevant agencies shall carry out periodic review and upgrading of TVET curricula with a view to making it more demand-driven.

- iii. TVET teachers/instructors shall be sponsored to undergo mandatory industrial work experience in their relevant work-place to upgrade their practical skills and competences for effective TVET curricula delivery.
- iv. The first-rated candidates shall be encouraged to enrol in TVET programmes through incentives such as scholarships, grants and loans to ensure retention, completion and practice of TVET.
- v. Government in collaboration with private sector, Development Partners and other stakeholders shall be responsible for the provision of necessary infrastructures, tools and equipment for the teaching and learning of Technical and Vocational trades.
- vi. Government through relevant agencies shall carry out public awareness campaigns in order to popularize inherent benefits in TVET.
- vii. Government shall set up framework that will drive public-private partnership (PPP) using the existing master plan in the establishment of model TVET institutions and upgrading of the existing ones to operate optimally.

3.7 Information and Communications Technology (ICT)

3.7.1 Introduction:

The development of human capital needs to be improved by a new set of knowledge, skills and attitude, and the learners equipped to be globally competitive towards meeting the challenges of the evolving environment hence ICT occupies a very strategic place in the country.

3.7.2 Objective

- To promote Information and Communication Technology Education for the Country's Socio-economic development and prosperity.

3.7.3 Implementation Guidelines

- (I) Government at all levels should embark on aggressive and intensive capacity building in ICT usage and application as well as training and re-training for development of indigenous local manufacturers of ICT hardware and software and other accessories through technology institutions and creative innovations in S&TE.
- (ii) Government at all levels should develop a framework to encourage ICT education.
- (iii) Support collaborative R&D activities among industries, higher educational institutions as well as private and public research institutions.
- (iv) Government at all levels should ensure the establishment of ICT data banks, facilitate National ICT innovation competition in support of S&TE.

3.8 Emerging Technologies

3.8.1 Introduction:

Emerging Technology is viewed as any novel technology currently being developed which is expected to substantially affect the social, educational, business and economic landscape of the society.

3.8.2 Objective:

- To explore and adopt emerging technologies and alternative tools for instruction in the S&TE and other general applications as they emerge.

3.8.3 Implementation Guidelines

- (I) Stakeholders should develop a supportive attitude in S&TE sub-sector for change through increasing awareness of new and emerging technologies whereby they will appreciate programmes that are crucial towards engendering a climate for invention, innovation and technopreneurship.
- (ii) Government at all levels should prioritise research programmes in new and emerging technologies to ensure focus in areas that yield the highest economic pay-off; such as building skills, competencies and develop a secure knowledge base in key areas to sustain technology support for Nigerian industrial sector.

CHAPTER FOUR

HUMAN RESOURCE DEVELOPMENT

4.1 Introduction

Human Resource Development is a key factor in formulating policies in all educational endeavours which involves research, training and retraining with skills development in all their ramifications.

4.2 Objectives

- To introduce policies and incentives that will increase private sector participation.
- To build leadership and management capacity to drive S&TE.
- To invest in training materials, tools and equipment that will build capacity.
- To train learners on the development of business plans that will support training activities.
- To institute bursary schemes to motivate trainees.

4.3 Implementation Guidelines

- (I) Government at all levels should provide enabling environment through strengthening Monitoring and Evaluation (M&E) processes.
- (ii) Government at all levels should ensure adequate budgetary allocation and release for human resource development, and provide trainees and interns from technical and vocational institutions on industrial training with stipends from Industrial Training Funds (ITF).
- (iii) Government at all levels should establish strong linkages and collaborations with employers, industries and other relevant bodies, and support the industries and establishments to provide hands-on training experiences for interns and apprentices from S&TE institutions.

CHAPTER FIVE

ROLES OF STAKEHOLDERS

5.1 Introduction

In the context of the Science and Technology Education (S&TE) policy, stakeholders are individuals, groups, organizations whose activities either derive from or affect the S&TE sub-sector. These groups or organizations are the primary stakeholders linked to this policy development and its implementation. The products of S&TE often transcend national boundaries. Consequently, the development of S&TE calls for collaboration among technicians, technologists, scientists, engineers, entrepreneurs and governments at intra-country, regional or global levels.

5.2 Objectives

- To provide a framework for the involvement of all categories of stakeholders in the development of the S&TE.
- To assign specific roles to different stakeholders involved in the S&TE sub-sector.
- To create the enabling environment for different levels of collaboration among all stakeholders for the purpose of providing quality S&TE.

5.3 Implementation Guidelines

5.3.1 Federal and State Ministries of Education and FCT Education Secretariat

Federal and State Ministries of Education shall:

- i. periodically update S&TE curricula as well as monitor and evaluate S&TE at all levels;
- ii. popularize S&TE through regular Science and Technology fairs, exhibitions, quiz competitions, S&TE clubs, and mass media;
- iii. ensure availability of qualified personnel to handle Science and Technology Education in schools as well as requisite infrastructure, equipment, tools and conducive environment

for S&TE;

- iv. facilitate collaboration among schools, industries and other employers;
- v. advise government at all levels on S&TE.

5.3.2 Federal Ministry of Health

The Federal Ministry of Health shall:

- i. ensure effective linkages and collaborations among knowledge institutions and industries engaged in health education sector;
- ii. conduct health education needs assessment to guide National Health Education Planning (NHEP); and
- iii. co-ordinate school health programmes to ensure its inclusion into schools' curricula and teaching of health issues.

5.3.3 Federal Ministry of Science & Technology

The Federal Ministry of Science and Technology shall:

- i. provide incentives to Nigeria youths for career development in S&TE fields;
- ii. encourage and support research activities in various institutions and agencies; and
- iii. liaise with Federal Ministry of Education on issues relating to S&TE.

5.3.4 Federal Ministry of Environment

The Federal Ministry of Environment shall:

- i. encourage the use of clean technologies in production system;
- ii. collaborate with S&TE institutions to develop an appropriate and effective waste management system to reduce pollution from waste generation and promote wealth creation; and
- iii. collaborate with the Federal Ministry of Education on emerging environmental issues in education sector.

5.3.5 Federal Ministry of Agriculture

The Federal Ministry of Agriculture shall:

- i. develop indigenous technologies for value addition of agricultural produce;
- ii. ensure that ARCN sponsored researches in agriculture are industry-driven; and
- iii. resuscitation of the Agricultural Research Grant Scheme and provide incentives in the agricultural education system so as to attract talents, sustain and maintain productivity

and enhanced extension services.

5.3.6 Federal Ministry of Industry, Trade & Investment

The Federal Ministry of Industry, Trade and Investment shall:

- i. properly fund ITF for effective SIWES delivery in S&TE;
- ii. ensure proper synergy between industries and S&TE institutions to close skills gap; and
- iii. provide incentives for industries to encourage them to accept S&TE students for SIWES.

5.3.7 Federal Ministry of Labour and Productivity

The Federal Ministry of Labour and Productivity shall:

- i. collaborate with S&TE institutions to ensure mastery of skills relevant to the needs of the labour market; and
- ii. ensure that Trade Test graduates possess the requisite skills commensurate with their certificates.

5.3.8 Federal Ministry of Communications Technology

The Federal Ministry of Communications Technology shall:

- i. develop indigenous capabilities for the local manufacturing of ICT hardware, software and other accessories through technological substitution and transfer;
- ii. encourage capacity building of ICT in S&TE; and
- iii. establish S&TE parks with ICT backbone and software development.

5.3.9 Federal Ministry of Youth and Sports Development

The Federal Ministry of Youths and Sports Development shall:

- i. institute Youth Science Awards at all levels of education and support the UNESCO World Youth Skills Day;
- ii. encourage S&TE Clubs and Societies within schools with a view to supporting peer networks and interest groups around S&TE; and
- iii. enhance healthier and physically strong citizenry through promotion of Science and Technology Education in recreational activities.

5.3.10 Collaborators and Partners in the S&TE sub-sector

The Collaborators and Partners in the S&TE sub-sector shall:

- i. support S&TE research through necessary funding in form of grants;
- ii. support human capital development for Science and Technology in institutions that are

engaged in S&TE through international exchange programmes and linkages for S&TE staff and students;

- iii. provide workplace experience for S&TE teachers and learners; and
- iv. offer technical assistance and expert advice on S&TE development.

CHAPTER SIX

FUNDING FOR SCIENCE AND TECHNOLOGY EDUCATION

6.1 Introduction

The assistance from private sectors, donor agencies, as well as development partners (Local & International) shall form part of the funding strategies for sustainability. These guidelines address the roles of various stakeholders in the mobilization of fund for sustainable implementation of the policy.

6.2 Objective

- To provide the necessary funds to ensure a successful implementation of Government policy towards S&TE.

6.3 Implementation Guidelines

- i. Federal, State, FCT and Local Governments shall give priority to S&TE through adequate budgetary provisions and timely release of funds for S&TE programmes, projects and initiatives.
- ii. STVET Fund shall be established for implementation of S&TE policies and programmes. To this end Government shall put mechanism in motion for legislative acts on allocating 0.5% of Consolidated Revenue Fund (CRF) into the STVET Fund.
- iii. Government at all levels shall set up a framework for the involvement of S&TE related industries in the funding and provision of necessary support, use of workplace, personnel exchange and ideas.
- iv. Government at all levels shall enlist the support of private partners, donor agencies, professional associations, alumni bodies and philanthropists, Nigerians in Diaspora, etc.
- v. Government at all levels shall ensure timely release of appropriate funding.
- vi. Government shall ensure standard for quality assurance criteria for all STVET institutions

and skills acquisition centers.

- vii. Government at all levels shall be responsible for developing the framework for PPP for STVET delivery for approval by the National Steering Committee.

CHAPTER SEVEN

SCIENCE AND TECHNOLOGY EDUCATION MANAGEMENT PLAN

7.1 Introduction

The successful delivery of Science and Technology Education (S&TE) is hinged on proper planning, effective administration, efficient Monitoring and Evaluation (M&E) and adequate financing as stipulated in the National Policy on Education (NPE).

7.2 Objective

- To establish and strengthen relevant institutions and structures needed to provide sound S&TE administration, good governance as well as quality leadership in all S&TE institutions.

7.3 Implementation Guidelines

7.3.1 National Steering Committee (NSC)

Government shall set up a National Steering Committee (NSC) to position S&TE as a national priority endeavour for fast tracking industrial and economic development of Nigeria to:

- oversee the implementation of the policy progress and projects in the S&TE subsector;
- approve the work plans for all the committees of S&TE;
- liaise with FEC & NEC on issues bordering on S&TE;
- enlist the support and also coordinate the activities of development partners on S&TE;
- render periodic report on the status of S&TE to Mr President and FEC;
- see to the organisation of launching of awareness campaign on achieving the objectives of S&TE policy; and
- see to the disbursement and judicious utilisation of STVET Fund based on approved work plan.

7.3.2 Implementation Task Team

Government shall establish an Implementation Task Team to:

- i. draw up national action plan for consideration of NSC;
- ii. receive the action plan from stakeholders for presentation to NSC;
- iii. carry out periodic M&E for S&TE activities;
- iv. regulate the activities of S&TE institutions, skills acquisition centres and co-ordinate the activities of VEIs and IEIs; and
- v. re-invigorate STVET at craft and advance craft level, without prejudice to NBTE Act.

7.3.3 State STVET Committee

The State governments are also to replicate the establishment and constitution of their respective State STVET Committee.

CHAPTER EIGHT

SCIENCE & TECHNOLOGY EDUCATION INFRASTRUCTURE

8.1 Introduction

S&TE requires robust provision of critical infrastructure for effective implementation. Below are some of the areas that should be addressed by stakeholders.

8.2 Objective

- To provide and maintain adequate S&TE infrastructure at all levels.

8.3 Implementation Guidelines

- (I) Government, private sector, community and other stakeholders shall provide necessary infrastructure such as classrooms, laboratory, workshop, power, water, equipment, tools, ICT centers, e-library facilities, multi-media, entrepreneurship and skill acquisition centers and other requisite facilities and security for the delivery of S&TE.
- (ii) Rehabilitation, upgrading, expansion and reconstruction shall be an integral aspect of the maintenance culture of all S&TE institutions.
- (iii) Private sector participation shall be encouraged in form of Build, Operate and Transfer (B.O.T) and other models.
- (iv) S&TE institutions shall provide for regular capacity building of S&TE teachers, instructors, technicians etc. towards effective utilization, maintenance, security and management of infrastructure.

CHAPTER NINE

STANDARDIZATION AND QUALITY ASSURANCE IN S&TE

9.1 Introduction

The knowledge, skills, competence and attitude of products of S&TE in Nigeria should meet global standard, ensure employability and promote entrepreneurship and job creation for relevance. Hence there is the need for standardization and quality assurance mechanism in S&TE planning curriculum and implementation.

9.2 Objective

- To set, review and maintain quality assurance standards and mechanisms in S&TE.

9.3 Implementation Guidelines

- i. Federal government shall take leadership role in the standardisation and quality assurance activities in S&TE.
- ii. Government at all levels through their regulatory agencies shall partner with relevant professional bodies to set and enforce desired global competitive standard for TVET delivery in Nigeria.
- iii. All S&TE institutions shall set up internal quality assurance mechanism for monitoring and evaluation for improving their performance and evaluation for improving their products.
- iv. Relevant government agencies shall continue to regulate the issuance of certificate for S&TE delivery at all levels in line with NPE and approved bench marks.

