



	FMST THEMATIC RESEARCH AREAS AND SUITES OF RESEARCH ISSUES	KEY FMST CENTER (in bold) WITH PROSPECTIVE COLLABORATORS	IMPLEMENTATION SCHEDULE																
			SHORT TERM				MEDIUM TERM					LONG TERM							
			17	18	19	20	21	22	23	24	25	26	27	28	29	30			
3.8	Scaling and measurements of required parameters for airborne contaminant dispersion in Nigeria	<b>NASENI, SHESTCO, NCEE, NMC, HIIICC, NARSDA</b>		X	X	X	X	X	X										
3.9	Development of Nigeria-relevant human exposure models for contaminants	<b>NASENI, NMC, IERD, ICEED</b>			X	X													
3.10	Assessment of potential applications of local materials to cleanup and remediation of oil contaminated sites in Nigeria	<b>SHESTCO, NASENI, RMRDC, NABDA, NCEE</b>		X	X	X													
3.11	Experimental and modeling studies of the leachability of toxics from Nigerian plastic and treated wood objects.	<b>NASENI, SHESTCO, NBRRI, NARICT, ICEER, NCEE</b>		X	X	X													
3.12	Experiments on the use of locally manufactured nanomaterials in portable and fixed water purification systems	<b>NASENI, RMRDC, SHESTCO, FIIRO, NARICT</b>		X	X	X													
3.13	Characterization of naturally occurring materials (NORM) in Nigeria's crude oil	<b>ECN, RMRDC, SHESTCO, NASENI, CPG, HIIICC, NCEE</b>					X	X	X										
3.14	Characterization of Nigerian terranes as prospective sites for low-level radioactive waste disposal	<b>NASENI, SHESTCO, NATSFA, HIIICC</b>			X	X	X	X	X	X	X								
3.15	Analyses and monitoring of the patterns and impacts of deforestation on biodiversity of Nigeria	<b>NASRDA, NASENI, CWWS, IOC, NCRS, NIFFR</b>					X	X	X										
3.16	Scaling of human exposure to automobile pollutant emissions during traffic jams in major Nigerian cities	<b>NASENI, NARICT, NNMDA, HIIICC, NCRS</b>			X	X													
<b>4.0</b>	<b>FACILITIES AND NETWORKED SYSTEMS</b>																		
4.1	Development of clean technologies for industrial applications	<b>NASENI, PRODA, FIIRO RMRDC, NILEST NACETEM</b>			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

	FMST THEMATIC RESEARCH AREAS AND SUITES OF RESEARCH ISSUES	KEY FMST CENTER (in bold) WITH PROSPECTIVE COLLABORATORS	IMPLEMENTATION SCHEDULE												
			SHORT TERM				MEDIUM TERM					LONG TERM			
			17	18	19	20	21	22	23	24	25	26	27	28	29
4.2	Development of integrated mechatronics, navigation, communication and human support modules to support manned space flights from Nigerian base stations	<b>NASRDA, NASENI, SHESTCO, PRODA, CSS, CSTP, EMDI, NEDDEC, CBSTE, ITU</b>			X	X	X	X	X	X	X	X	X	X	X
4.3	Installation and pilot-testing of an Advanced Manufacturing Technology Laboratory	<b>PRODA, NASENI, FIIRO, RMRDC, ARCEDEM, CAT, EMDI, NMDC, NEDDEC</b>		X	X	X	X	X							
4.4	Design, fabrications and instrumentation of electric power transformers, SHP turbines, vehicle engines and other machines to power devices in Nigeria	<b>PRODA, NASENI, FIIRO, RMRDC, NACETEM, NEDDEC, ARCEDEM, CAT, EMDI, NMDC,</b>			X	X	X	X							
4.5	Design and production of instrumented prosthetics and propelled vehicles for the physically disabled	<b>PRODA, NASENI, FIIRO, RMRDC, NILEST NEDDEC, CAT, ARCEDEM, EMDI</b>			X	X	X	X			X	X	X		
4.6	Design and field testing of a variety of telephones and associated devices	<b>PRODA, NASENI, SHESTCO, NEDDEC</b>			X	X	X	X							
4.7	Fabrication and flight-testing of Nigerian drones for civil, industrial and military applications	<b>NASRDA, NASENI, PRODA, CBSTE, CAT, CSTP, CSTD, EMDI</b>			X	X	X	X	X	X	X	X	X	X	X
4.8	Application of mechanical techniques to fabrication of machines parts for <b>adaptation by Nigeria's emerging manufacturing industries</b>	<b>PRODA, NABSENI, SEDIE, SEDIM, NISLT, NEDDEC, CAT, ARCEDEM, NCAM</b>			X	X	X	X	X	X	X	X	X	X	X
4.9	Design and fabrication of processing machines and machine parts for process mechanization	<b>PRODA, NASENI, CAT, ARCEDEM, HEDEC</b>	X	X	X	X	X	X	X	X	X	X	X	X	X
4.10	Development and installation of probes for measurement of earth tremors, landslides and other geohazards in Nigeria	<b>NASENI, CGG, CDRMDS, NGS, NIMG</b>					X	X	X						

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			SHORT TERM				MEDIUM TERM					LONG TERM			
			17	18	19	20	21	22	23	24	25	26	27	28	29
4.11	Field applications of large-volume recycled wastes in demonstrative construction projects	<b>PRODA, NASENI, NICT</b>			X	X	X	X	X	X					
4.12	Development of field-scale and effective techniques for erosion control and sand dune stabilization in Nigeria	<b>NASENI, GERC, NICT, GERG</b>		X	X	X									
<b>5.0</b>	<b>RENEWABLE ENERGY SYSTEMS AND PHOTONICS</b>														
5.1	Adaptation of platform energy technologies to rural development	<b>ECN, NASENI, ENCCERD, REPTM, NACETEM, CBSTE, CAT, ICEED</b>			X	X	X	X	X	X					
5.2	Development of energy conversion equipment and local production of power equipment components	<b>ECN, NASENI, PRODA, ENCCERD, ARCEDEM, CAT, SEDIE, SEDIM, ICEED</b>			X	X	X	X	X	X					
5.3	Modeling of electricity demand with applications to Nigeria	<b>ECN, NASENI, CERDZ, CERDI, CERS, NEDDEC, NCEEC</b>		X	X										
5.4	Formulation of electricity pricing model for Nigeria	<b>ECN, CERDI, CERDZ, CERS, NCEE</b>		X	X										
5.5	Design of scaled-up solar power installations for electrification of small to medium-sized communities in Nigeria	<b>ECN, NASENI, PRODA, NCERD, SERC, HIIICC, NPTI</b>		X	X										
5.6	Characterization of wind velocities across Nigeria	<b>ECN, NASENI, SERC, ICEED, NPTI</b>			X	X	X	X							
5.7	Computational assessment of electric power generation from nuclear reactions	<b>NASENI, ECN, CERT, NPTI</b>		X											
5.8	Development of safety protocols for nuclear power plants (customization to Nigeria)	<b>NASENI, ECN, CERT</b>		X	X	X									
5.9	Production of solar cells, LED and Nano filters using advances in nanotechnology	<b>ECN, PRODA, NASENI, NCERD, SERC, HIIICC, CERT, NPTI</b>	X	X	X	X									

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			SHORT TERM				MEDIUM TERM					LONG TERM						
			17	18	19	20	21	22	23	24	25	26	27	28	29	30		
5.10	Implementation of domestic projects on biomass-generated electricity in the 6 geopolitical zones of Nigeria	<b>ECN, NASENI</b> , HIIIECC, IAR, SERC, CERT, NCER, ICEED			X	X												
5.11	Production of biodiesel from non-edible plants with upgrade to medium scale	<b>ECN, NABDA, NASENI, FIIRO</b> , HIIIECC, CERDI, NCEE		X	X	X												
5.12	Performance of laboratory and field-based studies on utilization of methane from wastes as a green energy sources.	<b>ECN, NABDA, NASENI, FIIRO</b> , HIIIECC, CERDI, LCRI		X	X	X												
5.13	Design and field application of tidal energy extraction systems for electricity supply to Nigerian coastal communities	<b>ECN, NASENI, PRODA</b> , HIIIECC					X	X	X									
5.14	Adaptation of clean coal technologies to Nigerian coal for energy generation	<b>ECN, NASENI, FIIRO</b> , CERDI		X	X	X												
<b>6.0</b>	<b>MATERIAL SCIENCE INCLUDING NANOTECHNOLOGY</b>																	
6.1	Development of beneficiation techniques for solid minerals from geomaterials	<b>RMRDC, SHESTCO, LCRI, IMRAT, NIMG</b>				X	X	X	X									
6.2	Development of high-performance plastics from local materials for industrial applications	<b>RMRDC, NARICT, AMRG, IMRAT</b>			X	X	X	X	X	X								
6.3	Development of innovative molding /casting techniques for metallic products	<b>PRODA, RMRDC, NASENI, RRIN, AMRG, CAT, ARCEDEM, EMDI</b>			X	X	X	X										
6.4	Optimization of processes for ink production from local materials	<b>NARICT, RMRDC</b>			X	X												
6.5	Development of composite laterite and binder systems for earthen building construction	<b>NBRRI, NGSA, NIMG</b>			X	X	X	X										
6.6	Comprehensive analyses of the mineralogical, microtextural and durability characteristics of local	<b>NBRRI, NGSA, NIMG</b>				X	X	X	X									

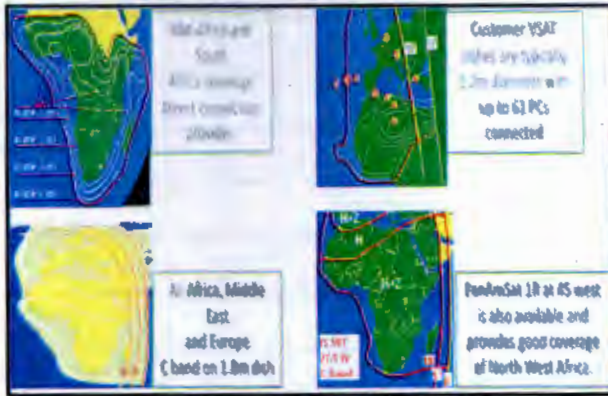
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			SHORT TERM				MEDIUM TERM					LONG TERM			
			17	18	19	20	21	22	23	24	25	26	27	28	29
	materials for use in soil stabilization and building construction														
6.7	Development of water-repellent earthen road and open ground construction materials (including spray-on)	<b>NBRRI, NARICT, RMRDC</b>			X	X	X	X	X						
6.8	Development of polymers from Nigerian-tuber processing wastes (yams, cassava etc.)	<b>NARICT, SHESTCO</b>	X	X	X	X	X	X							
6.9	Development and improvement of ceramics (construction quality) from locally available materials with focus on mineralogy, microstructure and durability	<b>RMRDC, SHESTCO, FIRO, AMRG, GERC</b>		X	X	X									
6.10	Synthesis of fertilizer and mulches from local materials	<b>SHESTCO, NARICT, IAR</b>		X	X	X									
6.11	Development of economically viable processing technologies for production of dyes and pigments from local materials	<b>NARICT, SHESTCO</b>		X	X	X									
6.12	Development of desulfurization methods for Nigerian crude oil	<b>NARICT, CPG</b>					X	X	X						
6.13	Development of plastic lumber for mass housing construction projects and electrification	<b>NBRRI, RMRDC, NICT</b>			X	X									
6.14	Synthesis of membranes and geotextiles using local raw materials for applications in water purification and construction	<b>RMRDC, NARICT, SHESTCO, NICT</b>			X	X	X								
6.15	Development of ductile pipeline materials using Nigeria-manufactured	<b>RMRDC, PRODA, NICT</b>					X	X	X						

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			17	18	19	20	21	22	23	24	25	26	27	28	29	30			
	and reinforced plastics for community water distribution																		
<b>7.0</b>	<b>MATHEMATICS, COMPUTATIONAL AND COMMUNICATION SYSTEMS</b>																		
7.1	Quantitative framing of mathematical applications in various sectors of the Nigerian economy (time-series analyses, simulations, spatio-temporal analyses, data-mining, Monte Carlo methods, etc.)	<b>NASENI, SHESTCO, FIIRO, NMC, NBS</b>		X	X	X													
7.2	Development of sectoral and interlinked databanks for Nigeria-relevant socio-economic parameters with online accessibility	<b>NASENI, SHESTCO, FIIRO, NITDA</b>		X	X	X													
7.3	Collaborative (with industry) development of high-utility software to support local projects in various economic sectors	<b>NASENI, SHESTCO, FIIRO, NITDA</b>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7.4	Creation/expansion of the Nigerian e-Government strategies (NeGst)	<b>NASENI, NITDA</b>		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7.5	Simulation of anthill sustainability and security operations for civil and industrial operations	<b>NASENI, NACETEM, NMC</b>		X	X	X													
7.6	Design of data storage, handling and retrieval systems for a Nigerian National Databank Repository	<b>NASENI, SHESTCO, NITDA</b>		X	X	X													
7.7	Configuration of rapid transit models for the 40 most populous Nigerian cities	<b>NASENI, SHESTCO, NBRRI, NMC</b>			X	X	X												
7.8	Simulation of blood flow to support drug delivery to body organs with clinical trials and applications	<b>NASENI, SHESTCO, NNMDA, NMC, NIPRD</b>		X	X	X													
<b>8.0</b>	<b>SPACE AND GEOSPATIAL SYSTEMS</b>																		





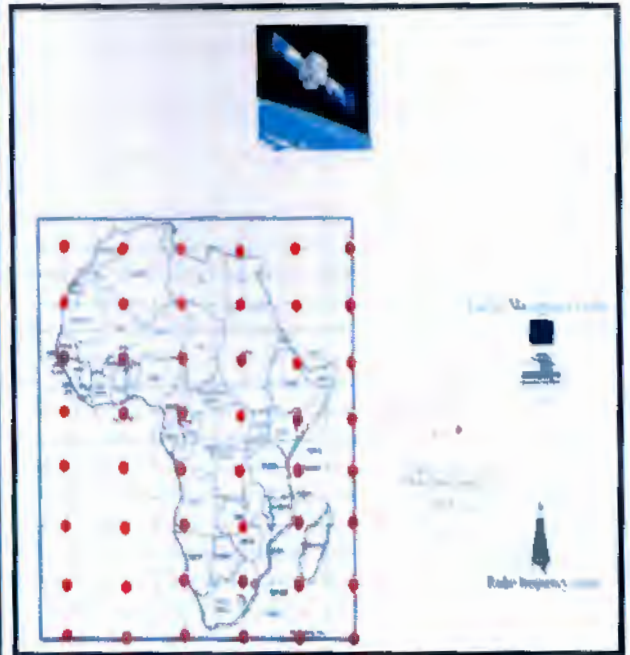
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			17	18	19	20	21	22	23	24	25	26	27	28	29
9.3	Development of robots for hazardous and repetitive tasks in Nigeria	<b>NASENI, NASRDA, PRODA, NSRMEA</b>					X	X	X	X	X	X	X	X	X
9.4	Development of portable, intelligent and scenario-reporting robots for military and disaster management applications	<b>NASENI, NASRDA, PRODA</b>						X	X	X	X				
<b>10.0</b>	<b>SCIENCE COMMUNICATION AND TECHNOLOGY DIFFUSION</b>														
10.1	Investigation of scientific principles that underlie traditional practices of various Nigerian ethnic groups	<b>NOTAP, SHESTCO, NISER</b>		X	X										
10.2	Framing of the impacts of culture on innovation in Nigeria	<b>NOTAP, SHESTCO, SSAN, IAMS</b>		X	X	X									
10.3	Configuration of systems for use of science and technology to advance <b>Nigeria's national interests in trade and diplomacy</b>	<b>NOTAP, SHESTCO,</b>		X	X	X									
10.4	Analyses of archeological artefacts for <b>indexing of Nigeria's technological heritage</b>	<b>NOTAP, SHESTCO, NBRRI, IAMS</b>		X	X	X									
10.5	Configuration of effective methods of communication of scientific advances and opportunities to different socio-economic classes of Nigerians	<b>NOTAP, SHESTCO, NIJ, SSAN,</b>		X	X										
10.6	Analyses of behavioural and design impacts on accident rates on Nigerian roads	<b>NOTAP, SHESTCO, SSAN</b>		X											
10.7	Identification and analyses of science and technology communication outlets and incentives for their expansion in Nigeria	<b>NOTAP, SHESTCO, NIJ, SSAN</b>		X	X										



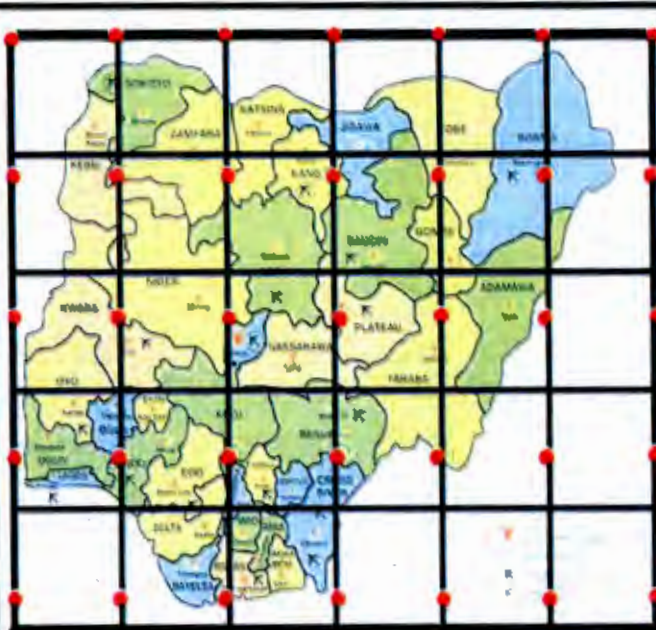
**Bentley Telecom Eutelsat W3A**

Eutelsat W3A (7 deg east) broadband internet via satellite coverage using the new Hughes HX and LinkStar DVB-S2 and iDirect technologies. The Hughes HX, introduced in March 2008, represents a significant step forwards. Various grades of service plus special quality of service controls and advanced proprietary TCP/IP compression to give faster downloads compared with unprocessed feeds, plus customer access to traffic monitoring system. Click here to email: [sales@bentleywalker.com](mailto:sales@bentleywalker.com) or phone now 00 44 239 246 3943 (ref:satsig) Also iDirect STAR COM service in North East Africa

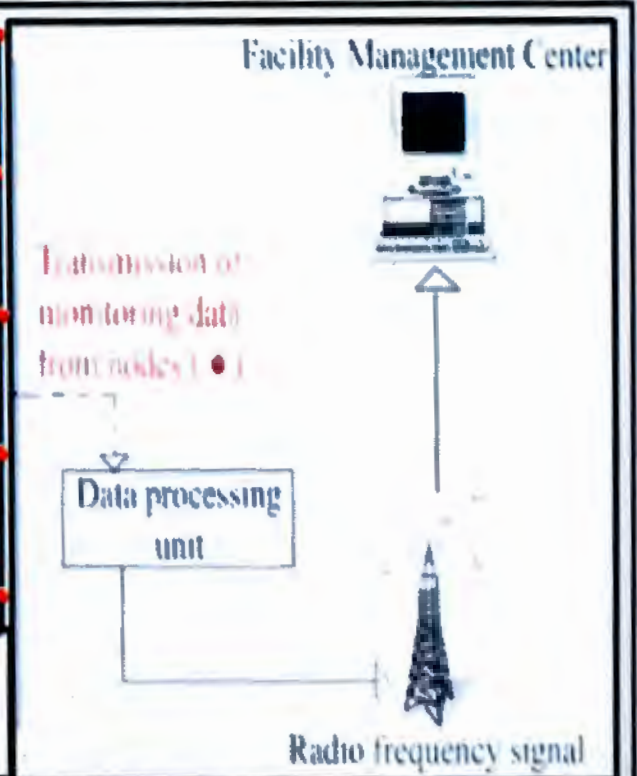
**FIGURE 68:** EXAMPLES OF DATA/INFORMATION COMMUNICATION SATELLITES WITH SIGNIFICANT FOCUS ON AFRICA: (Each Country Needs An On ground Analytical Station To Support Program Implementation At National State And LGA Levels)



**FIGURE 69:** EXISTING DATA THAT ARE GIVEN VARIOUS SPATIO-TEMPORAL COORDINATES NEED TO BE INTERLINKED WITH MORE RECENT DATA THAT CAN BE GENERATED BY SATELLITES AND TRANSFERRED BY BOTH SATELLITE AND CABLE COMMUNICATION SYSTEMS (98)



**Gridded Nigeria for Ground- based Environmental Monitoring Systems**



**FIGURE 70:** NIGERIA NEEDS ENVIRONMENTAL MONITORING SYSTEMS WITH SPATIO-TEMPORAL COORDINATES THAT SUPPLIES DATA FOR A BIENNIAL STATE OF THE ENVIRONMENT REPORT THAT CAN BE USED FOR STRATEGIC PLANNING AND ECONOMIC DEVELOPMENT INITIATIVES (57)



Source: Robohub

**FIGURE 71 :** ROBOTICS IN INDUSTRIAL ASSEMBLY OPERATIONS FOR MAINTENANCE OF HIGH STANDARDS



Source: Business Insider

**FIGURE 72:** ROBOTICS IN HOUSE OPERATIONS TO SUPPORT THE DISABLED



Source: Wonderwhizkids

**FIGURE 73:** ROBOTICS IN HIGH-PRECISION SURGERY AT MEDICAL FACILITIES



Source: GCN.com

**FIGURE 74:** ARTIFICIAL INTELLIGENCE TO SUPPORT COMPLEX ANALYTICAL ASSIGNMENT



Source: Georgia Tech's Research Horizons

**FIGURE 75:** ARTIFICIAL INTELLIGENCE AND ROBOTICS TO SUPPORT NATIONAL SECURITY AND MILITARY OPERATIONS

projects included in NSTIR 2030 (Table 10) is the establishment of a Science and Technology Museum to promote information diffusion.

Translation of discoveries and inventions from laboratory to application has been a major challenge in Nigeria since its independence. In the NSTIR 2030 configuration, this has received attention as regards project plans. Methods of maximizing it will also be developed through research to satisfy the following objectives.

- i. Build the critical mass of highly skilled manpower to transfer technology.
- ii. Establish Technology Transfer Offices in Tertiary Institutions.
- iii. Increasing investment in technology incubation centres and establish functional S&T parks.
- iv. Encouraging private sector participation in the establishment and management of Technology Incubation Centres and Science Parks.
- v. Supporting universities and research institutes to establish Technology Incubation Centres and Science Parks for the commercialization of R&D results.
- vi. Developing comprehensive and accessible data bank of all R&D results, inventions and innovations that can be commercialized for ease of reference.
- vii. Conducting periodic monitoring and evaluation and establish a feedback mechanism for technology transfer and diffusion process.
- viii. Conducting Technology Needs Assessment (TNA) to determine technology gaps for appropriate actions.
- ix. Improving on the incorporation of high-level imported technologies for local technology development.
- x. Providing technology support services and other incentives to transferees.
- xi. Extension and enforcement of local content law for technology transfer.
- xii. Using procurement as a deliberate strategy for national development to be utilized accordingly for technology transfer.

### 3.4. Training and Talent Deployment

In May, 2014, the European Union funded a **"Needs Assessment of the Nigerian Education Sector"** (142). Among the objectives of that study were identification of skills and competency gaps in the education sector of Nigeria; and determination of how the identified gaps could be addressed. While Nigeria is deficient in critical vocational skills, only 31% of the 1,670,833 students who applied to enter tertiary institutions on 2013 were admitted (142). The implication is that those who were not admitted are available for alternative training but such a diversion system is inadequate in Nigeria. Of the students who are admitted into tertiary institutions in Nigeria, most graduate with very limited communication and other marketable skills. Figure 84 shows the range of disciplines for effective operation on private sector tasks and public sector roles. Most tertiary institutions in Nigeria are ill-equipped to offer this depth of education required to perform the listed tasks and roles.

A good education is a requirement for harvesting of opportunities that emerge from a knowledge-based economy to which Nigeria aspires. Table 14 shows unemployment rates in Nigeria by educational level (157). An inspection of the table which applies to circumstances in 2009, indicates that when data on urban and rural areas are combined, unemployment among graduates of tertiary institutions averaged 21.3%, very similar to that of those who never attended any school (at 20.1%). This illustrates the irrelevance of their training with respect to the job market, non-utilization of their talents and ingenuity in self-initiated projects, and lack of employment opportunities. In the urban areas, education matters as evident in post-secondary unemployment rates. Table 15 shows that on a national basis, males still dominate STEM fields at male/female ratios ranging from 2/1 to 7/1 except in biology, and food science and technology. There is a need to provide more opportunities to women to fully utilize **Nigeria's potential** in STI and serve the knowledge-based economy.

Among many other research capacity-building workshops held in Nigeria, the Nigerian Educational Research and Development Council (NERDC) held a workshop from May 26 to 29, 2010. One of the



Source: www.tinkinhite.com

FIGURE 76: ILLUSTRATION OF VARIOUS MECHANISM OF SCIENCE COMMUNICATION TO STAKEHOLDERS



Source: The Horizon Tracker

FIGURE 77: ILLUSTRATION OF THE NEED TO ENLIGHTEN STAKEHOLDERS ABOUT SCIENCE AND TECHNOLOGY ISSUES USING EFFECTIVE METHODS



Source: TODAY.ng

FIGURE 78: NIGERIA'S MINISTER FOR SCIENCE AND TECHNOLOGY, DR. O. ONU BRIEFING LISTENERS ABOUT SCIENCE AND TECHNOLOGY ISSUES



Source: Google Science Fair 2011

FIGURE 79: SCIENCE AND TECH. FAIRS AS A MECHANISM OF PUBLIC ENLIGHTENMENT ABOUT SCIENCE AND TECHNOLOGY

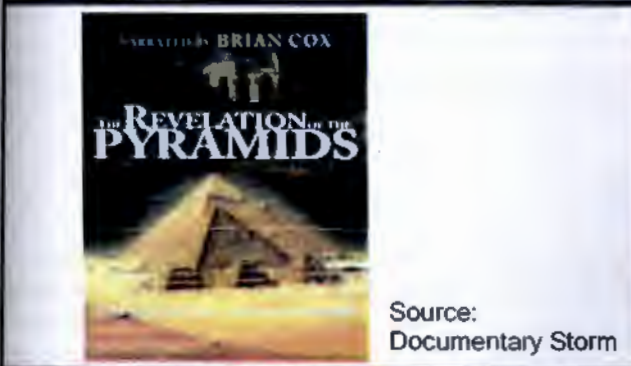


Source: Easy Tour China

FIGURE 80: SCIENCE AND TECHNOLOGY MUSEUM AS AN EFFECTIVE METHOD OF INCREASING SCIENCE LITERACY



FIGURE 81 : SCIENCE AND TECH MAGAZINES SHOULD HAVE SOME CONTENT OF INDIGENOUS SCIENCE AND TECHNOLOGY TO SPUR POPULAR INTEREST



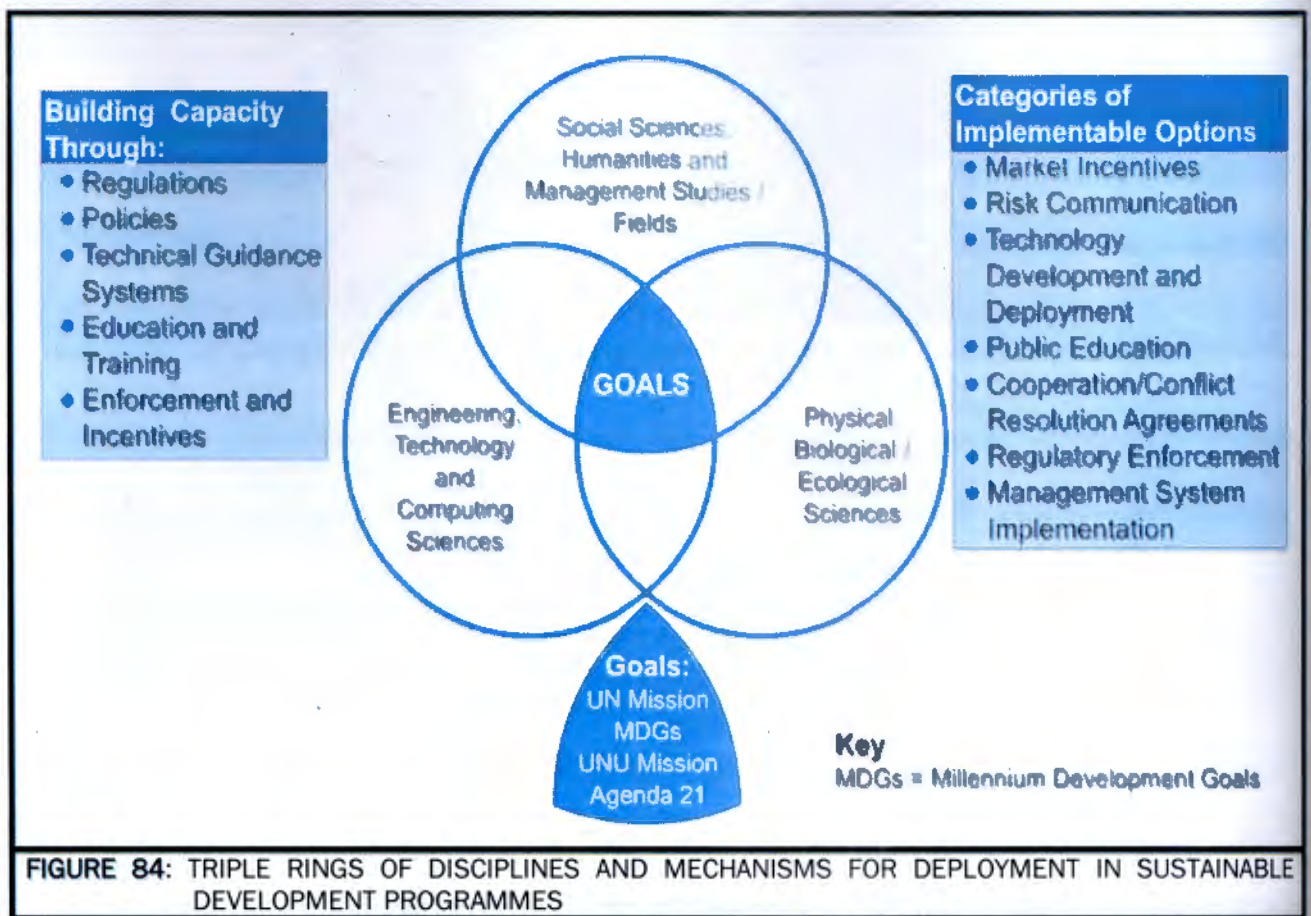
Source: Documentary Storm

FIGURE 82 : LOCALLY RELEVANT SCIENCE DOCUMENTARIES AS A SCIENCE LITERACY PROMOTION METHOD



Source: NaijaHeadlines

FIGURE 83 : DIRECT TEACHING AS A METHOD OF PROMOTION OF SCIENCE LITERACY



observations at the Workshop was that ***"no nation can forge ahead in our globalized world without having the right persons with the knowledge and skills that are necessary in our world of information technology"***. One of the recommendations was that ***"teaching of information literacy (SIC ICT) in our institutions should be emphasized as to encourage life-long learning, and understand the nature of information and its use"***. Lifelong learning implies that education should begin from childhood and run through retirement using classroom-based instruction, laboratory work, field experience, and group discussion, all of which are illustrated by Figures 85-89.

The Hays Global Skills Index (74) covers many significant educational parameters relative to capacity to satisfy the labor market. The parameters covered are: educational flexibility, labor market participation, labor market flexibility, talent mismatch, overall wage pressure, wage pressure in high-skill industries, and wage pressure in high-skills occupations. These factors also apply to the Nigerian skills development environment. In his keynote lecture at the 55th annual conference of the Science Teachers Association of Nigeria (STAN) in Asaba, Delta State of Nigeria on August 18, 2014, Prof. Hilary I. Inyang (201) recommended that in formal courses, STEM students in secondary and tertiary institutions should be made to know that the purpose of their technical education is not to receive a certificate but to contribute to efforts aimed at creating options for sustainable development of society, producing data for decision support systems, developing human resources and capacity, and creation of philosophies and products. The educational experience should foster original thinking and inventiveness in students and professionals at all levels.

Bolu and Egbo (168) performed a study of the role of higher educational institutions in the development of ICT professionals for innovation in Nigeria. They discovered that Nigerian universities teach a very wide array of ICT courses as shown in table 17. Nigerian employers generate the demand structure shown in Table 18 for ICT skills. Proficiency in UNIX Operating Systems, Database Administration and VSAT/Wireless/Technologies the demand list. A cursory evaluation of facilities at most of the schools will indicate that they are grossly inadequate, which is one of the reasons for the deficiencies that most employers have detected in the skill sets of graduates from STEM programmes of

Nigerian universities, especially, on techniques that require experience with measurement techniques and other kinds of equipment/field operations.

**Nigeria's Industrial Revolution Roadmap** includes the setup of industrial clusters in various regions of Nigeria. Currently, most of the potential locations lack the STEM skill base required to support industries that rely on STI. Mobility of labour can be counted upon to remedy skills deficiencies but to a point. Stability and equity require that local content be ensured in the operation of the planned clusters. Table 16 shows the distribution of undergraduate enrollments in science-based faculties of Nigerian universities by region, from 1997 to 2006. Numbers have changed but it is doubtful that the pattern has changed since the study. From the results, it can be concluded that gender inequity is very severe in the Northwest in favour of male students but surprisingly reversed in the South West in some fields.

Considering vocational training, it is very essential to the economic development of Nigeria. Actually, the best skills set **structure for Nigeria's industrialization is one that simulates a triangle with a diverse set of skilled workers at the level of technicians at the base (not necessarily in pay); graduates of polytechnics and engineering schools in the middle; and highly specialized experts at the top.** The entire hierarchy should intermix and collaborate on programmes and projects in the laboratories, classrooms, **designs offices and demonstration sites to spur Nigeria's growth in STI for support of the country's bid for industrial revolution.**

Training of artisans, technicians and project managers is a part of this NSTIR 2030. This will be done massively, not just for employers but for self-generation of employers as well. Table 19 shows the list of vocations that will be covered along with the duration of training and apprenticeship. Training terms range from 6 to 9 months depending on the **trainee's entry qualifications, including experience.** Apprenticeship terms range from 3 to 6 months depending on the type of vocation. It is envisaged that with access to capital following training and apprenticeship, this project combined with initiatives implemented by other units of the Federal and State Governments, will reduce unemployment to single digits within the next 10 years. The various vocations covered by this planned project are illustrated in Figures 90-121. The skills development plans that are included as part of NSTIR 2030 is consistent with **the following objectives of Nigeria's STI Policy.**

- i. Producing world class scientists, engineers and technologists who are well grounded in theory, practice of basic sciences and the needs of entrepreneurship.
- ii. Providing adequate support for continuous training of academic staff in tertiary and research institutions.
- iii. Strengthening curricula in technological entrepreneurship and management of technology for science and engineering students.
- iv. Mainstreaming students in the Arts and Social Sciences to appreciate the relevance of STI to profitability in business as well as national development.
- v. Encouraging and providing opportunities for the products of informal training schemes in STI to go for further formal training.
- vi. Strengthening capacity building institutions within the military, public and private sectors of the economy.
- vii. Facilitating on-the-job standardized training for professionals in STI organizations.
- viii. Promoting academic-industry exchange programmes to enhance knowledge sharing.

### **3.5. Technology Deployment and Commercialization in Key Socio-Economic Sectors**

For at least, the past 45 years, Nigeria has operated a mono-economy that has focused on oil and gas. **Nigeria's current economic development posture** which is best expressed in both the 2017 Economic Recovery and Growth Plan, and the National Industrial Revolution Plan (2014) is focused on **diversification of the economy. The effort is on adding value to Nigeria's abundant raw materials through industrial scale processing before domestic use and export. Nigeria's large population is also an asset** because innovation that has value can take advantage of a large domestic market. This includes service sectors such as ICT. The types of innovation that Nigeria is targeting as catalogued in the various national integrated and sector plans, most of which are summarized in Table 5, Table 10 and Appendix 1, require

deployment of technologies. Very few examples of the opportunities available and the technologies required are summarized below.

- **Agriculture:** the Nigerian agricultural sector needs modernization and expansion. For almost any crop demand exceeds supply as shown in Table 20. It is the largest sector of the Nigerian economy with a 40% contribution to the country's economy. Farming is mostly at small scale in communities. Among the technologies that need to be deployed to boost agricultural productivity in Nigeria are:
  - i. Technologies for local production of fertilizer
  - ii. Technologies for improvement of seeds
  - iii. Technologies for crop preservation and processing for export
  - iv. Pest control and irrigation technologies
- **Manufacturing:** Nigeria's manufacturing sector typically contributes less than 10% of Nigeria's GDP which ranks below the average for Africa as shown in Figure 122. Still as evident in Figure 123 Nigeria has the largest factory sector in Africa when it is not measured on a per capita basis. Electricity supply and poor infrastructure are the two most critical constraints. In order to improve Nigeria's manufacturing sector, the following technologies need to be deployed.
  - i. Efficient and cost-effective machinery for mass production of goods
  - ii. Low-cost technologies for processing or harvesting of raw materials
  - iii. Sustainable/renewable power systems for factories and operations
  - iv. Technologies for exacting measurements to enable good quality assurance programmes
  - v. Manufacturing technologies that can easily be operated and maintained in the Nigerian environment. (see the manufacturing indices in Figure 124).
- **Mining:** Nigeria has about 44 solid minerals that occur in sufficient quantities to drive midstream and downstream operations in this sector. Among these minerals are iron ore, coal, manganese, tin, limestone, bentonite and several others. Table 21 is a summary of the objectives and the requirements of the mining sector in Nigeria while Figure 125 addresses the action items planned in the current mining roadmap of Nigeria (164). The potential of the mining industry to contribute to Nigeria's economy is illustrated in Figures 126 and 127. The critical technologies that need to be deployed to enhance mining in Nigeria are stated below:
  - i. Mechanical excavation technologies that are capable of beneficiation without excessive dusting
  - ii. Technology for improvement of the stability of underground mines
  - iii. Material haulage technology to relieve miners who currently haul materials by hand
  - iv. Technology for rescue of workers who could be trapped underground
  - v. Mineral processing technology that can increase recovery of precious metal
  - vi. Advanced technology for segregation of materials based on their physical characteristics
  - vii. Facilities for micro/micro-observation of the textures, internal mineralogy and flaws in materials
  - viii. Technology for steel making and forming in different shapes for export and Nigerian manufacturing process
  - ix. Technologies for aerial-based and ground-based resource mapping
- **Energy Systems (Electric Power):** In Nigeria's Vision 20:2020, the target for electric power generation was 35,000 MW by 2020. That prospect is currently bleak but much more effort still needs to be made to deploy technologies to diversify Nigeria's electricity generation, transmission and distribution, especially with opportunities offered by renewables. The two most economically feasible renewable energy systems for powering small-medium scale businesses and communities in Nigeria are solar energy systems (both photovoltaic and thermal systems) and wind energy systems. Solar radiation provides opportunity for tapping of that energy resource throughout Nigeria.



**TABLE 14: UNEMPLOYMENT RATES BY EDUCATIONAL GROUP, AGE GROUP AND SEX (MARCH 2009) (157)**

ITEMS	Urban	Rural	Composite
<b>All Groups</b>	<b>19.2</b>	<b>19.8</b>	<b>19.7</b>
<b>Educational Group</b>			
Never Attended	20.6	20	20.1
Below primary	18.4	22.9	22.3
Primary	15.1	14.7	14.8
Secondary	21.4	25.3	23.8
Post secondary	13.9	26.4	21.3
<b>Age Group</b>			
15-24	49.9	39.6	41.6
25-44	16.3	17.3	17
45-59	10	12.1	11.5
60-64	18.2	16.2	16.7
<b>Gender</b>			
Male	17.2	16.9	17
Female	21.7	23.9	23.3

**TABLE 15: UNDERGRADUATE ENROLLMENT (%) BY SEX AND REGION IN INDIVIDUAL S&T COURSES (1997-2006) (158)**

Science	SE		NE		SS		SW		NW		MC		Total	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Mathematics	84	38	93	7	93	7	38	62	88	12	NA	NA	75	28
Chemistry	55	45	59	41	59	41	15	85	60	20	84	18	59	41
Physics	78	24	95	5	95	5	56	41	60	20	87	13	82	18
Biochemistry	59	41	NA	NA	72	28	NA	NA	NA	NA	57	43	63	37
Botany	48	52	NA	NA	71	29	NA	NA	NA	NA	NA	NA	59	41
Biology	NA	NA	55	45	27	73	22	78	78	22	65	38	50	51
Microbiology	49	51	NA	NA	74	26	NA	NA	73	27	51	49	62	38
Zoology	88	32	NA	NA	89	41	NA	NA	NA	NA	NA	NA	84	37
Geology	80	20	NA	NA	81	19	NA	NA	NA	NA	80	20	81	20
Statistics	58	42	63	37	NA	NA	NA	NA	85	15	NA	NA	66	31
<b>Technology</b>														
Computer Science	80	40	77	23	50	50	42	58	83	17	67	33	63	37
Electrical/Electronics Engineering	87	13	87	13	81	19	81	19	89	1	82	8	80	11
Agricultural Engineering	83	17	87	13	67	33	NA	NA	84	16	86	11	82	18
Civil Engineering	84	8	84	8	88	13	NA	NA	20	80	84	8	78	22
Mechanical Engineering	97	3	98	2	84	16	84	16	89	1	87	3	93	7
Food Science and Technology	26	74	61	39	42	58	NA	NA	NA	NA	65	37	48	52

NA = Not Available

Source: (Reference no. 158), Trends in Enrollment, Graduation and Staffing of Science and Technology Education in Nigeria Tertiary Institutions (2013)



Source: The Bells Group Of Schools

**FIGURE 85: STUDENTS OF THE BELLS SECONDARY SCHOOL STUDYING CHEMISTRY IN THEIR LABORATORY**



Source: cassavamatters

**FIGURE 86: AGRICULTURAL FIELD PROJECTS TO MARRY THEORY WITH PRACTICE**



Source: Kings and Queens Schools

**FIGURE 87: NIGERIAN SECONDARY SCHOOL STUDENTS STUDYING SCIENCE**



Source: Effective Literacy Programmes

**FIGURE 88: FORMAL ADULT EDUCATION PROGRAMMES IN SCIENCE AND TECHNOLOGY IN RURAL COMMUNITIES**



Source: The Guardian Nigeria

**FIGURE 89: NURSERY SCHOOL STUDENTS LEARNING ICT EARLY IN THEIR EDUCATIONAL EXPERIENCE**

**TABLE 17: ICT COURSE TITLES IN NIGERIAN UNIVERSITIES (168)**

Computer Engineering	Computer Science	Information Systems	Information Technology	Software Engineering	Mechatronics Engineering
Communication Technology	Education, Mats. Stats. & Computer Science	Office & Management Information	Information & Communication Technology	Software Engineering	Mechatronics
Computer Engineering	Education & Computer Science	Management Information System	Information Technology	Management software Development	Mechatronics Engineering
Computer Science & Engineering	Computer Science	Computer Education	Computer Science & Information Technology		
Electronics & Computer Engineering	Computer Science with Economics	Science & Computer Education	Information Technology		
Electrical Computer Engineering	Computer Science & Mathematics	Library & Information Science	Telecommunication Management		
Computer/Electronics	Statistics with Computer Science	Computer & Information System	Information Science Technology		
Electrical/Electronics		Information System & Economics			
Electronics		Computer & Information Science			
Computer Electronics		Information Science Management			
Computer Science with Electronics		Information System			
		Computer with Statistics			
		Bioinformatics			
		Information Resource Management			
		Communications			
		Business Computing			

Source: Analysis from Joint Admissions and Matriculation Board Publications, 2007-2010, Council for the Regulation of Engineering in Nigeria (COREN), 2013

**TABLE 18: SPECIFIC SKILLS REQUIRED BY NIGERIAN EMPLOYERS (168)**

Job Specific Skills	Importance
UNIX Operating System	28.10%
Database Administration	15.70%
VSAT/Wireless Technologies	13.22%
Windows Operating Systems	8.68%
Enterprise Resource Planning	7.44%
Computer Aided Design	7.44%
Internet Technologies	6.20%
Java Programming	5.37%
Others: NET Programming, Desktop applications, etc	7.85%
<b>TOTAL</b>	<b>100.00%</b>

**TABLE 16: UNDERGRADUATE ENROLLMENT BY SEX AND REGION IN SCIENCE BASED FACULTIES (158)**

<b>Undergraduate Enrollment (%) in Science based faculties by Region</b>												
<b>Year</b>	<b>NE</b>		<b>SW</b>		<b>NW</b>		<b>SE</b>		<b>NC</b>		<b>Total</b>	
	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>
1997	24	78	67	33	15	85	-	-	22	78	32	68
1998	24	78	60	40	22	78	38	62	27	73	34	66
1999	27	73	75	25	23	77	36	64	21	79	38	64
2000	33	67	20	80	29	71	40	60	31	69	31	69
2001	33	67	77	23	30	70	36	64	24	76	46	54
2002	69	31	71	29	21	79	38	62	34	66	47	53
2003	33	67	76	24	21	79	40	60	24	76	39	61
2004	26	74	77	23	29	71	40	60	-	-	43	57
2005	12	88	62	38	40	60	41	59	27	73	36	64
2006	34	66	67	33	31	69	-	-	27	73	40	60

NE - North East; NW - North West; NC - North Central; SW - South West; SE - South East.

<b>Undergraduate Enrollment (%) in engineering based faculties by Zone/Region</b>												
<b>Year</b>	<b>NE</b>		<b>SW</b>		<b>NW</b>		<b>SE</b>		<b>NC</b>		<b>Total</b>	
	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>	<b>F</b>	<b>M</b>
1997	27	73	23	77	0	100	23	77	12	88	17	83
1998	33	67	23	77	2	98	18	81	15	85	18	82
1999	49	51	26	74	1	99	18	82	14	86	22	78
2000	43	57	15	85	1	99	18	82	11	89	16	82
2001	34	66	34	66	1	99	18	81	12	88	20	80
2002	40	60	50	50	2	98	18	82	17	83	25	75
2003	27	73	42	58	4	96	22	78	16	84	22	78
2004	21	79	48	52	2	98	23	77	-	-	24	77
2005	25	75	53	47	4	96	-	-	80	20	41	60
2006	23	77	55	45	5	95	-	-	17	83	25	75

Source: (Reference no. 158), Trends in Enrollment, Graduation and Staffing of Science and Technology Education in Nigeria Tertiary Institutions (2013)

**TABLE 19: ARRAY OF ARTISAN TRADES FOR QUICK TRAINING OF NIGERIAN JOB SEEKERS FOR GAINFUL EMPLOYMENT**

S/N	TECHNICIAN/ARTISAN TRADES FOR TRAINING	DURATION OF TRAINING AND APPRENTICESHIP				
		TRAINING DURATION			APPRENTICESHIP DURATION	
		LEVEL 1	LEVEL 2	LEVEL 3	SHORT	MEDIUM
		12 MONTHS	9 MONTHS	6 MONTHS	3 MONTHS	6 MONTHS
1.	Palm mill operations		•	•	•	
2.	Waste management operations		•	•	•	
3.	Weaving	•	•	•	•	
4.	Landscaping	•	•		•	•
5.	Interior Design	•	•		•	•
6.	Shoemaking/repair	•	•	•	•	•
7.	Printing technology	•	•			•
8.	Paper mill operations		•			•
9.	Water treatment technology	•	•			•
10.	Water drilling operations	•	•			•
11.	Plumbing technology	•				•
12.	Air conditioning assembly and repair	•	•			•
13.	Refrigerator assembly and repair	•	•		•	•
14.	Plastic molding		•	•	•	
15.	Truck driving and construction equipment operation		•	•	•	
16.	Television and telecom. equipment assembly and repair	•	•			•
17.	Instrumented carpentry		•	•	•	
18.	Metal works and welding	•	•			•
19.	Computer hardware assembly and repair	•	•		•	
20.	Secretarial service			•	•	
21.	Airport logistics			•	•	
22.	Road construction and repair		•			•
23.	Urban drainage technology	•	•			•
24.	Hospitality/tourism			•	•	
25.	Emergency management and road safety		•	•	•	
26.	Security/surveillance techniques for public safety		•	•	•	
27.	Food processing and storage			•	•	
28.	Farming techniques			•	•	
29.	Oil spill clean-up operations			•	•	
30.	Large-scale tailoring			•	•	
31.	Community health inspection			•	•	
32.	Photography/filming operations			•	•	•
33.	Tank/pipeline/cable installation		•	•	•	•
34.	Building/bricklaying operations			•	•	
35.	Fish farming			•	•	
36.	Mining and quarry operations			•	•	
37.	Cassava processing			•	•	
38.	Oil-palm cultivation and processing			•	•	
39.	Pottery			•	•	
40.	Health and safety rescue		•	•	•	
41.	Computer draughtsman	•	•	•	•	
42.	Computer systems operator			•	•	



Source: Nairland



Source: IndiamART



Source: Mudriame



Source: Wolf safety services limited

FIGURE 96: CRANE DRIVER OPERATIONS



Source: www.ncat.gov.ng



Source: Marine Insight



Source: Alamy



Source: ABB

FIGURE 97 : EXCAVATOR/DRAGLINE DRIVING OPERATIONS



Source: Marine Insight



Source: Alamy



Source: ABB

FIGURE 95: HEALTH AND SAFETY/RESCUE TECHNICIAN OPERATIONS



Source: Nairland



Source: IndiamART



Source: Mudriame



Source: Wolf safety services limited

FIGURE 94: ENVIRONMENTAL LABORATORY TECHNICIAN OPERATION



Source: www.ncat.gov.ng



Source: Marine Insight



Source: Alamy



Source: ABB

FIGURE 93: BOAT REPAIR DOCK TECHNICIAN OPERATIONS



Source: Gaode Equipment Co., Ltd

**FIGURE 98: WATER WELL AND CONSTRUCTION DRILLING OPERATIONS**



Source: SweetCrudeReports

**FIGURE 99 : OIL WELL DRILLING OPERATIONS**



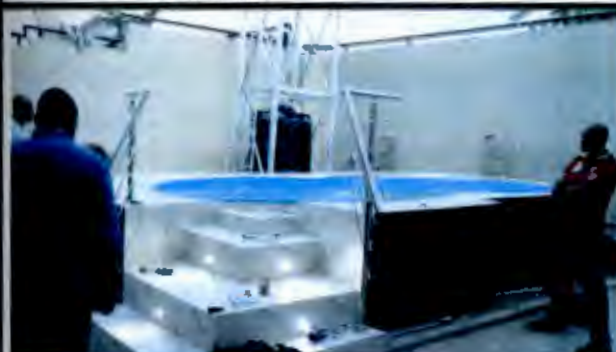
Source: Pulse.ng

**FIGURE 100: MASONRY / BUILDING CONSTRUCTION OPERATIONS**



Source: Professional Services; Oluwanisola Plumbing Works

**FIGURE 101: PLUMBING/PIPELAYING OPERATIONS**



Source: Nairaland

**FIGURE 102: FIBRE GLASS AND INJECTION MOLDING OPERATIONS**



Source: Classifieds in Ojo - Jiji

**FIGURE 103: MACHINING AND METAL WORKING OPERATIONS**



Source: Medical World Nigeria

**FIGURE 104: MEDICAL LABORATORY TECHNICIAN OPERATIONS**



Source: Trelleborg

**FIGURE 105: CHEMICAL PROCESSING/INDUSTRIAL TECHNICIAN OPERATIONS**



Source: Nairaland

**FIGURE 106: ROAD/RAILWAY CONSTRUCTION TECHNICIAN OPERATIONS**



Source: Hope for Nigeria

**FIGURE 107 : MINING TECHNICIAN OPERATIONS**



Source: <https://www.barry.edu/online/online-programs/bs-in-emergency-management.html>

**FIGURE 108: EMERGENCY MANAGEMENT**



Source: Botou Golden Integrity Roll Forming Machine Co., Ltd. - Alibaba

**FIGURE 109: GLAZER/POTTERY TECHNICIAN OPERATIONS**



Source: The News Chronicle

**FIGURE 110: PAPER MILL TECHNICIAN OPERATIONS**



Source: <http://oils.gpa.unep.org/facts/economy-health.htm>

**FIGURE 111: OIL SPILL CLEAN-UP**



Source: University of Agriculture, Abeokuta

**FIGURE 112 : BAKERY TECHNICIAN OPETATIONS**



Source: IndustryWeek

**FIGURE 113 : BREWING TECHNICIAN OPERATIONS**



Source: <http://www.climatewiseagriculture.com/articles>

**FIGURE 114: FARMING**



Source: The News Nigeria

**FIGURE 115: LEATHER TANNING TECHNICIAN OPERATIONS**



Source:

**FIGURE 116 : FIRE FIGHTING TECHNICIAN OPERATIONS**



Source: <http://y-inspired.vlisco.com/vlisco-starts-tailoring-masterclass-nigeria/>

**FIGURE 117: TAILORING**



Source: <https://www.flickr.com/photos/jita-media-library/4668278965>

**FIGURE 118: CASSAVA PROCESSING**



source: <http://www.rta.nc/news/infrastructure/20141204-nigeria-completes-first-standard-gauge-railway-modernization-project/>

**FIGURE 119: ROAD CONSTRUCTION**



Source: <https://inspiredhospitality.wordpress.com/tag/casamaj/>

**FIGURE 120: HOSPITALITY**





Source: <http://www.mobofree.com/nigeria/Services/Other-services/Delta/Other/landscaping-and-beautification/1011889>

FIGURE 121: LANDSCAPING

TABLE 20: GAPS IN NIGERIA DEMAND AND SUPPLY ACROSS KEY CROPS AND ACTIVITIES (2016 ESTIMATE) (165)

Crop	Demand (tons)	Supply (tons)	Observations
Rice	6.3 million	2.3 million	Insufficient supply chain integration remains issue
Wheat	4.7 million	0.06 million	Driven by demand for various types of wheat (white, hard, durum), etc. for bread, biscuits and semovita
Maize/Corn	7.5 million	7.0 million	Limited imports required but can shift due to feed demand
Soya Beans	0.75 million	0.6 million	Animal feed and protein cost alt. driving demand
Chickens	200 million birds	140 million	Gap filled by illegal imports that enter market at lower price point than domestic producers; gap also a moving target based on fast food/QSR demand
Fish	2.7 million	0.8 million	Fall off in ocean catch and weakness in aquaculture yields due to cost of fish feed a constraint on growth
Milk / Dairy	2.0 million	0.6 million	Driven by insufficient milking cows and low yields (~15-25 liters/day versus norm of 35 – 40 liters NZ/US)
Tomato	2.2 million	0.8 million	Actual production is 1.5 million tons but 0.7M ton is lost post-harvest
Yams	39 million	37 million	Limited gap today but volumes expected to rise in planning period
Oil Palm	8.0 million	4.5 million	Refers to fresh fruit bunch (FFB) from which oil is extracted at a 10% - 15% efficiency rate
Cocoa	3.6 million	0.25 million	Demand is global demand which will rise to 4.5M by 2020
Cotton	0.7 million	0.2 million	Demand is for seed cotton and could rise to 1.0 – 1.5 million tons subject to textile sector revival
Sorghum	7.0 million	6.2 million	Demand will rise further as use in feed grows in 2016 – 2020. Import of malt extracts and glucose syrup is currently used to manage gap, hence a commercial threat for Nigerian farmers

The average annual solar radiation ranges from 12.6 MJ/square meter-day in the Southern coastal areas to about 25.2 MJ/square meter-day in the far North (109). At 50-meter height where only the most advanced and expensive turbines can reach, wind velocities range from 2 meters/second to 8 meters/second. At 10meter height, where lower technology devices can be installed, wind speed ranges from about 2 meters/second in coastal areas to 4 meters/second in the far North (109).

Figure 128 shows the prevalent system of processing materials in villages across Nigeria. It is desirable to replace manual labour with machines that can increase food and materials production rates. Figures 129-131 illustrate the solar energy potential and utility as an energy source in Nigeria. In Table 22, the availability and energy value of each source of biomass in Nigeria is presented. In the future, Nigeria will need to develop and implement technology for capturing carbon emissions from power plants and factories for sequestration in the ocean floor as illustrated in Figure 132. In the absence of affordable, scaled-down renewable energy technologies and gainful employment in productive sectors of the economy, cutting of wood local energy supply and sale is likely to increase for deforestation which is schematically illustrated in Figure 134. The technologies that need to be deployed are listed below.

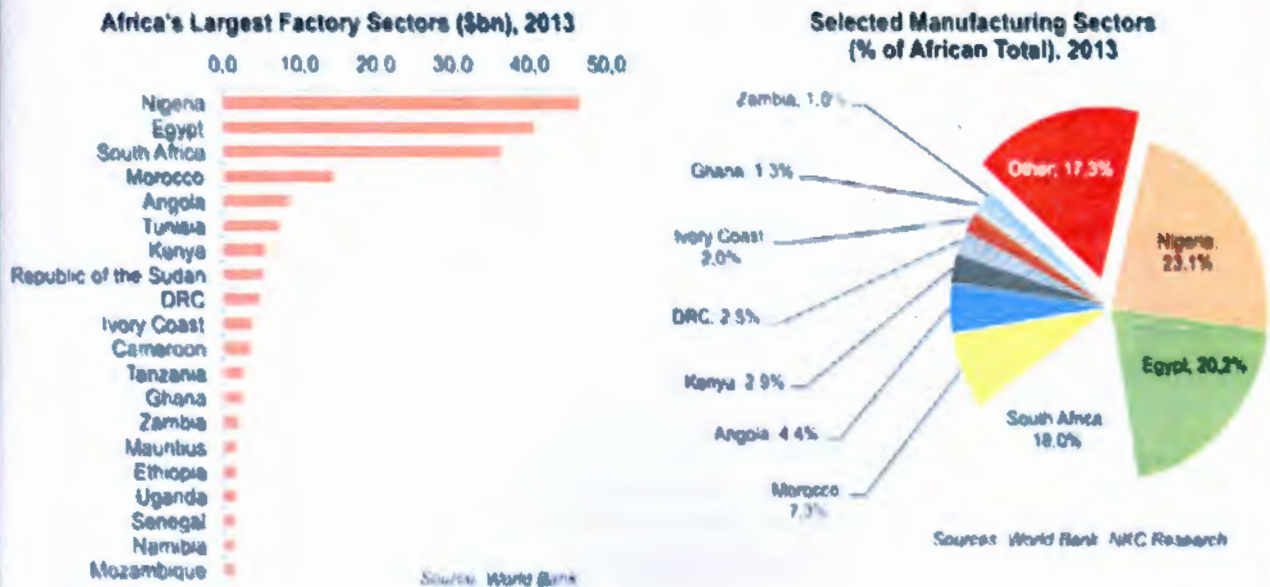
- i. **Technologies for utilization of Nigeria's wasted gas to generate electricity**
  - ii. Technologies for sourcing electric power from wastes and other organic materials
  - iii. Technologies for installation of solar panels to provide 60-70 percent of the electricity needs of households
  - iv. Technology for implementation of wind and solar power installations that can provide sufficient energy to power small-medium scale industries
  - v. Technologies to remove and neutralize emissions from machinery, including electric power generators
  - vi. **Clean coal technologies to support Nigeria's plan to use coal to generate power as a part of the electric power mix**
  - vii. Energy storage devices that are suitable for use in Nigeria
  - viii. Technologies for disposal of energy industry wastes
- **Oil-and-Gas: Oil-and-gas is the mainstay of Nigeria's revenue. Crude oil accounts for more than 90% of Nigeria's exports and brings in about 80% of Nigeria's revenue. About 65% of Nigerian oil has a specific gravity above 35% API with very low sulphur content. At the end of 2010, Nigeria had proven oil reserves estimated at 37,2 billion barrels with 5.29 trillion cubic meters of gas reserves (2.82% of the global total). Nigeria's current interest is to expand the midstream and downstream parts of its oil and gas industry. This implies engagement in the manufacture of petrochemicals, fertilizers, methanol, plastics and refined products. Examples of the technologies that the Nigerian oil industry needs to deploy are stated below.**
    - i. Technologies for deep-sea drilling
    - ii. Underwater oil exploration technologies
    - iii. Gas capture technologies to cease flaring
    - iv. Innovative systems for powering oil platforms
    - v. Modular refining technologies
    - vi. Technologies for protecting pipelines against vandalism
    - vii. Effective fire retardation technologies
    - viii. Technologies for development/production of composite materials with petroleum products

Figure 135 shows the spatial distribution of Nigerian oil facilities. Figure 136 shows elaborate piping at a Nigerian natural gas installation. The waystations linked by the West African Gas Pipeline that runs along the coast from Ghana to Nigeria are shown in Figure 137 while a typical oil drilling rig



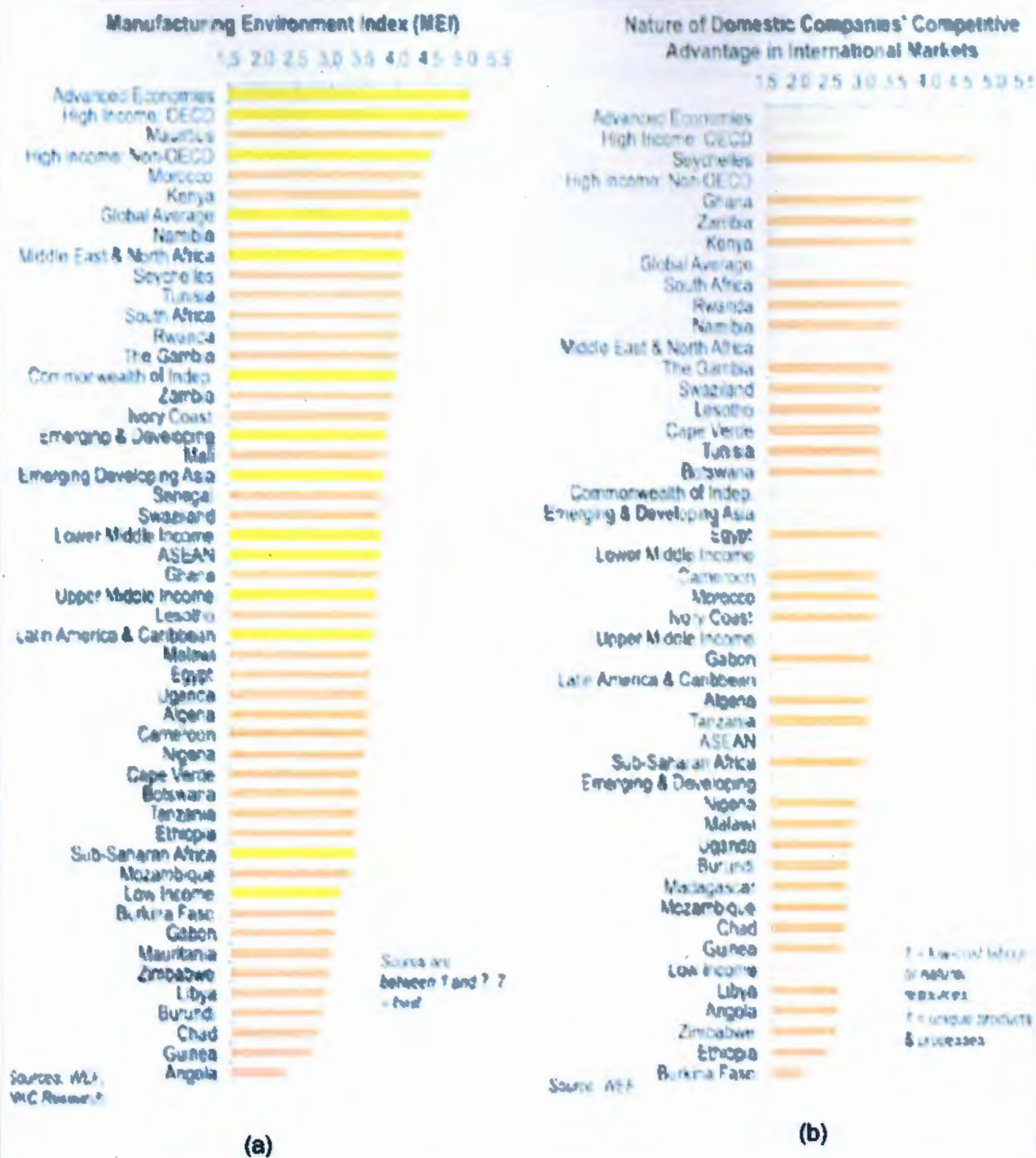
Source: KPMG (2015), Manufacturing in Africa

**FIGURE 122 : MANUFACTURING OUTPUT OF AFRICAN COUNTRIES (2013) AS A PERCENTAGE OF THEIR GDPs**



Source: KPMG (2015), Manufacturing in Africa

**FIGURE 123: FEATURES OF THE MANUFACTURING SECTOR OF AFRICAN COUNTRIES IN 2013**



The Manufacturing Environment Index (MEI) is constructed by NKC African Economics and takes into account the quality of overall infrastructure (e.g. transport and telephony), the quality of electricity supply (interruptions and fluctuations), workers' pay versus productivity, local supplier quantity and quality, the state of cluster development (i.e. geographic concentration of suppliers and producers), and value chain breadth.

Source: KPMG (2015), Manufacturing in Africa

**FIGURE 124: THE MANUFACTURING ENVIRONMENT IN SPECIFIC AFRICAN COUNTRIES COMPARED TO CIRCUMSTANCES IN REGIONAL BLOCS WITHIN AND OUTSIDE AFRICA (A) MANUFACTURING ENVIRONMENT INDEX, (B) NATURE OF DOMESTIC COMPANIES' COMPARATIVE ADVANTAGE IN INTERNATIONAL MARKETS. (201)**

**TABLE 21: IMPLEMENTATION OBJECTIVES AND ACTION PLAN OF THE ROADMAP FOR THE GROWTH AND DEVELOPMENT OF THE NIGERIAN MINING INDUSTRY (164)**

- **Minerals & Steel:**
  - *Developing an industrial minerals strategy to boost the local economy through utilisation of domestic minerals*
  - *Developing an energy minerals strategy for domestic use and industrial power generation using Nigerian coal resources*
  - *Developing the steel sector to provide a solid backbone for the manufacturing and industrial economy*
- **Geosciences data and information:**
  - *Improving the quality and breadth of geo-scientific data gathered in a cost-efficient manner that will adequately drive investment growth*
  - *Adequately archiving and disseminating the information gathered in modern formats to ensure ready accessibility to investors and other interested parties*
- **Enabling environment:**
  - *Building the required technical and managerial skills and capabilities locally to ensure the supply of steady talent required by the sector in the future*
  - *Ensuring social equity in the labour force by addressing issues of exploitation of women and children*
  - *Creating the necessary ancillary infrastructure to accelerate growth of the sector nationally and regionally*
  - *Broadening access to finance and improving the business climate in Nigeria to increase attractiveness of (foreign) investments in the sector*

Source: Roadmap for the Growth and Development of the Nigerian Mining Industry (2016)

## Timeline of key action items for executing the roadmap

Immediate 0 - 6 months	Short-term 6 months - 2 years	Medium term 2 - 5 years	Long-term 5 - 10 years	Ongoing to refresh regularly
<ul style="list-style-type: none"> <li>• Launch roadmap and begin communication campaign to generate industry buy-in</li> <li>• Set up Mining Implementation and Strategy Team (MIST) to drive execution of the roadmap</li> <li>• Design/establish process for strategic planning for long-term development</li> <li>• Begin active communication and promotion of roadmap with stakeholders</li> <li>• Finalize review of key industrial assets and prepare them for strategic turnaround</li> <li>• Identify gaps in existing training programs and suggest changes</li> </ul>	<ul style="list-style-type: none"> <li>• Develop strategy to utilize priority minerals domestically and substitute exports</li> <li>• Restructure and reorganize the MDMB for more efficient operations</li> <li>• Create new "super" Regulatory Agency</li> <li>• Impose regulatory clarity on powers and duties of MDAs in mining and establish clear fiscal framework for state participation</li> <li>• Incentivize financial participation of communities in mining</li> <li>• Actively drive the formalization of ASM</li> <li>• Expand coverage, resolution of, and access to geoscience data in Nigeria</li> <li>• Strengthen the financial and business climate</li> </ul>	<ul style="list-style-type: none"> <li>• Work with National &amp; State legislatures and govt to address gaps and conflicts in governing legislation</li> <li>• Deepen engagement of communities in mining</li> <li>• Develop and harmonize (financial) incentives for attracting mining majors and juniors to Nigeria</li> <li>• Encourage forward integration of mining and exploration companies into downstream operations</li> <li>• Build local technical/managerial skills and capabilities required in the industry</li> <li>• Promote gender equity and female participation in the sector</li> <li>• Catalyze investments in infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>• Drive the development and expansion of supporting infrastructure for mining (e.g. power generation, transportation)</li> <li>• Invest in education for citizens of mining communities</li> <li>• Drive the growth of export of value-added mining products</li> <li>• Encourage the formation of private mineral and metals exchanges to increase trading liquidity</li> <li>• Reinforce gender equity and eliminate the exploitation of child labour</li> <li>• Deepen financial services expertise and access to funds to drive sector growth</li> </ul>	<ul style="list-style-type: none"> <li>• Invest in tools and training required for effective service delivery by the MDMB and its agencies</li> <li>• Enforce established laws and regulations governing the mining sector</li> <li>• Work with other MDAs involved in the sector to coordinate policies, regulations and their implementation</li> <li>• Work with state governments to build and maintain an enabling environment for the mining sector</li> <li>• Provide training and extension services for ASMs to improve their productivity</li> <li>• Reinforce geoscience technical and research capabilities to drive investments</li> </ul>

Source: Roadmap for the Growth and Development of the Nigerian Mining Industry (2016)

**FIGURE 125: ACTION ITEMS FOR THE POLICY ROADMAP (164)**

# Successful execution of a mining plan will unlock significant value for Nigeria

**DIRECTIONAL**

## ESTIMATE OF MINING SECTORS' CONTRIBUTION TO GDP (2015 - 2025) (US\$ BILLIONS)



Table 1. Estimate of mining sectors' contribution to GDP at constant 1990 prices. 2. The indirect contribution is calculated using the input-output table for Nigeria. Based on the input-output analysis of the Nigerian economy published by the National Bureau of Statistics, Nigeria, 2005. Mining industry has a 4.3% of the multiplier effect on domestic value added in the Nigerian economy. Source: Roadmap for the Growth and Development of the Nigerian Mining Industry (2016). The total contribution of the mining sector to the Nigerian economy is estimated to be 2.6% of GDP in 2025. The indirect contribution of the mining sector to the Nigerian economy is estimated to be 2.0% of GDP in 2025. Total contribution of the mining sector to the Nigerian economy is estimated to be 4.6% of GDP in 2025.

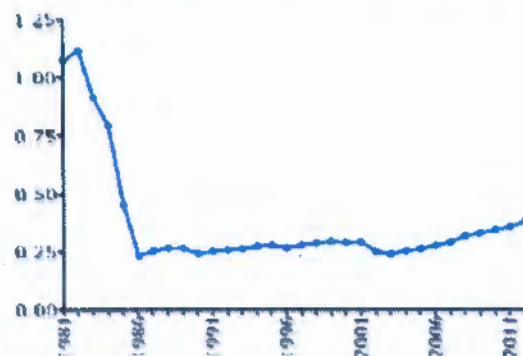
Source: Roadmap for the Growth and Development of the Nigerian Mining Industry (2016)

FIGURE 126: MINING SECTOR'S CONTRIBUTIONS TO GDP(164)

# Nigeria's mining sector has the potential to sharply contribute to GDP, currently lagging major African peers

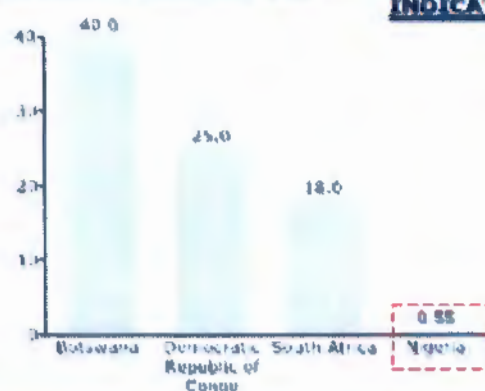
## MINING SECTORS' CONTRIBUTION TO GDP HAS DECLINED

Mining and quarrying contribution to GDP at constant basic 1990 prices (%)



## AND CURRENTLY THE LOWEST CONTRIBUTOR COMPARED TO OTHER AFRICAN PEERS

% contribution of mining sector to GDP



**INDICATIVE**

*"The low contribution of the mining sector to the nation's GDP has not always been the case in Nigeria since had a booming mining industry. Like the agricultural sector the discovery of oil resulted in the gradual neglect of the sector. Before the oil boom, Nigeria's economy was largely sustained by agriculture and exploration of coal minerals."*

Abdica.com, 2015

Source: National Bureau of Statistics, Freetown, S.E. Africa

Source: Roadmap for the Growth and Development of the Nigerian Mining Industry (2016)

FIGURE 127: HISTORICAL CONTRIBUTIONS OF MINERALS AND MINING SECTOR TO NIGERIA'S GDP (164)

and a portable refinery of the type that needs to be massively deployed in Nigeria are shown in Figures 138 and 139, respectively.

- **Information and Communication Technology ICT:** ICT is a rapidly growing sector in Nigeria. ICT is inextricably tied to various science and technology sectors of the FMST. In order for Nigeria to become a leading economy by 2030, high-speed broadband technology needs to be developed and implemented such that it covers at least, 80% of the country. Nigeria has also deployed a satellite in space with significant benefits. Figure 140 shows the growth effects of ICT in two categories of economies as rationale for investment in ICT by Nigeria. The ubiquity of ICT utilities in all sectors of a country's economy is illustrated in Table 23. Nigeria has a National Broadband Plan-2013-2018 to respond to the rapidly growing applications of ICT and existing deficiencies in ICT infrastructure. Figure 141 shows the growth of internet and telecom use in Nigeria. A modern mobile computing platform that will increasingly support social and business operations in Nigeria is illustrated in Figure 142.

With a population of about 170 million, Nigeria had about 116.6 million telephone lines in February 2013 (137). Four active GSM operators retained 96% market share. Three active CDMA keep the remainder. There is 98% 2G coverage of Nigeria but 35% 3G coverage, mostly restricted to urban areas. As reported in the Nigerian National Broadband Plan, internet penetration is 33% while broadband penetration is just 6%. There is a primary fiber-optic Backbone Infrastructure throughout Nigeria but services they are mostly concentrated in urban areas. In terms of ICT infrastructure, there were about 25,000 base stations in 2012, about 116,000 km of microwave radio coverage, and 41,000 km of fiber optic network. In the ICT sector, more of the same needs to be implemented to expand coverage to all areas of Nigeria. The specific technologies are listed below.

- i. Science and technology development for broadband technologies to cover 90% of the country by 2030.
- ii. Science and technology development for 4G LTE mobile telephone to cover over 90% of the country by 2030.
- iii. ICT technologies that enable effective operation of e-Government in Nigeria
- iv. ICT technologies that support democratic election processes in Nigeria
- v. A suite of technologies to operate ground-based support center for Nigeria's space travel and satellite launch operations.
- vi. Advanced but appropriate technologies to massively support distance learning by working class Nigerians who seek professional improvement.

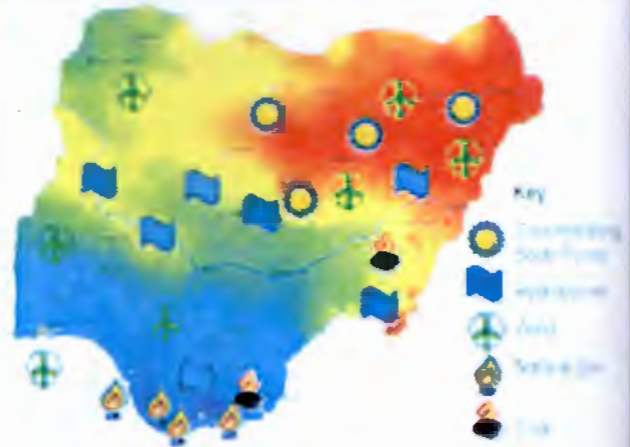
- **Health and Environment:** Communicable diseases are estimated to constitute 66% of the total disease burden and morbidity of Nigerians (223). Among them are malaria, diarrhoea, acute respiratory infections, tuberculosis, HIV/AIDS and neglected tropical diseases. Although the average life expectancy increased from 46 years in 2008 to 52.62 years in 2013 (225), about 12 % of men and women have high probabilities of dying between the ages of 15 and 50 (223). Of the 27 accredited medical schools in 2012, 21 are in the southern part while 6 are in the northern part of Nigeria. The annual graduation rate of doctors is about 2,300 but medical facilities are very poor across the country.

Environmental problems in Nigeria range from waste dumping in sensitive locations, including city centers to intense air pollution in major cities. Large scale environmental challenges are desertification (in the north), gully erosion (in the central and southern regions), oil spillages in the Niger Delta and surface/groundwater contamination in all regions. The impacts of global climate change are being felt through the increasing frequency and intensity of floods, migration of pests to new habitats and ecological challenges. The following technologies need to be deployed to improve human health and environmental conditions in Nigeria.

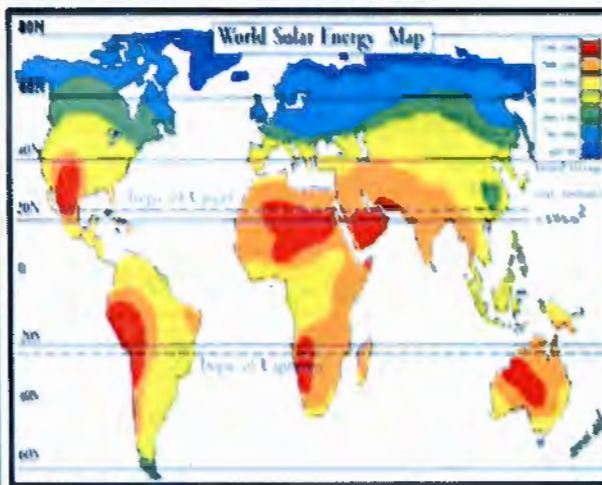
- i. Technologies for non-intrusive or minimally intrusive surgeries
- ii. Telemedicine technologies and facilities
- iii. More accurate technologies for body/organ imaging



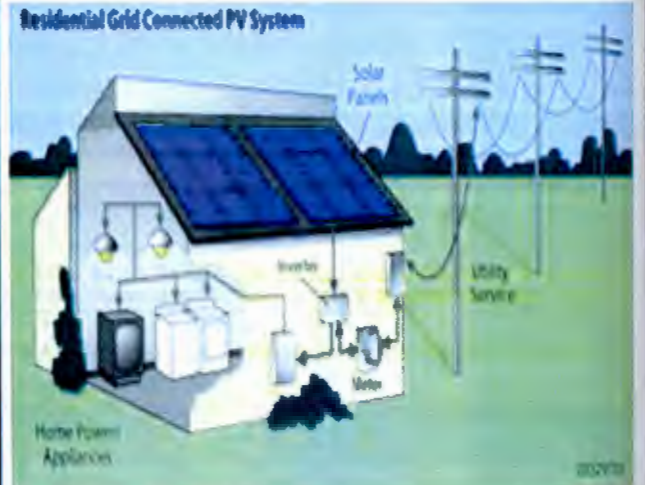
**FIGURE 128: MANUAL PRODUCTION OF PALM OIL IN NIGERIA**



**FIGURE 129: PROSPECTS OF VARIOUS RENEWABLE ENERGY SYSTEMS IN NIGERIA**  
SOURCE: PRESENTATION, CHALLENGES OF COAL TO POWER AND PROSPECTS OF RENEWABLE ENERGY IN NIGERIA, LOW HANGING FRUITS FOR GOVERNMENT AND PRIVATE SECTOR INVESTMENT BY DONALD IKENNA OFOEGBU FOR THE CENTRE FOR SOCIAL JUSTICE TEAM RETREAT, ABUJA.



**FIGURE 130 : REGIONAL DISTRIBUTION OF SOLAR RADIATION INTENSITY (HTTP://WWW.RISE.ORG.AU/)**



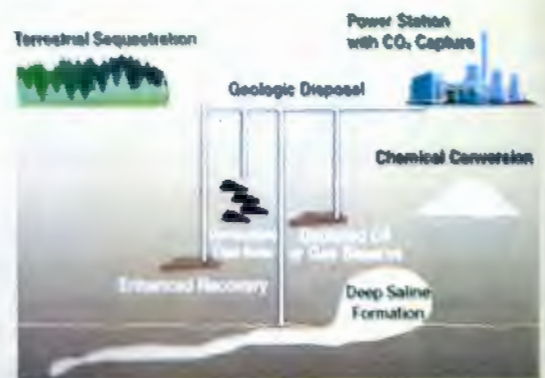
**FIGURE 131: GRID CONNECTIVITY REQUIREMENTS FOR SMALL-SCALE RENEWABLE ENERGY SYSTEMS (ILLUSTRATING WITH SOLAR ENERGY SYSTEM) COURTESY OF U.S DEPT. OF ENERGY**

RESOURCE	QUANTITY (MILLION TONNES)	ENERGY VALUE (THOUSANDS OF MW)
Fuelwood	39.100	531.000
Agro-waste	11.244	147.700
Saw Dust	1.800	31.433
Municipal Solid Waste	4.075	-

Adaptation from Sambo, A. S. (2009). Strategic development in renewable energy in Nigeria. Submitted to the International Association on Energy Economics, 5 pages

**TABLE 22: BIOMASS RESOURCES AND THEIR ESTIMATED QUANTITIES IN NIGERIA**

## Carbon Sequestration Options



**FIGURE 132: CARBON SEQUESTRATION AS AN EXAMPLE OF A TECHNICAL SOLUTION**



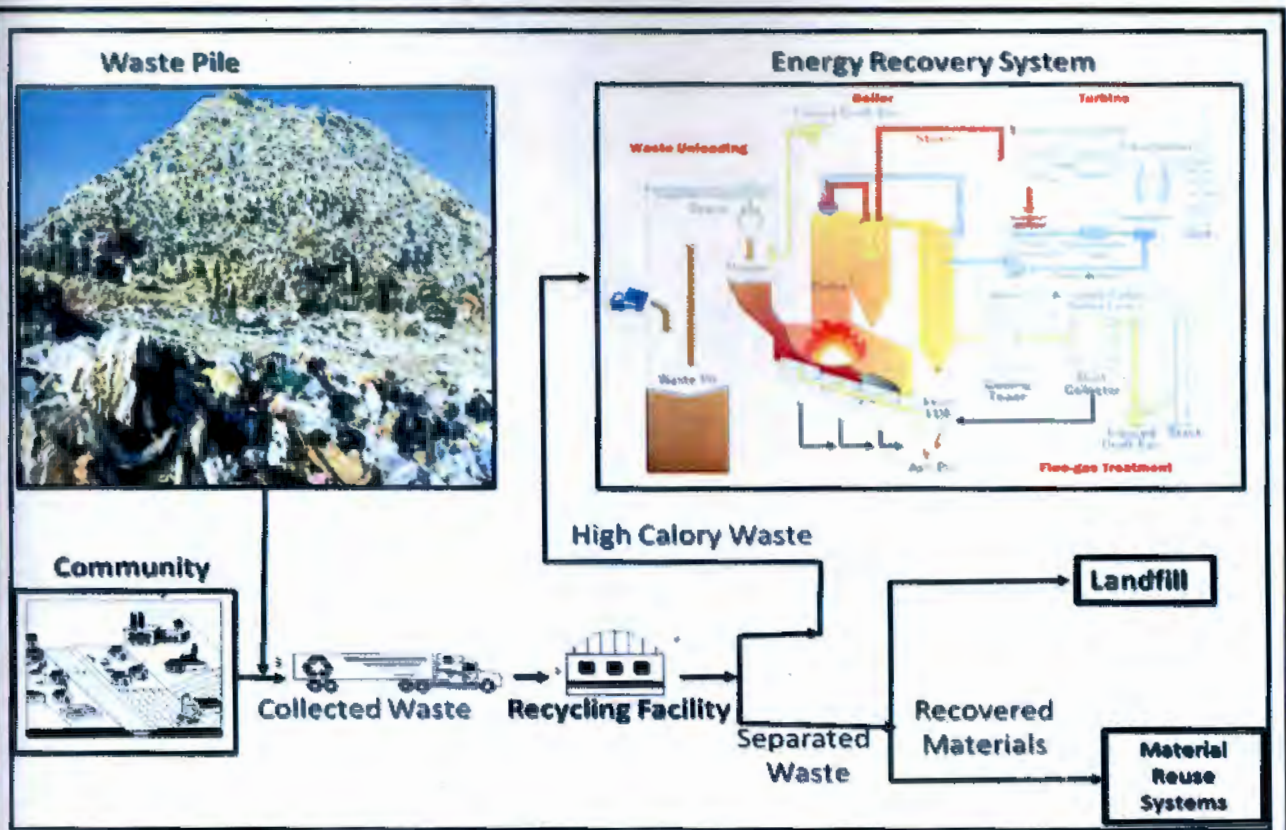


FIGURE 133: WASTE TO ENERGY SYSTEMS CAN BE IMPLEMENTED IN NIGERIA (Inyang ( ))

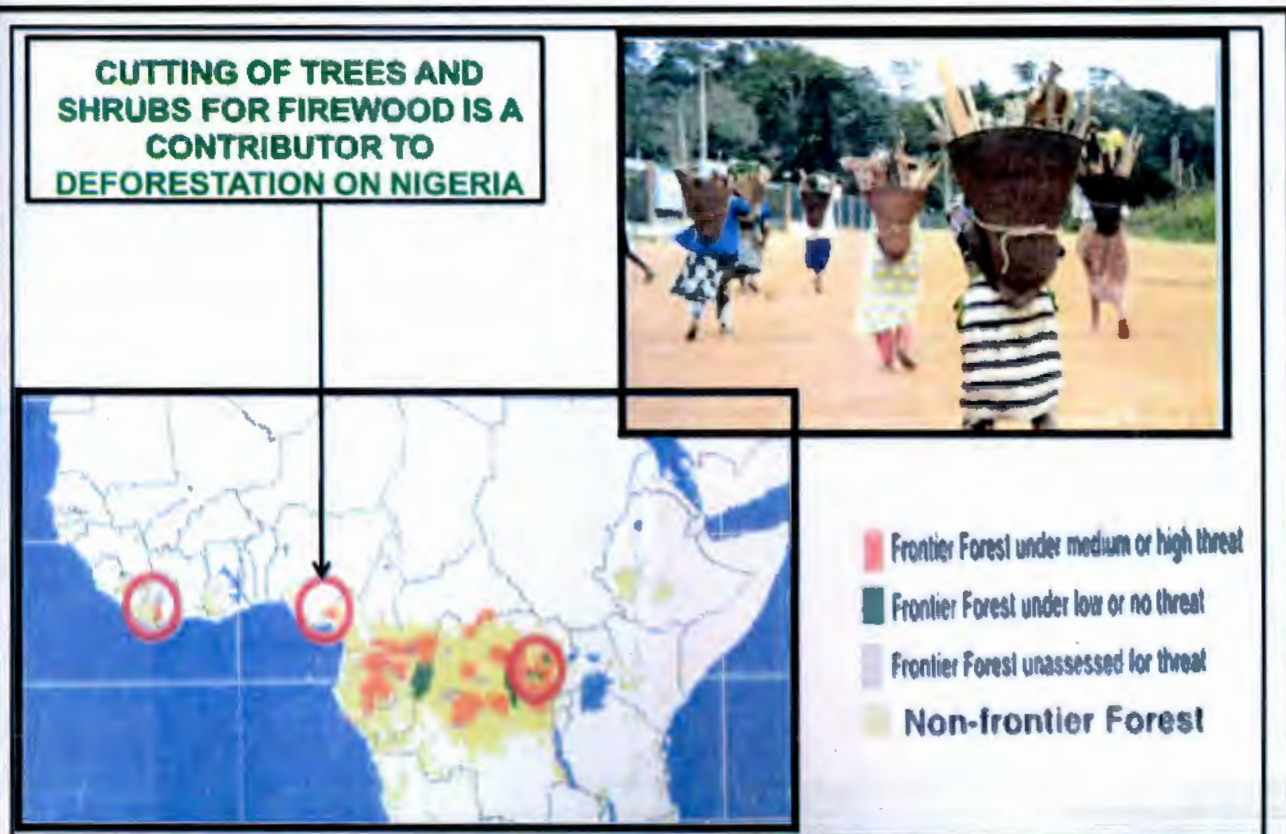


FIGURE 134: DEFORESTATION IS A MAJOR ENVIRONMENTAL DISASTER IN NIGERIA



Source: [http://www.lib.utexas.edu/maps/africa/nigeria\\_gas\\_1979](http://www.lib.utexas.edu/maps/africa/nigeria_gas_1979)

**FIGURE 135: THE OUTLAY OF NIGERIAN OIL AND GAS FIELDS**



Source: WealthResult.com

**FIGURE 136: NIGERIAN NATURAL GAS OPERATIONS**



Source: <http://nnpcgroup.com/nnpcbusiness/businessinformation/investmentopportunities/nigeriagas.aspx>

**FIGURE 137: THE WEST AFRICAN GAS PIPELINE ALIGNMENT**



Source:

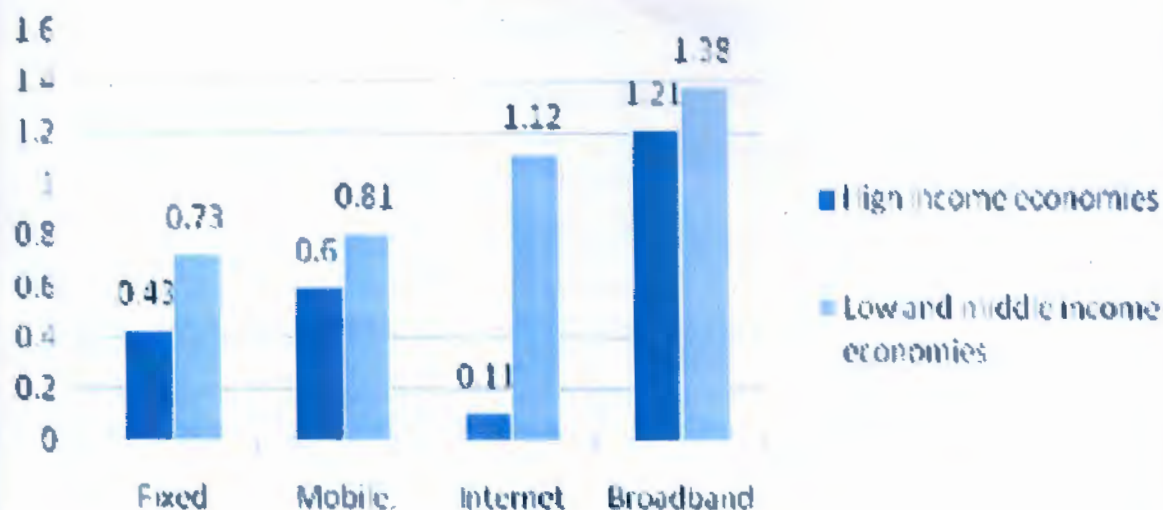
**FIGURE 138: ON-LAND OIL DRILLING**



Source: Alibaba.com

**FIGURE 139: PORTABLE OIL REFINERY**

## Growth Effects of ICT (in percentage points)



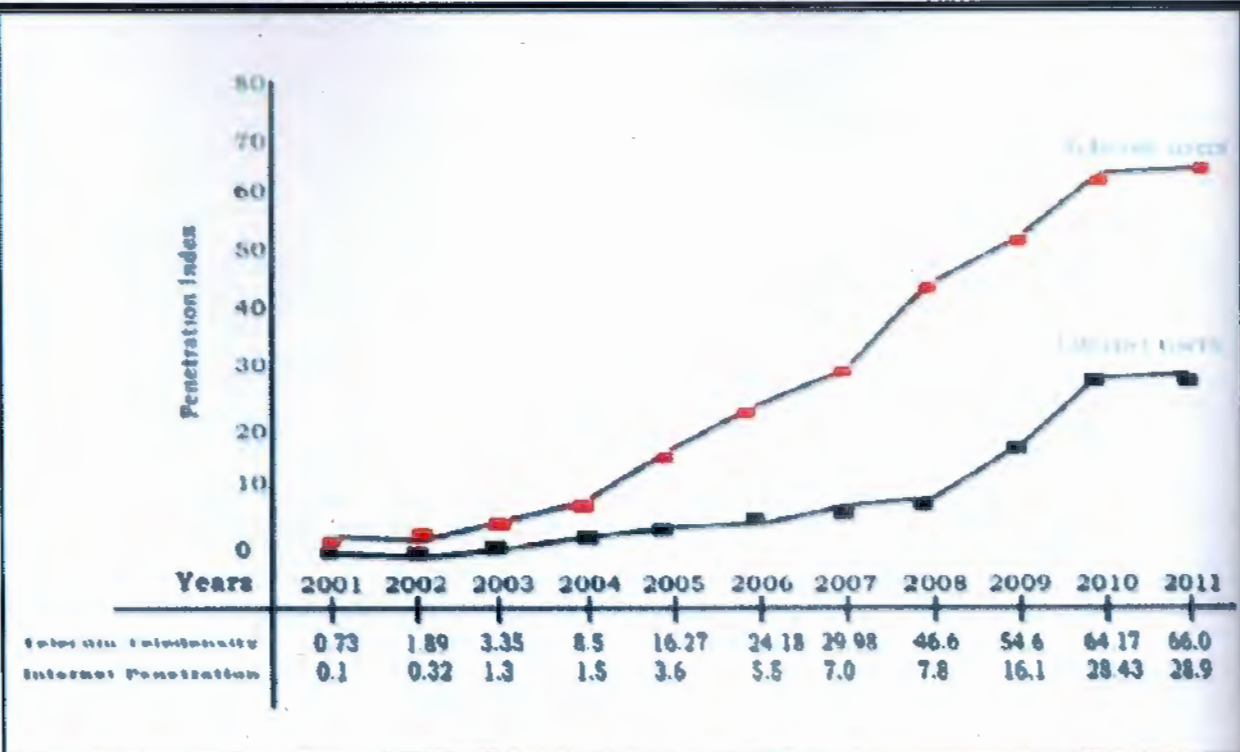
Original data source: Qiang et al, (2009) World Bank.  
Source: (Reference no. 137), Nigeria's National Broadband Plan 2013-2018

**FIGURE 140: EFFECTS OF ICT ON ECONOMIES**

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>❑ Issuance of National Identity Card</li> <li>❑ Issuance of Travelling Document (Passport, Yellow Card, etc.)</li> <li>❑ Issuance of Driver's license</li> <li>❑ Issuance of Tax Clearance</li> <li>❑ Issuance of Vehicle Number Plate</li> <li>❑ Issuance of C-of-O</li> <li>❑ Issuance of industry licence, permit, and authorizations</li> <li>❑ Issuance of Birth Certificate</li> <li>❑ Issuance of Marriage Certificate</li> <li>❑ Issuance of Death Certificate</li> <li>❑ Payment of Tax</li> <li>❑ Payment of import duty</li> <li>❑ Payment of government fines and sanction</li> </ul> | <ul style="list-style-type: none"> <li>❑ Registration of Land Acquisition</li> <li>❑ Registration of Vehicle Ownership</li> <li>❑ Registration of Companies</li> <li>❑ Registration of Cooperatives</li> <li>❑ Registration of Associations</li> <li>❑ Registration of Town Unions</li> <li>❑ Registration of other legal entities</li> <li>❑ Registration of Voters</li> <li>❑ Delivery of Education services</li> <li>❑ Delivery of Health Services</li> <li>❑ Delivery of Security &amp; Protection Services</li> <li>❑ Delivery of Essential Amenities</li> <li>❑ Delivery of Justice Administration</li> <li>❑ Delivery of Law and Order</li> <li>❑ Delivery of Fundamental Human Right</li> </ul> |
|--|---|

Source: (Reference no. 137), Nigeria's National Broadband Plan 2013-2018

**TABLE 23: EXAMPLES OF POSSIBLE E-GOVERNMENT SERVICES**



Source: (Reference no. 137), Nigeria's National Broadband Plan 2013-2018

**FIGURE 141: NIGERIA'S TELE-DENSITY AND INTERNET PENETRATION**

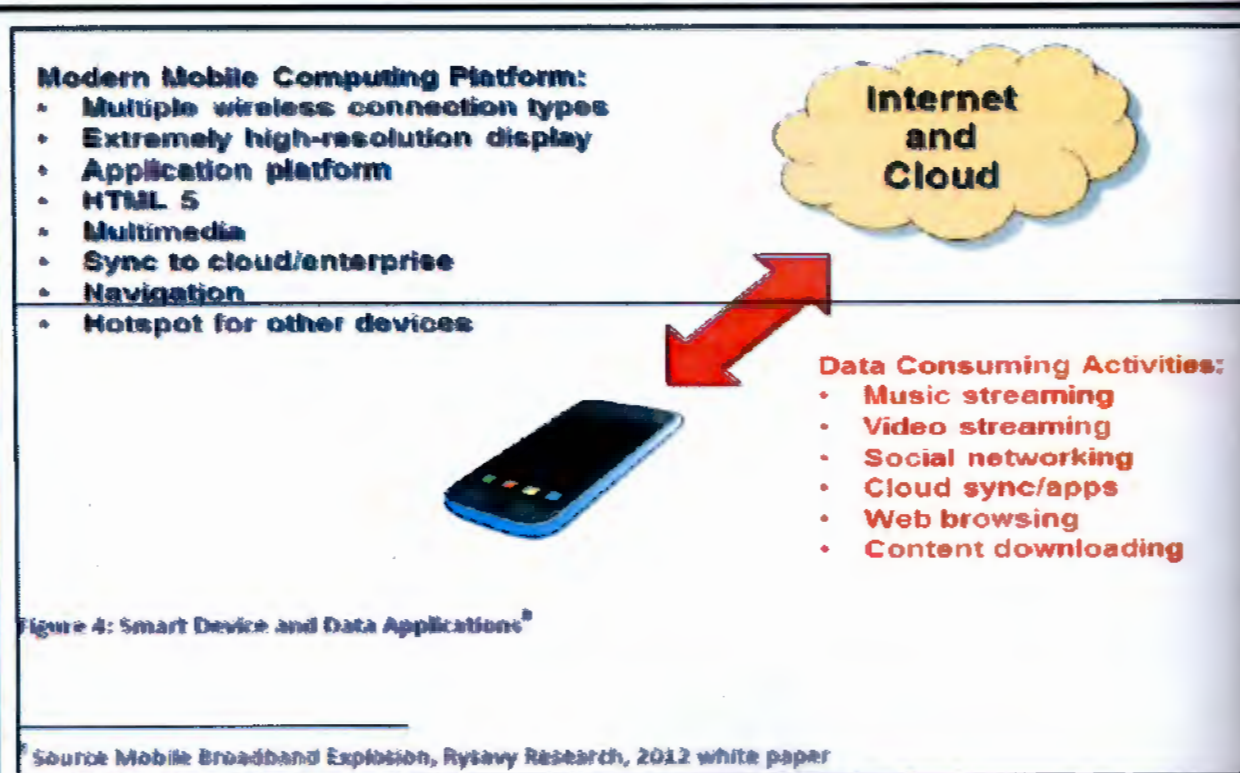


Figure 4: Smart Device and Data Applications<sup>8</sup>

<sup>8</sup> Source: Mobile Broadband Explosion, Rysavy Research, 2012 white paper

Source: (Reference no. 137), Nigeria's National Broadband Plan 2013-2018

**FIGURE 142: SMART DEVICE AND DATA APPLICATIONS**

- iv. Technologies for largescale and clean production of vaccines and drug
- v. Technologies for medical emergencies and resuscitation
- vi. Air pollution control technologies for old automobile and machines
- vii. Portable water treatment technologies for households and small communities
- viii. Technologies for predicting and monitoring of contaminant emissions and transport patterns from sources
- ix. Technologies for extracting contamination from runoff
- x. Technologies for cost-effective cleanup/remediation of oil polluted sites

### **3.6. Science Literacy Improvement and Public Engagement**

NSTIR 2030 covers four major projects on science literacy improvement as catalogued in Table 5. They are the Science and Technology Museum; the Junior Engineers and Technician Clubs Support; the Science Talent Hunting throughout Nigeria; and Implementation of National Science and Technology Competition. Many other projects on direct science advocacy and information dissemination also complement these projects. Altogether, they will satisfy the following objectives and approaches of the STI Policy on STI promotion.

- i. Encouraging relevant stakeholders to provide students at primary and secondary schools, as well as technical colleges with broad-based curricula comprising relevant scientific knowledge and vocational skills.
- ii. Promoting broad-based curricula comprising relevant scientific knowledge and vocational skills for schools and colleges.
- iii. Providing policy incentives to Nigerian youths for career development in S&T fields.
- iv. Popularizing STI through regular technology fairs, exhibitions, S&T clubs and the mass media (films, newspapers, radio, television, internet, etc.)
- v. Supporting programmes of the professional S&T bodies concerned with building STI capacity.
- vi. Improving conditions of service of STI professionals to encourage creativity and innovation.
- vii. Utilizing as much as possible Nigerian STI personnel and institutions for consultancy when such expertise is available.
- viii. Recognition of individual or institutional contributions to development through application of STI.
- ix. Empowering women in the utilization of STI for economic development.
- x. Increasing local content in industrial processes and engineering infrastructure development activities.
- xi. Encouraging the establishment or strengthening of S&T Ministries at the State level.
- xii. Encouraging the development and use of local languages for the transfer of
- xiii. STI knowledge to the formal and informal sectors of the economy.
- xiv. Promoting inventions and innovations that address immediate local needs.

### **3.7. System Monitoring, Evaluation and Improvement**

All the projects and programmes listed in Table 5 and Table 10 as part of NSTIR 2030 need to be monitored with respect to implementation. The FMST monitoring approaches that will be used to monitor all projects are as follows.

- i. A project progress summary to be authored bimonthly and submitted to the Center Director and the Office of the Permanent Secretary of FMST
- ii. A semi-annual report with the same submission requirement

- iii. A final report submitted to the Centre Director, the Permanent Secretary of FMST, the FMST Minister's Office and other persons and units of Government as directed by the Minister and/or Permanent Secretary
- iv. A completed standardized form signed by all the principal investigators, covering accomplishments of the project, follow-up plan, list for implementation, and plan for dissemination of results including publication, television presentation and press briefing

## 4.0 NSTIR 2030 SYSTEM SUPPORT REQUIREMENTS

### 4.1. Better Coordination of Science and Technology Projects and Programmes Across Agencies

Through the FMST, the Federal Government of Nigeria will provide strong leadership, effective coordination and adequate resources for the implementation of NSTIR 2030 in consistence with Nigeria's STI Policy. It will convene all stakeholders, including agencies of the Federal, State and Local Governments, the private sector, academia, multi-lateral organizations, non-profit organizations, community groups and private individuals to implement activities that support Nigeria's National Innovation System. The structures and modalities are outlined below.

- **National Research and Innovation Council (NRIC)**

The functions of NRIC as the apex oversight body on research and innovation in Nigeria are as follows:

- Setting of general national priorities for engagement of R and D
- Provision of general guidance and directions on coordination of STI activities in Nigeria in line with national interests
- Ratification of plans to establish new institutes and strengthen existing ones as necessary
- Facilitation of fundraising to support STI activities in Nigeria

With respect to the governance structure of NRIC, the membership and its leadership are as follows:

- The President of the Federal Republic of Nigeria (Chairman)
- Hon. Minister of Science and Technology (Deputy Chairman)
- Hon. Minister of Communication
- Hon. Minister of Agriculture
- Hon. Minister of Industries, Trade and Investment
- Hon. Minister of Education
- Hon. Minister of Health
- Hon. Minister of Solid Minerals
- Hon. Minister of Works, Power and Housing
- Hon. Minister of Petroleum Resources
- Hon. Minister of Environment
- Hon. Minister of Water Resources
- Hon. Minister of Women Affairs
- Hon. Minister of Transport
- Hon. Minister of Mines and Steel Development

- **FMST Ministerial Assembly on Science, Technology and Innovation (FMST-MASTI)**

FMST-MASTI is a consultative forum that will be held annually or sub-annually as necessary, often in conjunction with the National Science and Technology Week. Its objectives are stated below.

- i. Review of STI activities, needs, challenges and approaches to addressing them at all jurisdictional levels of Nigeria.
- ii. Enhancement of opportunities for interaction among STI stakeholders across various political jurisdictions and economic sectors

- iii. Facilitation of active and productive interactions and collaborations among STI stakeholders in Nigeria
- iv. Exhibition of opportunities and technologies that can enhance achievement of **Nigeria's STI objectives**
- v. Report by the Honorable Minister on achievements and future directions on STI
- vi. **Release of "Biennial State of STI in Nigeria" Report**

FMST-MASTI will have a Control Group that will be chaired by the Hon. Minister of FMST on a permanent basis with the Permanent Secretary of the FMST as the First Secretary aided by two Associate Secretaries from the private sector and academia respectively. Membership of the Control Group will be for terms of two years, renewable at the pleasure of its Chairman. Guidance on membership is provided below. Sub-Committees may be formed to address specific matters

- i. The Hon. Minister of Science and Technology (Chairman)
- ii. The Permanent Secretary of FMST (First Secretary)
- iii. Private Sector Representative (Associate Secretary)
- iv. Academia Representative (Associate Secretary)
- v. All State Commissioners of Science and Tech
- vi. Manufacturers Association of Nigeria (3 members)
- vii. Chambers of Commerce (3 members)
- viii. All Directors of FMST Research Centers
- ix. Directors of critical Non-FMST Centers and Institutes
- x. National Academies (3 members)
- xi. Trade Unions (4 members)
- xii. The Press (3 members)
- xiii. Academic Institutions (4 members)
- xiv. Development Partners (4 members)
- xv. Community Groups (4 members)

• **National Advisory Council on Science, Technology (NACST)**

This is the highest-level technical committee of external advisors and experts on science, technology and innovation (STI) in Nigeria. Membership in NACST is not through representation of any organization but through attainment of the highest level of technical expertise and demonstrated experience in the technical issues and related knowledge sectors that need to be deployed to support Nigeria's socio-economic development. Its functions and mandate are as follows.

- i. Recommendation of broad directions on coordination of STI activities (including R and D) to achieve **national objectives set by NRIC on Nigeria's STI-based socio-economic development**
- ii. Service as the look-out body for current and future STI needs of Nigeria for advice to the Federal Government of Nigeria, through the Hon. Minister of Science and Technology
- iii. Provision of independent advice to the Federal Government of Nigeria through the Hon. Minister of Science and Technology on STI matters, including the quality of STI projects and other projects of the Federal Government of Nigeria
- iv. Assistance to the Federal Government of Nigeria through the Federal Ministry of Science and Technology, on the constitution of expert panels to address critical STI issues whenever necessary
- v. Review of biennial **"State of Nigeria STI Reports"** developed by FMST
- vi. Formulation and review of STI policy

With respect to membership, NACST will be chaired by an eminent scientist/engineer who is not a direct employee of the Government at the Federal, State and Local Government levels in Nigeria. He/She must also be a winner of Nigeria's highest honour for excellence in science and technology-the Nigerian National Order of Merit (NNOM). All members of NACST must be appointed by the Hon. Minister of Science and Technology through self or organizational nominations, to serve 3-year renewable terms. Guidance on membership of the NACST which will be limited to a total of 20 persons is provided below. The following guidelines are provided for selection of experts to constitute NACST.

- The Chairman-a winner of NNOM
- Experts in specific disciplinary fields
  - All winners of Nigerian National Order of Merit (NNOM) Award in Science and Technology
  - Academies of Engineering & Sciences (5 members)
  - Chosen experts in various fields (5 members)

The NACST will meet as required but at least quarterly to address issues. Its subcommittees will be formed by the Chairman in consultation with the Hon. Minister of Science and Technology.

• **State Science, Technology and Innovation Councils (SSTIC)**

The SSTIC will ensure the percolation of STI into operational organs of government, the private sector, non-governmental associations and community groups at the state level and within the constituent Local Government Areas. The Federal Government will provide incentives for the formation and proper functioning of SSTICs. The primary functions are as stated below.

- i. Provide leadership and directions for STI activities at the state level
- ii. Promote science education and disseminate science, technology and innovation information
- iii. Align policies and programmes with those of the NRIC
- iv. Promote and implement decisions and programmes of FMST-MASTI

With respect to membership, the preferred composition and governance are briefly state below.

- i. The Chairman will be the Executive Governor of the State while each State's Ministry of Science and Technology or its equivalent will serve as the secretariat.
- ii. The Council shall consist of the following as members:
  - a. Honourable Commissioners of STI and STI-related Ministries
  - b. Representatives or members of appropriate committees of the State House of Assembly
  - c. Representatives of State chapter of organized private sectors and relevant professional bodies

**4.2. Creation of Incentives for Excellence**

The NSTIR 2030 projects that are catalogued in Tables 5 provide some incentives that conform to the Nigeria STI policy approaches stated below. Some of these approaches will be used in transactions although they may not constitute individual projects.

- i. Facilitating the acquisition and advancement of new and emerging technologies through international STI collaboration and Foreign Direct Investment (FDI).
- ii. Strengthening collaborative research and development activities with regional and international agencies.
- iii. Encouraging the nation to join and participate in international STI information networks.



- iv. Promoting international exchange programmes for staff and students in tertiary institutions, military and public service capacity-building institutions that are engaged in STI research activities.
- v. Mobilizing and actively engage Nigerian STI professionals in the Diaspora for national development.
- vi. Establishing relevant STI centres of excellence in new and existing institutions.
- vii. Encouraging multidisciplinary teams of experts for collaborative R&D and commercialization efforts.
- viii. **Facilitating Nigeria's integration into the global knowledge Network through creating avenues for strategic engagements with partners and multiple voices on Global STI issues**
- ix. Creating incentives for cross-border collaboration that empowers Nigeria's scientific, technological and industrial transformation
- x. Facilitating access to STI (knowledge) produced abroad through formalized liberal technological agreements, including trade agreements and patent laws.
- xi. Providing advice and knowledge that could lead to the establishment of the infrastructure of innovation.
- xii. Promoting creative competition amongst States to measure technological and investor friendly environment in the States.
- xiii. Facilitating reversal of brain drain.
- xiv. Increasing foreign funding through international collaboration and internationalization of research, science, technology and innovation.
- xv. **Encouraging knowledge centres to provide support for Nigeria's emerging industrial clusters through linkages and collaboration.**
- xvi. Facilitating effective partnership through the alignment of culture, social values and work ethics of Nigeria to the requirements of modern, entrepreneurial, scientific, technological and innovation goals.

#### **4.3. Talent Discovery Among the Disabled**

STI is a way of life and engagement that should provide opportunities to all. This Roadmap includes opportunities in training, consultations and entrepreneurship that must by necessity be opened up to the physically disabled. There are many examples within and outside Nigeria, of the physically challenged performing rather intricate but critical tasks with highly marketable skills. An excellent example is the revered physicist/cosmologist, Stephen Hawking who is paralyzed from his neck down but is still one of the greatest contributors to advances in space sciences. All across Nigeria are millions of physically handicapped persons of great intellect who need to be given opportunity through this NSTIR programme to realize their full potential, earn a living, and contribute to the socio-economic development of Nigeria. Without pre-conceptions about the limits of their talents, they will be specially sought after, for invitation to the training programmes and talent identification forums included and scheduled within NSTIR 2030. This will be done in collaboration with partners.

#### **4.4. Engagement of Learned Societies and Professional Associations**

As evident in Appendix 4, Nigeria has numerous professional associations. Unfortunately, until now, not much knowledge has been tapped from them to drive STI policies and productive industrial development programmes in Nigeria. Rather, labour disputes have dominated the arena while national productivity is driven to the background. Much needs to be created prior to sharing. Learned societies and professional societies along with academic institutions and research centers, constitute the brain trust from which STI knowledge will be harvested for implementation of NSTIR 2030. There are specific projects and programmes in that regard. In Table 10, they have been allocated seats *en bloc* in the governance bodies of NSTIR 2030. In Appendix 4, which is an unexhaustive list of STI-related professional associations in Nigeria, each association is classified with respect to its socio-economic

sector(s) of coverage, as well as the planned NSTIR 2030 programme thrusts. This will serve the FMST well as a guide for solicitation of input from the associations and learned societies.

Some of the organizations are assemblies of vetted nominees who gained membership on the strength of their excellence in specific scientific, engineering and other relevant fields. FMST will pay particular attention to these bodies, at the top of which is the body of laureates of the Nigerian National Order of Merit (NNOM). The leadership of the FMST, possibly, the Hon. Minister of Science and Technology, the Chairman of the NCSTI and the Permanent Secretary of FMST will hold quarterly meetings with the Governing Council of the Nigerian National Merit Agency (NNMA) to receive and address the recommendations (past or present) that the body of NNOM laureates will continue to develop for implementation in Nigeria. Involvement of the Academies has been covered in Section 4.1 of this document.

#### 4.5. Improvement of STEM Education

Good STEM education is the foundation for the creation of an adequate skills base for implementation of STI and NSTIR 2030 in Nigeria. The relevant parameters are infrastructure, up-to-date STEM textbooks, access to ICT, nutrition, home stability and many other factors, some of which are extraneous to science and technology itself. The implication then, is that FMST has to collaborate with other agencies of government at all levels, the private sector, development partners and even local communities, to improve STEM education in Nigeria.

Fortunately, this objective (along with the enumerated factors) is also covered in the following critical roadmaps/plans of the Ministries of the Federal Republic of Nigeria.

- National Industrial Revolution Plan (January, 2014)
- National Health Policy (2017)
- Roadmap for the Nigerian Education Sector (2009)

Synergies from the various projects included in these plans and roadmaps (including NSTIR 2030) programmes will deepen STEM education in Nigeria with benefits to STI implementation and national productivity

#### 4.6. Provision of Special Incentives for Women

Data that are presented in section indicate that women in Nigeria are disadvantaged by exclusion from opportunities and activities of both STEM and STI. In most cases, cultural factors are the drivers of this circumstance which is inimical to the socio-economic advancement of Nigeria. In the Vision 20:2020 document (198), promotion of gender equality is one of the targets of the plan. One of the sub-objectives of the plan is the promotion of gender equality in access to basic education. No nation can afford to *a priori*, disqualify almost half its population from knowledge systems and occupations that will determine its socio-economic success. **With this realization, Nigeria's STI policy contains a following targets.**

- i. Encourage the establishment of women STI desk at both the ministry level and relevant public and private agencies involved in STI activities.
- ii. Support women to participate and hold leadership positions in STI endeavours.
- iii. Provide funding and other incentives for continuing education of women in STI.
- iv. Provide scholarships and mentoring to increase female enrollment and retention in STI disciplines.
- v. **Provide a framework to encourage and increase women's employment in STI sectors.**
- vi. Mentor a vibrant national and sub-national woman and STI fora that will regularly engage in reflections on the role of women in STI, national development, and network them with their international counterparts.
- vii. Support efforts to promote gender mainstreaming in STI.

The Roadmap for the Nigerian Education Sector (2009) provides for **"ensuring of gender parity in teacher recruitment"**. This will provide millions of aspiring female students with role models. All NSTIR 2030 programmes will be open to women. Furthermore, talent development programmes will include

additional and specific opportunities for women. An effort will be made over a 5-year period to increase the percentage of women in the STI research teams of FMST laboratories to at least 30%. In collaboration with development partners, projects that target expansion of opportunities for women in STI will be implemented.

#### 4.7. Operation of a National Research Foundation and Proposal Solicitation Programmes

The constraint to Nigeria's engagement of deeper intellect in the solution of its complicated socio-economic problems is not lack of talent but lack of existence of mechanisms for engaging that intellect. Current opportunities for engagement are too probabilistic and depend mostly on patronage as opposed to genuine talent searches and solicitation. On the other hand, those who have the skills that can address the country's myriad of challenges do not volunteer their expertise and are mostly unaware of the parameters that drive circumstances that affect their practice or even where to append their knowledge outside their institutes.

The most practical solution to the aforesaid problem is the creation of a Nigerian National Research Foundation much like almost all other developing and technologically advanced countries have done. It is the most comprehensive and sustainable way of creating and injecting knowledge systems into an economy. In the absence of a National Research Foundation, there is no means of extracting the intellect of qualified Nigerians for national economic development. The Nigerian National Research and Development Foundation (NNRDF) would not itself perform research but would provide opportunities and mechanisms just like those of other countries (south Africa, Egypt, Brazil, etc.). The current TETFUND is not the organization to do that. The NNRDF would not duplicate its functions either. NNRDF would have the following roles and responsibilities.

- Development of annual **Call for Research Proposals** after consultations with Federal Ministries, Agencies, the private sector, multi-group panels on specific STI challenges of Nigeria. The form that is shown in Table 24 would be used by the FMST centre-based Principal Investigators and their collaborators to differentiate their submissions from those of others due to the mission-driven nature of their research programmes.
- Publication of **Solicitations for Proposals and Management of Technical Review Processes** on the submissions. The categories of research would reflect the 10 research areas of NSTIR listed in section 3.3.
- Small Business Innovation Research
- General Open Research for Institutions and Other Research Organizations
- Community Level Research
- Individual Investigations
- Collaborations with NOTAP and other business groups to translate research and development results to policies and enterprise development programmes.

#### 4.8. Stronger Roles by Academic Institutions

Nigerian academic institutions for a variety of reasons, have not played the pivotal role that they should play as the primary generators of knowledge and systems for socio-economic development of Nigeria. They are lowly-ranked relative to other institutions within and outside of Africa; ravaged by non-research related internal conflicts; and have an excessive proportion of faculty members who are not excited by research and development. Revival of research is needed in Nigerian tertiary institutions to levels that existed in the 1960s and 1970s. Implementation of the Nigerian National Research and Development Foundation (NNRDC) coupled with other opportunities that will be provided by NSTIR 2030, will push **universities into roles as creators of data, models, and systems for Nigeria's economic development**. In doing so, the steps and requirements recommended in Table 25 should be considered by the National University Commission (NUC), the equivalents of NUC for other categories of tertiary institutions in Nigeria and the leaders of all universities, polytechnics, colleges of education and related institutes in Nigeria. For both FMST-affiliated and other research institutes and centers, the form shown as Table 26 should be used to evaluate their performance for rewards, expansion or closure.

#### 4.9. Promotion of Corporate Sector Research and Intellectual Property Rights.

In every technologically advanced country, large corporations establish their research and development centers, either within their corporate structures or in tertiary institutions under partnership agreements. This arrangement is rare in Nigeria and contributes to relegation of STI to lower levels of significance. It also subtracts opportunities that academic institutions would have to increase their STI base through engagement of their researchers and students in both basic and applied research; improvement of STI research facilities; and publication of results in high-quality journals for elevation of institutional rank and prominence in STI fields. The Corporate Affairs Commission of Nigeria should work with FMST, Nigeria's Ministry of Finance, Ministry of Commerce, and Ministry of National Planning to create and implement a policy that requires every corporation with annual revenues in Nigeria above US\$ 50 million to set up a research institute in Nigeria, either within its organization or at a tertiary institution. If there are fears about intellectual property rights, those fears would be allayed by the fact that the structures will be setup across the board as required by the following mechanisms that are mandated by Nigeria's STI Policy of 2011.

- i. Ensuring adequate intellectual property recognition, promotion and protection of creativities, traditional knowledge, indigenous technology and other intellectual assets.
- ii. Building local capacities in intellectual property management for effective transfer of technology.
- iii. Promoting a sustainable culture on intellectual property at all educational levels.
- iv. Establishing and strengthening Technology Transfer Offices for effective management and utilization of Intellectual Property Rights in the National System of Innovation.
- v. Providing appropriate incentives for creativity and innovation to stimulate creativity and innovations.
- vi. Developing a viable IP policy especially regarding royalties and ownerships mechanism for equitable distribution of benefits accruing from inventions, traditional knowledge, biodiversity resources and innovations among stakeholders.
- vii. Establishing, regularly updating and facilitating access to intellectual property data bank and portals.
- viii. Ensuring a dynamic development of the IPR system to address new and emerging creativities including initiating when appropriate, the enactment and review of IP laws to incorporate all aspects and issues relating to plant breeder's rights, traditional knowledge and genetic resources.

#### 4.10. Incorporation of Technical Guidance into All Major Projects.

In sections 1.2 and 1.3 of this document, the failure of many national economic development plans to generate national wealth for improvement of Nigeria's socio-economic circumstances was attributed to poor planning, poor decision-making and non-engagement of technical talent, among other reasons. Numerous, expensive initiatives in all sectors have failed in Nigeria for the reasons stated above. NSTIR 2030 has the plan of stemming this problem by working with the Federal Ministry of Finance and other agencies to ensure that every project awarded by the Federal Government of Nigeria beyond the budget of ₦500million (cumulative for all phases) has a Technical Advisory Panel if its implementation requires knowledge in a specific technical matter and/or a Management Advisory Panel if the project requires application of deep expertise in management. Appointments to both panels will be based on knowledge and not political cloud.

Furthermore, STI is a knowledge sector is field in which advances occur almost daily in one part of the world or the other. Even when technology-laced projects are being implemented, advancements may render ongoing approaches and systems obsolete. This has implications on market potential, as well as the cost of production and/or services relative to those of competitors elsewhere who may now be producing goods at lower costs for competition with made-in-Nigeria goods and services in the same market. The response in Nigeria during implementation of NSTIR 2030 is to adapt the practice that other countries, particularly, the United States and Canada, have used to apply the latest knowledge from fast-evolving fields. This is the sponsorship and use of authored technical guidance documents for implementation of technologies within major projects where those technologies are not covered in

standard textbooks that take 2-5 years to write. Every major project that has major STI content, should provide for the development and use of a Technical Guidance Manual in its budget, to be evaluated by a panel, to reduce risks of technology deficiency-driven failures of expensive projects in Nigeria. Candidate projects are those that fall within the following categories.

- Steel production
- Railway alignment and construction
- Airport development and construction
- Industrial clusters development
- ICT projects
- The desert wall projects
- Dam construction projects
- Erosion control projects
- Skills development projects of national scale
- FADAMA and other major agricultural projects
- NNPC infrastructure development projects including refineries

#### **4.11. Market Expansion for Made-in-Nigeria Products**

Nigerian-made products may not find immediate acceptance or market penetration in other countries to levels that would allow cosmetic manufacturers to earn enough foreign currency to put back into their businesses (e.g. purchasing foreign-sourced raw materials). Being that Nigeria has a large population that constitutes a large domestic market, the industrialization policy that has been recently developed for Nigeria (which contains plans for domestic market expansion) should be followed up vigorously to support domestic innovators.

One of the market incentives that will complement tax exemptions is purchase of locally manufactured goods by Government and the specification that contractors use locally manufactured products and raw materials to implement projects that the Federal Government contracts with them.

## **5.0 FUNDING OF SCIENCE AND TECHNOLOGY IN GENERAL, AND NSTIR 2030 IN PARTICULAR**

### **5.1. Required Funding Levels**

A distinction is herein made between funding of Science and Technology which roughly approximates NSTIR 2030 in segments, and funding of Research and Development which is usually recorded in international databases. The latter often covers more than STI because fields outside science and technology may be involved. Focusing solely on the budget required to implement NSTIR 2030, the period between 2017 and 2030 has been divided into three segments conveniently shown in Table 5 and as re-stated below.

- Short-term period (2017-2020): 4 years
- Medium-term period (2021-2025): 5 years
- Long-term period (2026-2030): 5 years

The budget estimates presented in Table 27 are for the Short-Term period of 4 years from 2017 to 2020. In budget cycle terms, it is actually for 3 years because 2017 programmes have already been covered by allocations from budget activities that started in 2016. Based on the realistic estimates presented in Table 27, the various components of NSTIR 2030 require the following funding levels during the short-term period. Each of the components has several programmes and projects as detailed in Table 27.

- ₦25 billion for mobilization of the Nigerian intellectual resources for growth and diversification of the economy
- ₦30 billion for science and technology infrastructure improvement

- **₦70 billion for research and development intensification out of which ₦40 billion is budgeted for tripling of the research productivity/output of Federally sponsored (FMST) laboratories**
- **₦6 billion for training and talent deployment**
- **₦36 billion for technology deployment and commercialization**
- **₦10.50 billion for science literacy improvement and public/stakeholder's engagement, including the establishment/building of a Science and Technology Museum**
- **₦2.50 billion for system monitoring, evaluation and improvement.**

The total estimated funding requirements for the short-term NSTIR 2030 programme is **₦180 billion** over 3 years which averages just **₦60 billion** per year. It should be noted that the budget that was passed for science and technology for Nigeria in 2014 was a paltry **₦36 billion** out of a total national budget of **₦4.9 trillion** which was 0.73% of that national budget. There has not been much improvement on budget allocation to STI in Nigeria. An allocation of 3-4% would be adequate to generate significant advancement to the benefit of Nigeria. In terms of the NSTIR 2030 budget estimates presented in Table 27, the breakdown of the budget with respect to categories of expenditures are as follows.

- |  |                                |
|--|--------------------------------|
| • Programme Configuration and Planning:    | <b>₦2.69 billion (1.5%)</b>    |
| • Stakeholder Engagement Processes:        | <b>₦ 4.84 billion (2.7%)</b>   |
| • Management and Personnel Support:        | <b>₦ 20.96 billion (11.6%)</b> |
| • Facilities and Equipment:                | <b>₦ 46.95 billion (25.6%)</b> |
| • Deployment and Diffusion of Deliverables | <b>₦ 6.19 billion (3.4%)</b>   |
| • Project Operations                       | <b>₦ 55.2 billion (55.2%)</b>  |

## 5.2. Funding Sources

**Nigeria's STI policy targets the provision of adequate funding for STI infrastructure and activities** for sustainable development through viable mechanisms. The identified sources of funding are as follows:

- **A National Research and Development Fund and NSTIR programmes (15%).**
- **Government allocations (50%).**
- **Public-private partnerships funds with some incentives (15%).**
- **International science promotion and R and D funds through grants and open contest research proposals (see the list in Appendix 6) (10%).**
- **Venture capital funds some of which can be accessed through development banks (10%).**

## 5.3. Establishment of a Science and Technology Bank

R and D projects that show promise for transition to entrepreneurship should qualify for graduated loans. Currently, banking philosophies and processes in Nigeria do not allow such risks to be taken although in reality, risks inherent in them may not be higher than those of traditional, commercial ventures. **The net results are that great ideas that would have contributed to Nigeria's development are abandoned or lost due to lack of support funds.** In some cases, other countries poach the Nigerian experts who are originators of great ideas. This challenge can be addressed through the establishment of a Science and Technology Bank with some risk sharing by the Federal Government on funding of approved projects. The Federal Ministry of Finance is also taking the lead in the planning of a Development Bank of Nigeria (154) that may cover some capital projects listed in NSTIR 2030.

## 5.4. Tax Incentives for the Private Sector

**Nigeria's private sector is capable of contributing significantly to the funding of the NSTIR 2030 programmes and projects if given the right incentives to do so.** For example, portions of their revenues that are contributed to verifiable NSTIR 2030 research projects could be made tax-exempt. Some countries have done this with corporate social responsibility.

TABLE 24: CONFIGURED FORM TO USE BY FMST LABORATORY PERSONNEL FOR INTRAMURAL RESEARCH PROPOSALS

**FEDERAL MINISTRY OF SCIENCE AND TECHNOLOGY (FMST)**



**FEDERAL GOVERNMENT OF NIGERIA**

**RESEARCH PROPOSAL AND PROJECT JUSTIFICATION FORM**

<b>A. PRINCIPAL INVESTIGATOR (PI)</b>	Name:		
	Email:	Tel:	
	Unit within FMST:		
	Terminal Degree:	Attach resume (5-Page Max)	
<b>B. CO-INVESTIGATOR(S)</b>  <b>Note:</b> Limited to those who will make verifiable, Significant intellectual contributions to the project.  <b>Note:</b> They may come from internal FMST entities or external organizations	1.	Name:	
		Email:	Tel:
		Unit within FMST:	
		Terminal Degree:	Attach resume (2-Page Max)
	2.	Name:	
		Email:	Email:
		Unit within FMST:	
		Terminal Degree:	Attach resume (2-Page Max)
	3.	Name:	
		Email:	Email:
		Unit within FMST:	
		Terminal Degree:	Attach resume (2-Page Max)
<b>C. DESCRIPTION OF RELEVANCE TO LOCAL/NATIONAL/GLOBAL DEVELOPMENT GOALS (3 Page Max)</b>			
<b>D.</b>	<b>CATEGORIZATION OF THE PROPOSED PROJECT WITHIN THE NIGERIAN NATIONAL SCIENCE AND TECHNOLOGY IMPROVEMENT ROADMAP (NSTIR) 2030</b> <i>(Mark appropriate category and explain (2-page max) Mark X on all the apply)</i>		
	Science Policy Support	Training and Talent Deployment	
	Science & Tech. Infrastructure Improvement	Tech. Deployment & Commercialization	
	Research and Development Intensification	Science Literacy Improvement & Public Engagement	
		System Monitoring, Evaluation & Improvement	
<b>E. PROJECT SUMMARY (2-pages max)</b>			
<b>F. INTRODUCTION (2-pages max)</b>			
<b>G. TECHNICAL APPROACH INCLUDING ANALYSIS OF KEY CONCEPTS (8-pages max)</b>			
<b>H. MODELING AND OR EXPERIMENTS AS REQUIRED (3-pages max)</b>			
<b>I. FACILITIES AND EQUIPMENT (2-pages max)</b>			
<b>J. PLANNED ANALYSES OF DATA (4-pages max)</b>			
<b>K. PLANNED DISSEMINATION OF RESULTS (2-pages max)</b>			
<b>L. EXPERIENCE AND QUALIFICATIONS OF PERSONNEL (all personnel 24-pages max)</b>			
<b>M. PLANS FOR INVOLVEMENT OF INTERNS (2-pages max)</b>			
<b>N. BUDGET OF THE PROJECT</b>			

**TABLE 25: STEPS THAT UNIVERSITIES CAN TAKE TO ENHANCE THEIR CONTRIBUTIONS TO SUSTAINABLE DEVELOPMENT**

**1. IMPROVEMENT OF INTERNAL GOVERNANCE**

- a. Think strategically to enhance sustainability
- b. Decentralize authority to improve efficiency
- c. Promote equity without ethnic and gender biases

**2. DEMONSTRABLE COMMITMENT TO THE EDUCATION OF STUDENTS**

- a. Focus on student welfare socially and educationally
- b. Identify talent rather than deficiencies in students
- c. Encourage intellectual debate on- and off-campus

**3. IMPROVEMENT OF RESEARCH CAPACITY**

- a. Focus on areas of comparative advantage
- b. Form alliances with external sponsors on projects
- c. Create substantive research centers
- d. Seek and recruit and reward research personnel
- e. Improve research facilities

**4. FORMATION OF PROGRAMME ALLIANCES WITH THE PUBLIC AND PRIVATE SECTOR**

- a. Create opportunities for engagement of collaborators
- b. Create incentives such as named buildings, streets, prizes and endowments
- c. Engage in high-utility projects
- d. Use external issues as targets for analyses (theses, consulting, entrepreneurship)

**5. INVOLVEMENT IN KNOWLEDGE-BASED NETWORKS**

- a. Host seminars, debates and conferences on topical and fundamental issues
- b. Engaged renowned experts, politicians and advocates to the benefit of students and the general public
- c. Improve internal access to information (library, internet, etc.)
- d. Host major journals, publications and professional societies
- e. Collaborate with other universities and organizations worldwide

**6. CREATION AND UNBIASED DISTRIBUTION OF INCENTIVES TO INTERNAL ADMINISTRATORS, FACULTY AND STUDENTS**

- a. Create distinguished professorships for both teaching and research
- b. Create annual prizes for excellent performance to encourage high scholarship
- c. Provide internship opportunities through arrangements with external hosts



**TABLE 26: SUGGESTED CRITERIA FOR PERFORMANCE EVALUATION OF RESEARCH ORGANIZATIONS OF FMST AND OTHER AGENCIES ON THE IMPLEMENTATION OF NSTIR 2030**

PERFORMANCE FACTOR	PERFORMANCE CRITERIA	EVALUATION				
		Excel.	Very Good	Good	Fair	Poor
1. RESEARCH EXCELLENCE/SCHOLARSHIP	A. Ratio of external research funds to internal operational funds provided by the home institution					
	B. Number of peer-reviewed publications per faculty associated of the institute/center during the performance evaluation period					
	C. Number of patents developed and research prizes won by institute/center					
	D. Number of external funding proposals sent out through the center/institute					
	E. Number of agencies, corporations and institutions collaborating with the institute/center					
2. EXTERNAL PROFESSIONAL RECOGNITION	A. Service rate of center/institute personnel on editorial boards, conference panels and professional societies as leaders					
	B. Number of professional recognition awards given to faculty, personnel and students of the institute/center					
	C. Number of invited speeches, seminars, testimonies, etc. made by institute/center personnel					
3. EXTERNAL OUTREACH SERVICE	A. Number and significance of workshops, training sessions organized and hosted by center/institute					
	B. Number and significance of contributions by institute/center to public policy at any or various jurisdictional levels					
	C. Number of conferences and special presentations hosted and participation of various institutional sectors					
	D. Number of interns from external organizations and/or collaborators from external organizations involved in the programs of the institute/center					
4. INVOLVEMENT OF FACULTY AND VISITING SCHOLARS	A. Number of departments whose faculty are involved in institute/center programs					
	B. Total number of faculty who are active in institute/center programs, and number of inter-departmental research proposals					
	C. Level of support (fiscal and professional) provided by institute/cent to faculty associates					
5. STUDENT SUPPORT AND INVOLVEMENT	A. Number of students who benefit from grants. Scholarships, fellowships awarded through the center/institute					
	B. Fraction of external funds devoted to student support through the institute/center					
	C. Number of students who perform research using institute/center facilities					
	D. Number of students who complete degree programs based on research supported by the institute/center					
6. CONTINUING RELEVANCE TO ORGANIZATIONAL MISSION	A. Satisfactory score of the center/institute on other activities within the mandate of the host organization					
7. ORGANIZATIONAL ACTIVITIES						

TABLE 27: ESTIMATED BUDGET REQUIREMENTS AND DESIRABLE BUDGET COMPOSITION FOR THE SHORT TERM (2017-2020) COMPONENT OF THE NSTIR 2030

IMPROVEMENT SECTORS AND KEY PROGRAMMES	2017-2020 (SHORT-TERM 3-YEARS) ESTIMATED BUDGET (N BILLION)							DESIRABLE FUNDING SOURCES				
	Program Config. & Planning	Stakeholder Engage. Processes	Mgt. and Personnel Support	Facilities & Equipment	Deploy. & Diffusion of Deliverables	Project Operations	TOTAL	NATIONAL PUBLIC BUDGET	STATE & LOCAL PUBLIC BUDGET	PRIVATE SOURCES	INT. GRANTS	
<b>A. SCIENCE POLICY SUPPORT PROGRAMMES AND ACTIVITIES</b>												
<b>A.1</b>	<b>MOBILIZATION OF THE NIGERIAN INTELLECTUAL RESOURCES FOR GROWTH AND DIVERSIFICATION OF THE ECONOMY</b>											
A.1.1	<i>Creation of the National Science and Technology Advisory Groups in key economic sectors</i>	0.10	0.40	2.00	1.00	0.50	6.50	10.50	X			
A.1.2	<i>Institutionalization of a special science tax</i>	0.05	0.05	0.10	0.00	0.10	0.20	0.50	X			
A.1.3	<i>Commissioning of an Annual Nigerian National State Science and Technology Report</i>	0.05	0.15	0.10	0.10	0.40	1.20	2.00	X			
A.1.4	<i>Establish policies and programmes for popularization of science and technology in all MDAs</i>	0.05	0.15	0.10	0.10	0.40	1.70	2.50	X			
A.1.5	<i>Collaborate with appropriate Nigerian agencies to enhance implementation of local content programmes.</i>	0.02	0.02	0.05	0.01	0.05	0.05	0.20	X	X		
A.1.6	<i>Work with the Nigerian Congress to create and enforce made in Nigeria rules in all government contracts</i>	0.01	0.02	0.02	0.01	0.01	0.23	0.30	X	X	X	
	<b>SUBTOTAL A.1</b>	<b>0.28</b>	<b>0.79</b>	<b>2.37</b>	<b>1.22</b>	<b>1.46</b>	<b>9.88</b>	<b>16.00</b>				
<b>A.2</b>	<b>REWARD SYSTEM AND INCENTIVES IMPROVEMENT</b>											
A.2.1	<i>Establish a new remuneration package for S&amp;T professionals in government</i>	0.02	0.02	0.06	0.04	0.05	0.81	1.00	X	X		
A.2.2	<i>Implement National Science and Technology Support Awards in key sectors: Biosystems, manufacturing, science and tech. policy, agriculture, health, ICT and space systems, mathematical sciences, chemical</i>	0.10	0.20	0.30	0.10	0.30	3.00	4.00	X			

	systems and science communications												
A.2.3	Create three parallel remuneration tracks in federal science and tech. establishments: administrative, technical; and entrepreneurship	0.05	0.05	0.20	0.10	0.10	0.50	1.00	X				
<b>SUBTOTAL A.2</b>		0.17	0.27	0.56	0.24	0.45	4.31	6.00					
<b>A.3</b>	<b>MANDATES REVIEW AND ENFORCEMENT</b>												
A.3.1	Enforce compliance with the Acts of Establishment of Nigeria's science and tech. agencies and institutions	0.02	0.03	0.05	0.05	0.10	0.25	0.50	X				
A.3.2	Work with the Federal Ministry of Education to enforce the 60/40 science/art admission ratio and increase it to 70/30 by 2030	0.02	0.03	0.05	0.05	0.10	0.25	0.50	X				
A.3.3	Double budget allocation to science and technology every 2 years up to 2030	0.01	0.03	0.10	0.01	0.05	0.30	0.50	X				
A.3.4	Work with the Federal Ministry of Finance and the Due Process Office to formulate a policy that requires the allocation of 5% of every budget of ₦200 million and above to science and technology support in federal contracts.	0.05	0.05	0.45	0.01	0.05	0.89	1.50	X				
<b>SUBTOTAL A.3</b>		0.10	0.14	0.65	0.12	0.30	1.69	3.00					
<b>SUBTOTAL A</b>		0.55	1.20	3.58	1.58	2.21	15.88	25.00					
<b>B. SCIENCE AND TECHNOLOGY INFRASTRUCTURE IMPROVEMENT</b>													
<b>B.1</b>	<b>INCREASE IN SHARE OF THE MANUFACTURING SECTOR IN GDP FROM 4 TO 40% BY 2030</b>												
B.1.1	Create and implement technical/vocational infrastructure grant program	0.05	0.05	0.20	0.10	0.10	3.50	4.00	X				X
B.1.2	Direct construction and PPP-formatted operation of electric power stations and water supply systems to industrial clusters and R and D stations in Nigeria	0.03	0.02	0.02	4.50	0.05	0.38	5.00	X	X	X		

B.1.3	Set up of materials testing/quality assurance laboratories in each of the 6 geopolitical zones of Nigeria	0.10	0.10	0.50	5.00	0.10	1.20	7.00	X	X	X	
B.1.4	Development of a GIS-capable National Data Repository in collaboration with statistics agencies	0.05	0.15	0.50	2.00	0.10	0.20	3.00	X			
<b>SUBTOTAL B.1</b>		<b>0.23</b>	<b>0.32</b>	<b>1.22</b>	<b>11.60</b>	<b>0.35</b>	<b>5.28</b>	<b>19.00</b>				
<b>B.2</b>	<b>SPACE TRAVEL TO INSTALL 3 MORE NIGERIAN SATELLITES AND IMPROVEMENT OF CYBER-INFRASTRUCTURE TO SUPPORT S&amp;T-BASED ENTREPRENEURSHIP</b>											
B.2.1	Establishment of a National S&T Information Repository in collaboration with the National Bureau of Standards	0.05	0.10	0.80	1.00	0.05	1.00	3.00	X			
B.2.2	Space travel to launch at least, 2 more advanced Nigerian satellites and establishment of mission control and data center in Abuja	0.20	0.10	0.20	2.80	0.20	0.50	4.00	X		X	
<b>SUBTOTAL B.2</b>		<b>0.25</b>	<b>0.20</b>	<b>1.00</b>	<b>3.80</b>	<b>0.25</b>	<b>1.50</b>	<b>7.00</b>				
<b>B.3</b>	<b>IMPROVEMENT OF FINANCING OF LARGE-SCALE INTEGRATED SCIENCE AND ENTREPRENEURSHIP</b>											
B.3.1	Creation of a Science and Technology Bank with productivity-focused rules and lending	0.05	0.10	0.20	0.10	0.05	2.00	2.50	X		X	
B.3.2	Provision of tax and other incentives to commercial banks to fund projects with high science and tech utilities	0.02	0.02	0.03	0.01	0.02	0.40	0.50	X			
B.3.3	Lower interest rate on industrial/S&T facilities improvement loans by 200% without requirement of collateral (Govt. assumes risks)	0.02	0.03	0.10	0.03	0.02	0.80	1.00	X		X	
<b>SUBTOTAL B.3</b>		<b>0.09</b>	<b>0.15</b>	<b>0.33</b>	<b>0.14</b>	<b>0.09</b>	<b>3.20</b>	<b>4.00</b>				
<b>SUBTOTAL B</b>		<b>0.57</b>	<b>0.67</b>	<b>2.55</b>	<b>15.54</b>	<b>0.69</b>	<b>9.98</b>	<b>30.00</b>				
<b>C. RESEARCH AND DEVELOPMENT INTENSIFICATION</b>												
<b>C.1</b>	<b>RESEARCH RESOURCES UTILIZATION IMPROVEMENT</b>											
C.1.1	Categorization of all research and development entities in Nigeria with respect to the 10 focus areas and their alignment with federally	0.02	0.02	0.10	0.05	0.01	0.10	0.30	X			

sponsored research centers for collaboration											
C.1.2	Development of a directory of experts in Nigeria and their focus with storage in coded, editable format	0.01	0.01	0.04	0.02	0.02	0.40	0.50	X		X
C.1.3	Creation of a National Science and Technology Library or library section to store both paper and electronic copies of articles and books.	0.10	0.10	0.70	5.00	0.30	2.50	8.70	X		X
C.1.4	Work with appropriate Nigerian agencies at various jurisdictional levels to improve library resources in Nigeria	0.01	0.05	0.10	0.02	0.02	0.30	0.50	X	X	X
<b>SUBTOTAL C.1</b>		<b>0.14</b>	<b>0.18</b>	<b>0.94</b>	<b>5.09</b>	<b>0.35</b>	<b>3.30</b>	<b>10.00</b>			
<b>C.2</b>	<b>IMPROVEMENT (TRIPLING) OF RESEARCH PRODUCTIVITY OF FEDERALLY-SPONSORED (FMST) LABORATORIES</b>										
C.2.1	Open up research staff employment opportunities to foreign experts on contract basis and advertise vacancies globally	0.02	0.03	1.40	0.50	0.05	1.00	3.00	X	X	
C.2.2	Establishment of centres of excellence or center suites of excellence to focus research on each of the Ten nationally target research areas. (collaborative)	0.02	0.18	0.50	2.50	0.15	0.65	4.00	X	X	X
C.2.3	Increase the ratio of research and technical personnel to administrative personnel in federal research centers & laboratories to 8/2.	0.05	0.10	1.00	0.50	0.05	0.30	2.00	X		X
C.2.4	Form external and qualified technical panels to evaluate the research productivity of FMST Centers both at the organizational and individual researcher levels	0.02	0.08	0.50	0.05	0.05	0.30	1.00	X	X	X
C.2.5	Expansion and intensification of research in FMST centers and labs on each of the 10 thematic areas (see Table (10))	0.20	0.30	2.00	7.00	0.50	20.00	30.00	X	X	
<b>SUBTOTAL C.2</b>		<b>0.31</b>	<b>0.69</b>	<b>5.40</b>	<b>10.55</b>	<b>0.80</b>	<b>22.25</b>	<b>40.00</b>			

<b>C.3 IMPROVEMENT OF ALIGNMENT OF FEDERALLY SPONSORED CENTERS AND RESEARCH WITH NATIONAL SOCIO-ECONOMIC DEVELOPMENT TARGETS</b>												
C.3.1	Initiation of a research justification assessment programme for all federally funded centers to ensure alignment and contribution to national development targets	0.02	0.03	0.10	0.02	0.03	0.80	1.00	X			
C.3.2	Development and use of a uniform designation and cataloging system for reports from government funded projects	0.02	0.03	0.10	0.02	0.03	0.80	1.00	X			
<b>SUBTOTAL C.3</b>		<b>0.04</b>	<b>0.06</b>	<b>0.20</b>	<b>0.04</b>	<b>0.06</b>	<b>1.60</b>	<b>2.00</b>				
<b>C.4 PROVISION OF INCENTIVES TO PRIVATE SECTOR ORGANIZATIONS IN R&amp;D INVESTMENT</b>												
C.4.1	Establishment of program support for large R&D joint ventures for companies that are in the same industry	0.05	0.10	0.50	0.50	0.15	1.70	3.00	X		X	
C.4.2	Opening up of Nigeria's current national research support programme to both public and private institutions	0.03	0.05	0.20	0.20	0.02	1.00	1.50	X		X	
C.4.3	Creation of a Nigerian National Research Foundation to support investigator-initiated research in nationally important thematic areas	0.05	0.10	0.20	0.55	0.10	5.00	6.00	X			X
C.4.4	Annual National Research Gaps Synthesis (ANRGS) to support engagements by Nigerian researchers and institutions	0.01	0.02	0.05	0.02	0.15	0.25	0.50	X			
C.4.5	Collaborate with the Federal Ministry of Education and Ministry of National Planning to provide grants for publication of STEM textbooks & technical guidance manuals in key development issues	0.05	0.15	0.50	0.10	0.20	1.00	2.00	X	X		
C.4.6	Creation of 5 National Research Chairs at the Distinguished, Senior and Junior levels in each of the 10	0.02	0.10	0.12	0.10	0.10	4.56	5.00	X			

	thematic areas (totally 50) for 10 year-periods every two years to be administered by the Nigeria's National Merit Agency (NNMA)											
	<b>SUBTOTAL C.4</b>	0.21	0.52	1.57	1.47	0.72	13.51	18.00				
	<b>SUBTOTAL C</b>	0.70	1.45	8.11	17.15	1.93	40.66	70.00				
<b>D. TRAINING AND TALENT DEPLOYMENT</b>												
<b>D.1</b>	<b>TRAINING CURRICULA IMPROVEMENT</b>											
D.1.1	Incorporated entrepreneurship training in the curricula of Universities and Polytechnics	0.02	0.02	0.05	0.05	0.01	0.15	0.30	X	X	X	X
D.1.2	Implementation of an FMST Artisan Training Programme	0.02	0.03	0.20	0.20	0.05	0.50	1.00	X	X	X	X
D.1.3	Use about 30% of the National Youth Service Corp year to train and brief graduates on science and technology and associated opportunities	0.04	0.05	0.15	0.05	0.01	0.40	0.70	X	X	X	X
	<b>SUBTOTAL D.1</b>	0.08	0.10	0.40	0.30	0.07	1.05	2.00				
<b>D.2</b>	<b>CREATION OF DOMESTIC OPPORTUNITIES</b>											
D.2.1	Create and operate a Nigerian science and tech. diaspora engagement programme with allowance for up to 3-year sabbaticals and foreign-site-at-large roles	0.02	0.06	0.40	0.40	0.02	0.60	1.50	X			X
D.2.2	Create a Scientist-in-Government and Scientist in Enterprise support program	0.02	0.05	0.13	0.04	0.01	0.25	0.50	X	X	X	X
D.2.3	Create Science & Tech. internship programmes in federal centers and laboratories for students at the rate of 2000 per year	0.02	0.02	0.30	0.20	0.02	0.44	1.00	X			X
	<b>SUBTOTAL D.2</b>	0.06	0.13	0.83	0.64	0.05	1.29	3.00				
<b>D.3</b>	<b>EXPANSION OF ROLES AND OPPORTUNITIES IN THE FOREIGN ARENA FOR NIGERIAN SCIENCE AND TECH. PROFESSIONALS</b>											
D.3.1	Categorize and solicit African continental and global professional organizations to set up and operate their headquarters in Abuja in a	0.01	0.04	0.05	0.03	0.02	0.15	0.30	X			X

	specialty constructed low-rent campus											
D.3.2	Initiate collaboration with Nigerian Tourism Agencies to provide incentives for trade organizations to host international fairs and science and tech. summits/conferences in Nigeria	0.02	0.03	0.03	0.01	0.01	0.10	0.20	X			
<b>SUBTOTAL D.3</b>		<b>0.03</b>	<b>0.07</b>	<b>0.08</b>	<b>0.04</b>	<b>0.03</b>	<b>0.25</b>	<b>0.50</b>				
<b>D.4</b>	<b>GENERATE INTEREST AND AWARENESS OF THE SCIENTIFIC AND TECHNOLOGICAL HERITAGE OF AFRICANS IN GENERAL AND NIGERIANS IN PARTICULAR</b>											
D.4.1	Create scientific heritage programmes for TV broadcasts (documentaries & live discussions)	0.01	0.01	0.10	0.06	0.02	0.20	0.40	X			
D.4.2	Name streets and monuments after eminent scientists and analysts	0.01	0.01	0.01	0.01	0.01	0.05	0.10	X		X	
<b>SUBTOTAL D.4</b>		<b>0.02</b>	<b>0.02</b>	<b>0.11</b>	<b>0.07</b>	<b>0.03</b>	<b>0.25</b>	<b>0.50</b>				
<b>SUBTOTAL D</b>		<b>0.19</b>	<b>0.32</b>	<b>1.42</b>	<b>1.05</b>	<b>0.18</b>	<b>2.84</b>	<b>6.00</b>				
<b>E. TECHNOLOGY DEPLOYMENT AND COMMERCIALIZATION</b>												
<b>E.1</b>	<b>PROVISION OF TECHNICAL AND ENTERPRISE SUPPORT INCREASE NIGERIA'S TECHNOLOGY DEPLOYMENT LEVEL BY 400% IN 2030 RELATIVE TO 2017 FOR TECHNOLOGY DEPLOYMENT</b>											
E.1.1	Channel a minimum of 20% of SME funds to commercialization of R and D results	0.03	0.05	0.37	0.50	0.05	2.00	3.00	X			
E.1.2	Create the Department of Technology Policy and Planning in the National Planning Commission (NPC)	0.01	0.01	0.01	0.01	0.01	0.05	0.10	X			
E.1.3	Create technology incubation centers in all major Nigerian cities as a collaborative among government, corporations, Banks and Universities	0.10	0.20	2.00	4.30	0.30	8.00	14.90	X		X	
<b>SUBTOTAL E.1</b>		<b>0.14</b>	<b>0.26</b>	<b>2.38</b>	<b>4.81</b>	<b>0.36</b>	<b>10.05</b>	<b>18.00</b>				
<b>E.2</b>	<b>ATTAINMENT OF 30% SUBSTITUTION OF THE VALUE OF IMPORTED PRODUCTS IN NIGERIA BY 2030</b>											
E.2.1	Establish a legal framework for progressive growth of local technologies and increase in raw	0.01	0.02	0.04	0.10	0.02	0.30	0.49	X			



	<i>material content of manufacturing industries in Nigeria</i>											
E.2.2	<i>Establish an electronic system for acquisition processing, storage and dissemination of information on new and advanced materials to researchers, entrepreneurs and policy makers.</i>	0.01	0.02	0.20	0.25	0.03	1.00	1.51	X			
E.2.3	<i>Require that all federally sponsored institutions must establish research, development and commercialization units under a dedicated Deputy Vice Chancellor</i>	0.01	0.03	0.10	0.03	0.03	0.80	1.00	X			
E.2.4	<i>Require each federally funded institution to report on result of industrial and entrepreneurship activities annually</i>	0.01	0.03	0.10	0.03	0.03	0.80	1.00	X			
<b>SUBTOTAL E.2</b>		0.04	0.10	0.44	0.41	0.11	2.90	4.00				
<b>E.3</b>	<b>INCREASE THE NUMBER OF SCIENCE AND TECH BASED COMPANIES IN NIGERIA'S INDUSTRIAL CLUSTERS AND PARKS BY 300% BY 2030</b>											
E.3.1	<i>Provide incentives such as energy-share and low rent facilities to companies at government initiated industrial cluster parks</i>	0.10	0.30	0.40	1.50	0.20	9.50	12.00	X		X	
E.3.2	<i>Site branches of appropriate government research laboratories at the industrial parks</i>	0.10	0.10	0.40	0.35	0.05	1.00	2.00	X		X	
<b>SUBTOTAL E.3</b>		0.20	0.40	0.80	1.85	0.25	10.50	14.00				
<b>SUBTOTAL E.</b>		0.38	0.76	3.62	7.07	0.72	23.45	36.00				
<b>F. SCIENCE LITERACY IMPROVEMENT AND PUBLIC /STAKEHOLDERS ENGAGEMENT</b>												
<b>F.1</b>	<b>SCIENCE LITERACY IMPROVEMENT</b>											
F.1.1	<i>Establishment of a science and technology museum</i>	0.10	0.10	0.30	3.00	0.10	0.50	4.10	X			X
F.1.2	<i>Strengthening of existing science programmes through junior engineers and technicians clubs</i>	0.01	0.02	0.04	0.02	0.01	0.10	0.20	X			

F.1.3	Strengthening of S and T talent hunting through Catch Them Young S&T Clubs throughout Nigeria	0.01	0.02	0.04	0.02	0.01	0.20	0.30	X	X		X
F.1.4	Implementation of national science and technology competition	0.01	0.02	0.03	0.02	0.02	0.35	0.45	X			X
<b>SUBTOTAL F.1</b>		<b>0.13</b>	<b>0.16</b>	<b>0.41</b>	<b>3.06</b>	<b>0.14</b>	<b>1.15</b>	<b>5.05</b>				
<b>F.2</b>	<b>DIRECT SCIENCE ADVOCACY AND INFORMATION DISSEMINATION</b>											
F.2.1	Implement biweekly science and technology briefings on television and radio in English and local languages using Nigerian experts	0.01	0.02	0.06	0.03	0.03	0.50	0.65	X			
F.2.2	Establish permanent sites for S&T Fairs at State and Local Government levels	0.02	0.03	0.02	0.35	0.03	0.95	1.40	X	X	X	
F.2.3	Serialize the biographies of eminent Nigerian scientists and engineers in newspapers and television using the NNOM Award Winner's lists and other non-political lists	0.01	0.02	0.15	0.02	0.05	0.55	0.80	X			X
F.2.4	Implement an annual National Science and Tech. week in collaboration with the private sector, academe, the states and the press	0.01	0.02	0.05	0.01	0.01	0.40	0.50	X	X	X	X
F.2.5	Initiate a programme of Science Diffusion at the Local Level (SDLL) in which weekly scientific briefings are given by local teachers and corpsers in local languages at the village level	0.03	0.05	0.20	0.07	0.05	0.70	1.10	X	X		X
<b>SUBTOTAL F.2</b>		<b>0.08</b>	<b>0.14</b>	<b>0.48</b>	<b>0.48</b>	<b>0.17</b>	<b>3.10</b>	<b>4.45</b>				
<b>F.3</b>	<b>COMMERCIAL SECTOR ENGAGEMENT PROGRAMME</b>											
F.3.1	Establish a programme by which Chambers of Commerce identify knowledge gaps and needs that confront them in efforts to increase productivity	0.02	0.03	0.25	0.02	0.08	0.60	1.00	X		X	
<b>SUBTOTAL F.3</b>		<b>0.02</b>	<b>0.03</b>	<b>0.25</b>	<b>0.02</b>	<b>0.08</b>	<b>0.60</b>	<b>1.00</b>				
<b>SUBTOTAL F</b>		<b>0.23</b>	<b>0.33</b>	<b>1.14</b>	<b>3.56</b>	<b>0.39</b>	<b>4.85</b>	<b>10.50</b>				

**G. SYSTEM MONITORING, EVALUATION AND IMPROVEMENT**

<b>G.1 IMPROVEMENT OF STANDARDS AND QUALITY ASSURANCE AGAINST STANDARDS</b>												
G.1.1	Provide regulatory standards and develop quality assurance protocols for indigenous technologies especially in housing, food production & traditional medicine	0.01	0.02	0.05	0.01	0.01	0.20	0.30	X		X	X
G.1.2	Develop metrics for evaluation of progress in Nigeria's science and technology system (innovation system)	0.01	0.02	0.05	0.01	0.01	0.20	0.30	X			
G.1.3	Develop a national ranking system for experts involved in science and tech. and other innovation programs in Nigeria	0.01	0.02	0.14	0.01	0.01	0.21	0.40	X			X
<b>SUBTOTAL G.1</b>		<b>0.03</b>	<b>0.06</b>	<b>0.24</b>	<b>0.03</b>	<b>0.03</b>	<b>0.61</b>	<b>1.00</b>				
<b>G.2 ATTAINMENT OF 100% CHARACTERIZATION OF NIGERIA AS REGARDS DEVELOPMENT AND SCIENCE AND TECHNOLOGY INDICATORS</b>												
G.2.1	Collaborate with Nigeria's statistics agencies on studies for data on all parameters of sustainable development goals (SDGs)	0.02	0.03	0.20	0.03	0.02	0.70	1.00	X			X
G.2.2	Create a depoliticized national development aspiration polling program for science and technology	0.02	0.02	0.10	0.04	0.02	0.30	0.50	X			
<b>SUBTOTAL G.2</b>		<b>0.04</b>	<b>0.05</b>	<b>0.30</b>	<b>0.07</b>	<b>0.04</b>	<b>1.00</b>	<b>1.50</b>				
<b>SUBTOTAL G.</b>		<b>0.07</b>	<b>0.11</b>	<b>0.54</b>	<b>0.10</b>	<b>0.07</b>	<b>1.61</b>	<b>2.50</b>				
<b>GRAND TOTAL</b>		<b>2.69</b>	<b>4.84</b>	<b>20.96</b>	<b>46.05</b>	<b>6.19</b>	<b>99.27</b>	<b>180.00</b>				

## 5.5. Establishment of a National Science and Technology Endowment Fund

In the recent past, Nigeria has established and operated several economic sector funds, most of which did not yield the desired results because of mismanagement and absence of sustained analytical input. In most regards, they are politically motivated without the appropriate management structure and required skills input despite the fact that they were in sectors that require STI. A National Science and Technology Endowment Fund is hereby proposed to serve as the main funding sources for STI activities and projects in Nigeria, including those of NSTIR 2030. Its existence will establish a firm base that will enable the sustainability of multi-year research and infrastructure projects without the abandonment that usually plagues them due to budget instabilities. Funds to support the Endowment would be sourced from the following federal organizations as well as development partners and the private sector.

- i. Raw Materials Research and Development Council (RMRDC)
- ii. Education Trust Fund (ETF)
- iii. Industrial Training Fund (ITF)
- iv. Automotive Development Fund (ADF)
- v. National Communication Development Fund (NCDF)
- vi. Information Technology and Development Fund
- vii. Agricultural Development Fund
- viii. Ecological Fund
- ix. Lottery Fund
- x. Sugar Development Fund
- xi. Development/Donor Agencies, etc.

## 6.0 PLANS FOR MONITORING, EVALUATION AND IMPROVEMENT OF PROGRAMMES AND PROJECTS

### 6.1. Levels of Monitoring and Evaluation

Nigeria's columns and rows in international rankings on various socio-economic indices are often blank because of lack of data. This discourages investors, blights national prestige; and makes it difficult to assess socio-economic progress that may result from implementation of development programmes and projects. Concerning NSTIR2030, projects and programmes will be monitored continuously at the following levels for use of data for completion key performer indicators (KPIs) analyses.

- STI project analyses, including research
- FMST operating unit level analyses covering each center, institute and administrative unit.
- NSTIR 2030 performance analyses using key indicators of progress on achievement of the strategic objectives.

### 6.2. Appropriate Evaluation Indices

As alluded to in Section 6.1, evaluation indices which in this case, will be the key performance indices (KPIs) vary from project-level through programmes to organizations. The three hierarchical levels of evaluations have been considered in drafting a preliminary scheme with the appropriate evaluation factors, for use in tracking-progress with NSTIR 2030. To the extent possible, impacts of the programme will be given preference over volume of activities as evident in Table 28. It is however, recognized that the latter does impact the former with much depending on the effectiveness of implementation.

### 6.3. Integration of Results into National Development Programmes

The NSTIR 2030 programme has been configured after reviews of basically all of Nigeria's development plans and most of the sectoral roadmaps since independence in 1960. STI needs in various sectors administrated by other units of the Federal Government have been studied and framed, often through extraction of information from sector roadmaps as exemplified in Appendix 1. Agencies and other organizations that operate outside the administrative control of FMST have been classified as potential collaborators and/or users of deliverables of NSTIR 2030 projects. These classifications are presented in Appendix 1, Appendix 3, Appendix 4, Table 5 and Table 10. On a continuing basis, NSTIR 2030

**TABLE 28: KEY PERFORMANCE INDICATORS (KPIs) FOR USE BY FMST TO TRACK ANNUAL PROGRESS ON IMPLEMENTATION OF NSTIR 2030. (ratings will be completed by stakeholder's consensus)**

KPI	SIGNIFICANCE AND APPLICATION	SCORE (10 is the highest)																		
		1	2	3	4	5	6	7	8	9	10									
<b>A. NATIONAL COMPETITIVENESS IN THE INTERNATIONAL ARENA (NCIA-SCORES)</b>																				
A.1	NATIONAL COMPETITIVENESS INDEX RANK	<i>This enables the productivity of Nigeria through the help of STI to be assessed relative to the rank of other countries.</i>																		
A.2	GLOBAL INNOVATION INDEX RANK	<i>This is a measure of the <b>stealth of the country's</b> ability to use STI to address challenges and improve quality of life</i>																		
A.3	GLOBAL MANUFACTURING INDEX RANK	<i>This is a measure of the capacity to produce goods to serve the economy locally and externally with attendant jobs and wealth creation</i>																		
<b>B. SATISFACTION OF NATIONAL DOMESTIC SOCIO-ECONOMIC OBJECTIVES (SNDS-SCORE)</b>																				
B.1	NO OF STI-FOCUSED BUSINESSES CREATED	<i>This measures the utility of STI to economic development of the country through creation of enterprises</i>																		
B.2	NO OF JOBS CREATED ANNUALLY BY STI RELATED FIRMS	<i>this directly measures wealth distribution and contribution of STI to social stability</i>																		
B.3	ESTIMATED MONETARY CONTRIBUTION OF STI TO NATIONAL ECONOMY	<i>This measures the extent to which STI justifies investment through payback</i>																		
B.4	TOTAL R&D PERSONNEL IN THE COUNTRY (UNESCO)	<i>This measures the diffusion of STI into the professional stock of the country</i>																		
B.5	NUMBER OF FOREIGN RAW MATERIALS REPLACED BY LOCAL MATERIALS	<i>This is an indicator of the use of STI to reduce production costs for Nigerian industries</i>																		
B.6	NUMBER OF PRODUCTS REMOVED FROM IMPORT LISTS DUE TO LOCAL PRODUCTION	<i>This is an indicator of impact of STI on industrial growth in Nigeria with benefits for the economy</i>																		
<b>C. PRODUCTIVITY IN SCIENCE, TECHNOLOGY AND INNOVATION (PSTI-SCORE)</b>																				
C.1	TOTAL NUMBER OF PATENT APPLICATIONS	<i>This measures the inventiveness of the country derived from catalyzing activities of FMST</i>																		
C.2	TOTAL NUMBER OF RESEARCH ARTICLES PUBLISHED IN INTERNATIONAL JOURNALS	<i>This measures the intellectual contributions of Nigerian researchers through discoveries and formulations of new approach</i>																		
C.3	TOTAL NUMBER OF COMPLETED STI PROJECTS	<i>This is a measure of the contributions of Nigeria's STI to the economic development of the country</i>																		
C.4	TOTAL NUMBER OF ARTISANS, TECHNICIANS, SCIENTISTS AND ENGINEERS TRAINED	<i>This is a measure of STI workforce improvement and expansion to provide skilled workers for Nigeria's industrialization</i>																		

deliverables will also be provided to all agencies of the Federal Government and upon demand, to other stakeholders. In particular, the following national planning organizations will receive reports and briefings.

1. Federal Ministry of Budget and National Planning
2. National Planning Commission
3. Federal Ministry of Commerce
4. National Investment Promotion Council

Particularly, FMST will perform programme monitoring in collaboration with the Federal Ministry of Budget and National Planning.

#### **6.4. Period Reviews and Modification of Plans**

All strategic plans are impacted by circumstances that were not prevailing at this time of their formulation. Being that relatively long time horizons are involved, the probability of path-changing events is high. NSTIR 2030 covers 14 years. It is divided into three time segments. This makes it flexible enough for modifications as deviant circumstances evolve. Ideally, it will be necessary to review the plan every three years and make necessary changes without destroying the approach and strategy.

#### **6.5. Stakeholder Engagement Processes**

In section 4.1 which deals with programme governance, inclusion of experts from stakeholder groups into the governance structures of the Roadmap has been described. Also, in Section 4.4, mechanisms for engagement of professional associations, learned societies, NGOs, academic institutions, states and community groups have been discussed.

#### **6.6. External Communications**

Research articles and research accomplishments by Nigerians need to be systematically advertised in domestic and foreign media. Knowledge and intellectual accomplishments of Nigerians are drowned out in local media by celebrations of accomplishments that matter very little with respect to national socio-economic development. First of all, the FMST research establishment will be required to publish a compendium of summaries of research reports annually with contact information on the investigators/authors. The RMRDC should be commended for publishing its own journal but that should be internationally indexed. There should also be several more of such publications.

At the public information level, each center should publish a quarterly newsletter, distributed as hard copies to libraries of all tertiary institutions and government agencies, and electronically, worldwide. Impact is only made in rankings and other ratings when stakeholders and evaluators become aware of the accomplishments of innovators. All the FMST centers and their collaborators produce enough STI data and discoveries to brief Nigerians and the press on results and their significance on television, radio and at press briefings every week. NSTIR 2030 covers sub-project on these aspects adequately.

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8.0 APPENDIX

• APPENDIX 1: UTILITY OF THE NSTIR 2030 PROGRAMMES TO KEY ELEMENTS OF RECENT NIGERIAN NATIONAL ECONOMIC SECTOR PLANS

KEY TO NUMBER CODES OF FMST RESEARCH PROGRAMMES

- |   |  |
|---|--|
| 1. Biotechnology including Pharmacology         | 6. Materials Science including Nanotechnology            |
| 2. Health and Nutrition                         | 7. Mathematics, Computational, and communication Systems |
| 3. Environment, Meteorology and Water Resources | 8. Space and Geospatial Systems                          |
| 4. Facilities and Networked Systems             | 9. Artificial Intelligence and Robotics                  |
| 5. Renewable Energy Systems and Photonics       | 10. Science Communication and Technology Diffusion       |

RECENT NIGERIAN NATIONAL ECONOMIC SECTOR PLANS	SPECIFIC KEY INITIATIVES IN THE NIGERIAN NATIONAL ECONOMIC SECTOR PLANS	RELEVANCE OF FMST RESEARCH PROGRAMME										RELEVANT NSTIR 2030 UTILITIES						
		1	2	3	4	5	6	7	8	9	10	Policy	Infrac.	R&D	Training /Talent	Tech. and Com.	Science Literacy	Monit. & Evaluat.
A. THE ECONOMIC RECOVERY AND GROWTH PLAN (2017)	• Purchase of made-in-Nigeria goods										X	X		X		X		X
	• Promotion of manufacturing powerhouses in Aba, Calabar, Kaduna, Kano, Lagos, Nnewi, Onitsha and Ota				X		X			X			X	X	X	X		
	• Self-sufficiency in food and agro-products	X		X	X								X	X	X	X		
	• Revival of abandoned Nigeria fertilizer blending plants		X				X						X	X		X		
	• Export processing of agricultural products and manufactured goods.	X	X		X								X	X	X	X		X
	• Policy instruments to support import substitution										X	X		X		X	X	
	• Boosting of oil exploration and downstream activities				X		X			X			X	X	X			X
	• Rapid development of infrastructure: road rail and power				X		X						X	X	X	X		
	• Development of digital platforms to modernize the Nigerian economy							X					X	X	X	X	X	
	• Support for innovation to improve productivity and competitiveness				X						X			X	X	X	X	
	• Programmes to protect lives and property nationwide (national security)							X	X	X				X	X	X		
	• Promote beneficiation of solid minerals					X			X					X	X	X		
• Improvement of health care delivery	X	X										X	X	X	X		X	
• Improvement of education at all levels	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	

B.	THE ROADMAP FOR GROWTH AND DEVELOPMENT OF THE NIGERIAN MINING INDUSTRY (2016)	• Winning over of domestic users of industrial minerals					X			X				X	X	X			
		• Expansion of domestic ore and mineral asset processing industry			X		X		X				X	X	X	X			
		• Implementation of industrial power generation using Nigerian coal resources					X						X	X	X	X			
		• Development of the steel sector to provide a solid backbone for the Nigerian manufacturing and industrial economy						X					X	X	X	X			
		• Improvement of the quality and breadth of geoscientific data							X	X			X	X	X	X			X
		• Improvement of the environmental sustainability of the mining industry			X									X	X	X	X	X	X
C.	NIGERIA INDUSTRIAL REVOLUTION PLAN (2014)	• Catalysis of industrial activities to become the dominant job creator and income generator for Nigeria in 5years	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
		• Attainment of status be Nigeria as the preferred manufacturing hub and one of the top two hubs in West Africa	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		• Attainment of status of preferred source of low-medium technology consumer and industrial goods domestically and regionally	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		• Broad plans to promote job creation, revenue diversification, import substitution, export diversification and broadening of the tax base	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		• Resource mapping of installed plants, locations of raw materials and demand centers							X	X	X				X	X			X
		• Development of information system to facilitate the search for companies and skilled people in each industrial sector								X		X			X	X			X
		• Work with appropriate agencies such as the Nigerian Bureau of statistics to develop quantitative indices for scale of Nigeria's industrial productivity								X	X				X				X
		• Achievement of 20-30% operating cost advantage in manufacturing in Nigeria relative to competing countries on low-medium technology products.			X	X	X								X	X	X		

**THE AGRICULTURE  
PROMOTION POLICY  
(2016-2020)**

• Increase in agriculture's share GDP to 23%	X	X	X							X		X	X	X	X		X
• Increase in agriculture's share of labor force to 70%	X	X	X							X			X	X	X		X
• Integration of agricultural community value chains into the broader supply chain of Nigerian and global industrial activities	X	X	X							X			X	X	X		X
• Facilitation of the national capacity to meet Nigeria's food security and food safety requirements while providing quality nutrition	X	X	X							X		X	X	X	X	X	X
• Promotion of the responsible use of land, water and other natural resources to create vibrant agricultural sector that provides employment and livelihood to growing population			X							X			X	X		X	X
• Provide better coordination of the national agricultural research system, delivery of extension services and public and private sector supplies	X	X	X	X						X	X		X	X	X		X
• Promotion of investment in agriculture	X	X	X										X		X		
• Financing of agricultural development programmes	X	X								X			X		X		
• Expansion of research for innovation and productivity improvement	X	X								X			X	X	X		
• Development of agricultural information systems												X	X	X		X	X
• Revival of regional farm radio broadcasts to provide advice on planting, weeding, harvesting and product pricing										X		X	X	X		X	
• Provision services on soil testing and mapping, crop rotation, fertilizer application, etc. to enhance soil fertility	X	X			X					X		X	X	X			
• Stimulate domestic production of good quality inputs such as seeds, fertilizer and enzymes.	X	X	X							X		X	X	X	X	X	
• Specify standards and implement quality control processes at various levels of the value chain	X	X								X		X	X	X			X
• Provision of access to information on innovations and markets										X			X	X	X	X	X

		• Development of processing and storage facilities for materials			X								X	X		X		
		• Performance of regular, methodology-driven livestock surveys and census to drive evidence-based decision-making	X	X						X				X	X			X
		• Support of the establishment of modern ranching, abattoir and livestock processing systems	X	X	X	X	X			X			X	X	X			X
		• Promotion of water conservation by harvesting run-off water and reducing desertification by tree planting.			X	X				X	X		X	X	X	X	X	X
		• Enhancement of fish breeding and fishery/aquaculture inputs	X	X	X					X			X	X	X			X
		• Promotion of pest and disease control services			X			X		X			X		X		X	X
E.	NATIONAL RENEWABLE ENERGY AND ENERGY EFFICIENCY POLICY (NREEEP) (2015)	• Assurance of the development of the nation's energy resources with sources diversification				X	X						X	X	X	X		
		• Acceleration of the process of acquisition and diffusion of technology, managerial expertise and indigenous participation in renewable energy and energy efficiency sector industries for stability and self-reliance	X				X			X			X	X	X	X	X	
		• Supply of electricity to almost half of the Nigerian population that is currently electricity deficient	X				X	X		X			X	X	X	X		
		• Diversification of energy resource base and the mix among large, mini and microsystems	X			X	X	X		X			X	X	X	X	X	
		• Increase in the contribution of solar energy to the total energy mix to a minimum of 3% of the total electricity supply by 2020 and 6% by 2030				X	X	X		X			X	X	X	X	X	
		• Extension of electricity supply to rural and remote/off-grid areas through the use of solar home systems				X	X			X			X	X	X	X	X	
		• Increase in solar water heating technologies				X	X			X			X	X	X	X	X	
		• Catalysis of Nigeria's domestic development of appropriate energy storage technologies	X			X	X	X		X			X	X	X	X	X	
		• Development of extension programmes to facilitate the use of solar home systems				X				X			X	X			X	

• Promotion of research and development on solar energy technology				X	X		X	X				X	X	X		
• Sourcing and providing adequate incentives to local entrepreneurs for the production of solar energy conversion systems			X	X	X		X				X	X	X	X	X	
• Implementation of web-based solar prospecting tool that translates solar resources into potential power generation at the local level				X		X	X	X			X	X	X	X	X	
• Training of skilled manpower for the maintenance of solar energy conversion systems				X				X				X	X	X	X	
• Encouraging research and development on wind energy utilization			X	X			X	X			X	X	X			
• Intensification of wind data acquisition and development of wind maps with web-based with prospecting			X	X	X		X	X			X	X	X			
• Development and implementation of incentives for the development of wind farms and adoption of community, off-grid wind energy systems			X	X	X		X	X			X	X	X	X	X	X
• Training of skilled local craftsmen to ensure sustainable operation of wind energy systems				X				X				X	X		X	
• Development of zoning and regulatory wind energy guidelines to prevent inappropriate public outcry against deployment of wind turbines								X	X			X			X	
• Implementation of feasibility studies for small community-based renewable electricity solutions for off-grid areas, including home-based wind, solar, hydro, biomass and tidal systems				X			X	X				X				
• Promotion of the demonstration and dissemination of energy devices for adoption and market penetration			X	X				X				X		X	X	
• Initiation and promotion of renewable energy and energy efficiency educational institutions and research activities in educational institutions and research institutes				X				X				X	X		X	



		• <i>By the year 2025 extension of irrigation facilities to realize Nigeria's irrigation potential of 3.14 million hectares</i>											X		X	X	X	X	X	X
H.	ROADMAP FOR THE NIGERIAN EDUCATION SECTOR (2009)	• <i>Periodic review of tertiary education curricula to ensure alignment with national needs and goals every 5 years</i>	X	X	X	X	X	X	X	X	X	X	X			X	X			X
		• <i>Improvement of funding sources for tertiary education by exploring strategies such as cost-sharing, PPP, endowments, consulting services, alumni support, etc.</i>											X		X	X	X	X		
		• <i>Implementation of government directives on ICT initiatives in tertiary institutions</i>								X	X				X	X	X	X		
		• <i>Re-instatement of the moribund Teacher Vacation Courses (TVC) in science and technology in post-basic education</i>								X	X				X	X	X	X		
		• <i>Empowerment of post-basic education agencies to review, update, print and circulate curriculum and examination syllabi</i>									X				X	X	X	X		
		• <i>Provision of extensive training to upgrade the skills of the unqualified post basic education teachers to enable them teach technology in the Vocational Educational Institutions (VEIs)</i>									X				X	X	X	X	X	X
		• <i>Provision of seed grants to VEIs</i>									X				X	X		X		
		• <i>Ensuring of timely review and enrichment of the curricula of basic (primary and nursery) schools</i>									X				X	X		X		
		• <i>Increase in budgetary provision for ICT laboratories and associated infrastructure in basic schools</i>				X		X			X			X	X	X		X		
		• <i>In both basic and post-basic schools, develop programmes that recognize and reward teachers through incentives</i>									X				X	X				X
		• <i>Ensuring of gender parity in teacher recruitment</i>									X				X	X		X		X
		• <i>Encouragement of major publishers to produce relevant textbooks and instructional materials to feed the basic education subsector through PPP</i>									X			X	X	X	X	X		

		• Implementation of the policy on ICT education at all levels							X			X	X	X	X	X	X	X	X
		• Provision of alternative power supply such as solar energy and biomass energy in schools	X		X	X						X		X	X	X	X		
I.	NATIONAL HEALTH POLICY (2016)	• Reduction of reproductive, maternal, neonatal, child and adolescent health problems		X										X			X	X	
		• Prevention and control of communicable and non-communicable diseases		X							X			X			X	X	
		• Reduction of the burden of public health emergencies		X												X			
		• Promotion of mental, oral and eye health and wellbeing of all Nigerians		X									X	X					
		• Improvement of the nutritional health status, throughout the life cycle of Nigerians with focus on vulnerable groups		X										X					
		• Reduction of the burden of food-borne diseases and illnesses among the general population		X										X					
		• Reduction of the disease burden resulting from unsafe water and poor sanitation in Nigeria		X	X									X	X		X	X	
		• Ensure of proper healthcare waste management and protection of human health from environmental and chemical hazards and the effects of climate change		X	X									X	X		X	X	
		• Reduction of overall burden of disease through behavior and lifestyle change		X							X			X			X	X	
		• Ensuring all access to gender-sensitive health services irrespective of sexual orientation		X										X					
		• Improve healthcare systems in Nigeria to reverse outward medical tourism		X									X	X					
		• Ensure quality medicines, vaccines and other health technologies		X										X		X			
J.	NATIONAL STRATEGIC FRAMEWORK ON	• Provide skills-based nutrition education for adequate energy and protein consumption		X							X			X	X				
		• Improvement of household food processing technology to reduce labor input	X	X							X			X	X	X			



THE HEALTH AND DEVELOPMENT	• Facilitation of favorable environments and opportunities for physical activity	X								X			X	X		X	
	• Advocacy/sensitization of food manufactures and importers to vitamin requirements	X								X			X	X	X		
	• Implementation of consumer education programmes through popular media	X								X			X	X		X	
	• Modification of foods through activities that reduce iron deficiency, anemia, and iodine deficiency	X								X			X	X	X	X	
	• Performance of studies (situation analyses) of young people's involvement in accidents	X	X	X						X			X	X		X	X
	• Design of appropriate interventions that target reduction of accidents	X							X	X			X	X		X	X
	• Performance of multi-media awareness campaign on road safety								X				X	X		X	
	• Research on the pattern of drug use among at-risk groups	X								X			X	X			X
	• Research on the effects of emergency substances, e.g., Zakani, paw-paw leaves, on health	X								X			X	X			X
	• Training of counsellors and other health workers on early identification of people with drug problems, and counselling skills	X								X			X	X			X
	• Establishment of counselling centers on all states and LGAs within existing Health Care Centers	X	X							X		X	X	X		X	
	• Establishment of vocational centers within and outside hospitals, on health	X	X							X		X	X	X		X	
	• Organization of workshops/seminars aimed at people-oriented solutions to the drug problem and other health challenges	X								X			X	X		X	
• Training and re-training of health education and teachers in curricula	X								X			X	X		X		
• Training of resource persons/speakers to implement community-based Health Education Programmes	X								X			X	X		X		
K. NATIONAL ECONOMIC	• Creation of about 7 million jobs by 2007 through support for enterprises, worker	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X

EMPOWERMENT AND DEVELOPMENT STRATEGY (2005)	training and promotion of integrated rural development																		
	• Creation of affordable housing through use of local building materials, training of architects in low-cost housing designs, and easing land acquisition processes				X	X	X				X		X	X	X	X	X		
	• Improvement of health-care services with focus on health education, local production of drugs, and focus on the domestically prevalent diseases	X									X		X	X	X	X	X	X	X
	• Strengthening of the skills base through provision of ICT, special distance learning, improvement of vocational training and establishment of technical schools				X			X			X		X	X	X			X	
	• Protection of vulnerable groups			X	X	X				X	X			X	X			X	
	• Promotion of peace and security through security sector reform, implementation of early warning systems among other support systems							X	X	X	X		X	X	X			X	X
	• Promotion of private enterprise	X	X	X	X	X	X	X	X	X	X		X	X	X	X			
L NATIONAL TECHNICAL WORKING GROUP VISION 2020	• Engendering of a culture of STI in the society										X		X	X			X		
	• Building of a competitive workforce that is science-based	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	• Forging of a national innovation system that encompasses all existing and new STI initiatives	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	• Enhancement of the level of investment and participation of the private and public sectors in R&D and innovation activities	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	
	• Building of capacity in new technologies such as biotechnologies, nanotechnology and advanced materials	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X
	• Development of capabilities in space technologies as an essential tool for socio-economic development of Nigeria									X	X	X		X	X	X	X	X	
	• Development of science-based traditional medicine and indigenous knowledge	X	X				X				X			X	X	X	X	X	
M. SCIENCE, TECHNOLOGY AND	• Facilitation and acquisition of knowledge to adapt, utilize, replicate and diffuse	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

**INNOVATION POLICY (STI) OF NIGERIA, (2011)**

technologies for the growth of SMEs, agricultural development, food security, power generation and poverty reduction																				
• Support for establishment and strengthening of organizations and structures for coordination and management of STI activities within a virile national innovative system											X	X	X	X	X	X	X	X	X	X
• Encouragement and promotion of the creation of innovative enterprises that will utilize Nigeria's indigenous knowledge and technology to produce marketable goods and services	X	X	X	X	X	X	X	X	X	X										
• Support of the mechanisms for local technologies for the production of globally competitive goods and services that use Nigeria's raw materials intensively	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
• Facilitation and support for the creation and maintenance of up-to-date reliable and accessible database on Nigeria's STI resources and activities									X	X		X	X	X				X	X	
• Promotion of activities for effective STI communication and inculcation of the STI culture in Nigerians										X			X	X				X		
• Creation and sustenance of reliable mechanisms for adequate funding of STI activities in Nigeria										X		X	X	X	X					
• Innovation, support and strengthening of strategic bilateral and multilateral cooperation in scientific, technological and innovation activities across all sectors of the economy										X			X	X						

**• APPENDIX 2: NIGERIA'S POST-1999 ACTS OF THE NATIONAL ASSEMBLY AND TECHNICAL SUPPORT SYSTEMS THAT WOULD SUPPORT THEIR IMPLEMENTATION**

YEAR	ACT OF THE NIGERIAN NATIONAL ASSEMBLY	ASPECTS OF SCIENCE AND TECHNOLOGY SYSTEMS THAT WOULD SUPPORT THEM
1999 ACTS	1. Supplementary Appropriation Act 1999	• Budget implementation
	2. 2nd Supplementary Appropriation Act 1st	• Budget implementation
2000 ACTS	1. National Minimum Wage (Amendment) Act 2000	• Not applicable
	2. Appropriation Act 2000	• Budget implementation
	3. Appropriation (Amendment) Act 2000	• Budget implementation
	4. 2nd 1999 Supplementary Appropriation Act 2000	• Budget implementation
	5. Corrupt Practice and Other Related Offences Act 2000	• ICT technologies and detection systems for fraud; monitoring systems for surveillance; and computations
	6. Niger Delta Development Commission (Establishment) Act 2000	• Technologies and methodologies for programme implementation covering infrastructure development and contaminated site remediation
	7. National Assembly Service Commission Act 2000	• Programme implementation
	8. 2001 Appropriation Act 2000	• Programme implementation
2001 ACTS	1. Police Service Commission (Establishment) Act 2001	• Programme implementation
	2. Supplementary Appropriation Act 2001	• Programme implementation
	3. 2nd Supplementary Appropriation Act 2001	• Budget implementation
	4. Electoral Act 2001	• Programme implementation using computer security systems, surveillance systems, and advanced statistics
2002 ACTS	1. National Examinations Council (NECO) (Establishment) Act 2002	• Programme implementation using remote monitoring technologies, personnel identification systems such as biogenics, and pattern recognition systems.
	2. The Appropriation Act 2002	• Budget implementation
	3. Supreme Court (Additional Original Jurisdiction) Act 2002	• Programme implementation including case management technical systems, e.g. electronic filing methods
	4. Electoral Act 2002	• Programme implementation using computer security systems, surveillance systems, and advanced statistics
	5. Economic and Financial Crimes Commission (Establishment) Act 2002	• ICT technologies and detection systems for fraud; electronic surveillance systems; and computing
	6. Certain Political, Public and Judicial Office Holders (Salaries and Allowances, etc.) Act 2002	• Advanced accounting systems and statistics
	7. Federal Roads Maintenance Agency (Establishment, etc.) Act 2002	• Programme implementation including development of new durable materials and construction/maintenance methods; design methodologies and performance prediction tools for development
	8. The Supplementary Appropriation Act 2002	• Budget implementation
	9. Money Laundering (Amendment) Act 2002	• ICT technologies for money traffic monitoring

	10. Bank and Other Financial Institutions (Amendment) Act 2002	<ul style="list-style-type: none"> <li>• Large-scale data systems; cloud computing; and electronic network design</li> </ul>
	11. Environmental Health officers (Registration, etc.) Act 2002	<ul style="list-style-type: none"> <li>• Programme implementation including training on Nigerian health and environmental hazards, risks analyses and control systems; monitoring technologies and epidemiological analyses</li> </ul>
2003 ACTS	1. Insurance Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation including risk analyses, infrastructure assessment, and hazards zonation</li> </ul>
	2. The Nigerian Security and Civil Defence Corps Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation including research and applications of pattern recognition, surveillance systems, hazards analyses, forensics and network analyses</li> </ul>
	3. The Electoral (Amendment) Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation including computer security systems, surveillance systems and advanced statistics</li> </ul>
	4. Appropriation Act 2003	<ul style="list-style-type: none"> <li>• Budget implementation</li> </ul>
	5. Coastal and Inland Shipping (Cabotage) Act 2003	<ul style="list-style-type: none"> <li>• Budget implementation including weather prediction, radar and other geospatial monitoring systems, mapping including GIS, marine geophysics, mining and environmental assessments</li> </ul>
	6. The Corrupt Practices and Other Related Offices Act 2003	<ul style="list-style-type: none"> <li>• ICT technologies and detection systems for fraud; monitoring systems for surveillance; and computations</li> </ul>
	7. Money laundering (Prohibition) Act 2003	<ul style="list-style-type: none"> <li>• ICT technologies for money traffic tracking</li> </ul>
	8. Petroleum Products Pricing Regulatory Agency (Establishment) Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation including markets analyses, scenarios prediction, and competition/logistics analyses</li> </ul>
	9. Nigerian Meteorological Agency (Establishment) Act 2003	<ul style="list-style-type: none"> <li>• Space-based geospatial monitoring; GIS hazard zonation systems; geohydrological analyses and monitoring probe design</li> </ul>
	10. The Nigerian Maritime Labour Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation</li> </ul>
	11. The Medical Laboratory Science Council of Nigeria Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation using analytical systems, research and equipment in toxicology, biotechnology, chemical sciences, clinical sciences and environmental systems</li> </ul>
	12. The Nigerian Institute of Science, Laboratory Technology Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation using analytical systems, research and equipment in toxicology, biotechnology, chemical sciences, clinical sciences and environmental systems</li> </ul>
	13. The Ports (Related Offences, etc.) (Amendment) Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation using behavioral sciences, computer-based monitoring and surveillance systems</li> </ul>
	14. The Nigerian Institute of management (Establishment) Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation with strong applications of information and computing technologies</li> </ul>
	15. The High Court of the federal Capital Territory Abuja (Number of Judges) Act 2003	<ul style="list-style-type: none"> <li>• Programme implementation using ICT in case filings and management</li> </ul>
	16. Small and Medium Scale Industries Development Agency (Establishment) Act 2003.	<ul style="list-style-type: none"> <li>• Programme implementation involving training and promotion of industrial technologies; venture-capitalism in technologies ranging from ICT through agriculture to manufacturing; and support for data management</li> </ul>
	17. Education Tax Fund (Amendment) Act 2003	<ul style="list-style-type: none"> <li>• Programme management</li> </ul>

	18. Debt management Office (Establishment, etc.) Act 2003	• Programme management
	19. Nigerian Communications act 2003	• Programme implementation through advances in telecommunication systems including telephony, television and radio broadcasting technologies
	20. Custom and Excise Management (Amendment) Act 2003	• Programme implementation using coding and electronic tracking technologies, and large data management systems
	21. The Nigerian Council of Registered Insurance Brokers Act 2003	• Programme implementation through support for risk analyses, advanced statistics and decision support systems
	22. The Nigerian Accounting Standards Board Act 2003	• Programme implementation
	23. Border Communities Development Agency (Establishment) Act, 2003	• Programme implementation using advanced surveillance technologies, geospatial mapping and socio-economic analysis
	24. Trafficking in Persons (Prohibition) Law Enforcement Administration Act 2003	• Performance implementation using route surveillance technologies and methods
	25. National Institute of Marketing of Nigeria Act 2003.	• Programme implementation using ICT-based marketing systems
	26. Child's rights Act 2003	• Programme implementation including the use of personnel tracking systems
	27. Treaty to Establish the African Union (Ratification and Enforcement) Act 2003	• Programme implementation
	28. The Supplementary Appropriation Act 2003	• Budget implementation
	29. The Universities (Miscellaneous provision) Amendment Act 2003	• Programme implementation
2004 ACTS	1. Economic and Financial Crimes Commission (Establishment) Act 2004	• Programme implementation using surveillance and electronic fraud detection systems
	2. Pension Reform Act 2004	• Programme implementation
	3. Electoral Act (Amendment) Act 2004	• Programme using electronic polling system design and operations, and fraud detection, electronic surveillance
	4. Allocation of Revenue (Abolition of Dichotomy in the Application of the Principle of Derivation) Act 2004	• Programme implementation including use of natural resources accounting
	5. The Appropriation Act 2004	• Budget implementation
	6. Compulsory, Free Universal Basic Education Act 2004	• Programme implementation using ICT
	7. National Gallery of Art (Amendment) Act 2004	• Programme implementation using ICT, art preservation techniques, and surveillance/anti-theft systems
	8. Appropriation Law 2004	• Budget implementation
	9. The International Convention for The Safety of Life at Sea (Ratification and Enforcement) Act, 2004	• Programme implementation using aerial surveillance, marine hazard analysis, search-and-rescue systems, and radar/satellite technologies
	10. Federal Capital Territory Statutory Appropriation Act 2004.	• Budget implementation
	11. United Nations Convention Against Transitional Organized Crime (Ratification and Enforcement) Act, 2004	• Programme implementation supported by research on socio-economic issues; psychological profiling systems; and electronic eavesdropping

2005  
ACTS

1. Electric Power Sector Reform Act, 2005	<ul style="list-style-type: none"> <li>• Programme implementation benefitting from electricity pricing analyses, demand and supply assessments, power system components design and manufacture and systems analyses</li> </ul>
2. Treaty to Establish African economic Community Relating to the Pan-African Parliament (Accession and Jurisdiction) Act, 2005	<ul style="list-style-type: none"> <li>• Programme implementation covering design of industrial systems and installations; market and migration analyses; and design of innovation-enhancing systems</li> </ul>
3. Small and Medium Scale Industries Development Agency (Amendment) Act, 2005	<ul style="list-style-type: none"> <li>• Programme implementation to create products and services in key national industrial target sectors including agriculture, energy, manufacturing, and construction</li> </ul>
4. Treaty on Mutual Legal Assistance in Criminal Matters between the Government of the Federal Republic of Nigeria and the government of the Republic of South Africa (Ratification and Enforcement) Act, 2005	<ul style="list-style-type: none"> <li>• Programme implementation using surveillance and electronic cash movement tracking systems, forensics, and profiling methods</li> </ul>
5. Extradition Treaty between the Government of the Federal Republic of Nigeria and the government of the Federal Republic of South Africa (Ratification and Enforcement) Act, 2005.	<ul style="list-style-type: none"> <li>• Programme implementation</li> </ul>
6. Treaty between the Federal Republic of Nigeria and the Democratic Republic of Sao Tome and Principe on the Joint Development of Petroleum and Other Resources in Areas of the exclusive Economic Zone of the two ..... (Ratification and Enforcement) Act 2005.	<ul style="list-style-type: none"> <li>• Programme implementation</li> </ul>
7. Advance Fee Fraud and Other offences (Amendment) Act 2005	<ul style="list-style-type: none"> <li>• Programme implementation using cyber-based detection and surveillance systems</li> </ul>
8. Federal Capital Territory Statutory Appropriation Act, 2005	<ul style="list-style-type: none"> <li>• Budget implementation</li> </ul>
9. Court of Appeal (Amendment) Act, 2005	<ul style="list-style-type: none"> <li>• Programme implementation</li> </ul>
10. United Nations Convention on Carriage of Goods by Sea (Ratification and Enforcement) Act 2005	<ul style="list-style-type: none"> <li>• Programme implementation using spatio-temporal (space-based) and aerial surveillance technologies</li> </ul>
11. Treaty to Establish Rotterdam Convention on the Prior Informed Consent. Procedure for certain Hazardous Chemicals and Pesticides in International Trade (Ratification and Enforcement) Act 2005.	<ul style="list-style-type: none"> <li>• Programme implementation covering risk analyses, occupational and public exposure assessments, chemical and biological toxicology, and chemical characterization</li> </ul>
12. Infrastructure Concession Regulatory Commission (Establishment, etc.) Act 2005.	<ul style="list-style-type: none"> <li>• Programme implementation aided by infrastructure assessments</li> </ul>
13. Appropriation Act 2005	<ul style="list-style-type: none"> <li>• Budget implementation</li> </ul>
14. Supplementary Appropriation Act, 2005	<ul style="list-style-type: none"> <li>• Budget implementation</li> </ul>
15. Trade Union (Amendment) Act, 2005	<ul style="list-style-type: none"> <li>• Programme implementation</li> </ul>
16. Monitoring of Revenue Allocation to Local Government Act, 2005	<ul style="list-style-type: none"> <li>• Programme implementation using computer-based accounting systems</li> </ul>

	17. National Lottery Act, 2005	• Programme implementation using large-scale electronic data management systems
	18. Federal High Court (Amendment) Act, 2005	• Programme implementation using computer-based case management systems
	19. West African Gas Pipelines Project Act, 2005	• Programme implementation using natural resources valuation methods, environmental impact assessments, facilities construction, and aerial surveys
	20. Trafficking in Persons (Prohibition) Law Enforcement and Administration (Amendment) Act, 2005.	• Programme implementation using electronic tracking and surveillance systems
<b>2006 ACTS</b>	1. National Service (Part Amendment) Act, 2006	• Programme implementation
	2. Appropriation Act, 2006	• Budget implementation
	3. Nigerian Geological Survey Agency (Establishment) Act, 2006	• Programme implementation using advances in remote sensing, geophysical surveys, geochemical testing, GIS, and zonation systems
	4. Electoral Act, 2006	• Programme implementation using ICT utilities
	5. National Industrial Court Act, 2006	• Programme implementation use ICT case management systems
	6. Border Communities Development Agency (Amendment) Act, 2006	• Programme implementation requiring socio-economic analyses, regional infrastructure design and population studies
	7. Federal Capital Territory Statutory Appropriation Act, 2006	• Programme implementation
	8. International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage 1971 as amended (Ratification and Enforcement) Act, 2006	• Programme implementation requiring advances and appreciation of natural resources valuation methodologies, resource allocation techniques and Geographic Information Systems (GIS)
	9. The National Boundary Commission (Establishment) Act, 2006	• Programme implementation supported by advances in photogrammetry (advanced surveys) and GIS
	10. The International Convention on Civil Liability for Oil Pollution Damage, (Ratification and Enforcement) Act, 2006	• Programme implementation requiring advances and appreciation of natural resources valuation methodologies, resource allocation techniques and GIS
	11. Advance Fee Fraud and Other Fraud Related Offences Act, 2006	• Programme implementation
	12. National Oil Spill Detention and Response Agency (Establishment) Act, 2006	• Programme implementation requiring application of oil detection systems, all spill clean-up technologies and impact assessment methodologies
	13. National Hajj Commission of Nigeria (NAHCON) Establishment Act, 2006	• Programme implementation
	14. Civil Aviation Act, 2006	• Programme implementation requires the use of high-technology electronic and space-based monitoring systems, advances mechatronics, materials testing systems
<b>2007 ACTS</b>	1. Appropriation Act, 2007	• Budget implementation
	2. Federal capital Territory Customary Court Act, 2007	• Programme implementation using ICT-case management and filing systems
	3. Electoral (Amendment) Act, 2007	• Programme implementation using ICT utilities
	4. Nigeria Mineral and Mining Act, 2007	• Programme implementation with capabilities enabled by geophysical and geochemical prospecting, advanced excavation technology, remote sensing ad mineral processing



5. Ekiti State Appropriation law, 2007	• Budget implementation
6. International Convention for the prevention of Pollution from Ships, 1983 and 1978 protocol Act, 2007	• Program implementation enabled by electronic tracking, aerial surveys, environmental monitoring technology
7. Charter Institute of Bankers of Nigeria Act, 2007	• Programme implementation using ICT
8. Federal Inland Revenue Service (Establishment) Act, 2007	• Programme implementation using ICT
9. Federal Justice Officers (Administration of Pension) Act, 2007	• Programme implementation using ICT
10. Companies Income Tax (Amendment) Act, 2007	• Programme implementation using ICT
11. Value Added Tax (Amendment) Act, 2007	• Programme implementation using ICT
12. Merchant Shipping Act, 2007	• Programme implementation using advances in logistics, operations research, satellite-based tracking and communication technologies
13. Nigeria Institute of Animal Science Act, 2007	• Programme implementation using advanced knowledge from veterinary science, agronomy, nutritional sciences and meat-packing technology
14. Supplementary Appropriation Act, 2007	• Budget implementation
15. Federal Capital Territory Appropriation Act, 2007	• Budget implementation
16. Nigeria extractive Industries Transparency Initiative (NEITI) Act, 2007	• Programme implementation with capacities enabled by geophysical and geochemical prospecting and processing, advanced excavation technologies, and environmental control
17. Special Supplementary Appropriation Act, 2007	• Budget implementation
18. Federal Road Maintenance Agency (Amendment) Act, 2007	• Programme implementation enabled by advances in Nigeria-relevant structural design, materials strength and durability testing, natural and waste materials utilization and technologies and structural materials performance predictions
19. Nigeria Security and Civil Defence Corps (Amendment) Act, 2007	• Programme implementation enabled by advanced surveillance and monitoring technologies, hazards analyses, encrypting technologies, and chemical sensing systems
20. The Statistical Act, 2007	• Programme implementation enabled by advances in computational methods, computer-based statistical analyses, simulation and visualization systems
21. Central Bank of Nigeria Act, 2007	• Programme implementation using advanced financial analysis methods and ICT
22. Federal Road Safety Commission (Establishment) Act, 2007	• Programme implementation enabled by advances in Nigeria-relevant structural design, materials strength and durability testing, natural and waste materials utilization and technologies and structural materials performance predictions
23. Chartered Institutes of bankers of Nigeria Act, 2007	• Programme implementation using ICT
24. Institute of Peace and Conflict Resolution (Establishment) Act, 2007	• Programme implementation using communication and off-site conferencing systems
25. Nigeria Christian Pilgrim Commission Act, 2007	• Programme implementation

	26. Revised Edition (Laws of Federation of Nigeria) Act, 2007	• Programme implementation using printing technologies
	27. National Identity Management Commission Act, 2007	• Programme implementation using ICT
	28. Nigeria Maritime Administration and safety Agency Act, 2007	• Programme implementation using ICT
	29. Chartered Institute of Purchasing and Supply management of Nigeria (Establishment) Act, 2007	• Programme implementation using ICT
	30. Council for the Regulation of Freight Forwarding in Nigeria Act, 2007	• Programme aided by logistics analyses, freight handling technologies and advanced labelling systems
	31. National Information Technology Development Agency Act, 2007	• Programme implementation aided by advances in ICT including cloud computing, micro-electronics, space based systems, telephony and advanced materials
	32. Public Procurement Act, 2007	• Programme implementation aided by ICT
	33. National Agency for the Control of HIV and AIDS (Establishment) Act, 2007	• Program implementation aided by advances in medical diagnostics, improved health advisory system, and patient care
	34. National Automotive Council of Nigeria (Amendment) Act, 2007	• Programme implementation aided by local fabrication of steel, fiber, glass, hardened plastics, mechatronics and metrology
	35. Investment and Securities Act, 2007	• Programme implementation aided by ICT
	36. The Nigeria National Petroleum Corporation (Amendment) Act, 2007	• Programme implementation aided by advances in exploration geophysics, drilling technology, petroleum refining technologies and development of modular refineries
	37. Institute for Democratic and Legislative Studies Act, 2007	• Programme implementation aided by ICT
	38. National Environmental Standards and Regulations Enforcement Agency (Establishment) Act, 2007	• Programme implementation aided by remote sensing, Geographic Information Systems (GIS), chemical detection and monitoring systems, and exposure
	39. Chartered Institute of Professional Printers of Nigeria Act, 2007	• Programme implementation aided by local manufactured assembly of printing, paper and ink
	40. Fiscal Responsibility Bill, 2007	• Programme aided by ICT
	41. The Nigerian National Petroleum Corporation (Amendment) Act, 2007	• Programme implementation aided by advances in exploration geophysics, drilling technology, petroleum refining technologies and development of modular refineries
<b>2008 ACTS</b>	1. Appropriation (Amendment) Act, 2008	• Budget implementation
	2. Appropriation Act, 2008	• Budget implementation
	3. Niger Delta Appropriation Act, 2008	• Technologies and methodologies for programme implementation covering infrastructure development and contaminated site remediation
	4. Certain Political and Judicial Office Holders (Salaries and Allowances, etc.) (Amendment) Act, 2008	• Programme implementation aided by ICT
<b>2009 ACTS</b>	1. Appropriation Act, 2009	• Budget implementation

• APPENDIX 3: NON-FMST UNITS AND AGENCIES OF NIGERIA AND THEIR APPROPRIATE ROLES IN THE IMPLEMENTATION OF THE NSTIR 2030

S/N	NON-FMST UNITS AND AGENCIES OF THE FEDERAL AND STATE GOVERNMENTS OF NIGERIA	KEY SOCIO-ECONOMIC SECTORS								NSTIR 2030 ROLES						
		AGRIC.	MANU.	MINING	ENERGY	OIL & GAS	CIVIL INF.	ICT	ENV., WATER & HEALTH	POLICY	INFRAC.	R&D	TRAINING & TALENT	TECH. & COMM.	SCIENCE LIT.	MONIT. EVAL. IMPROV.
1.	African Regional Center for Engineering Design and Manufacturing (ARCEDEM), Ibadan		X								X	X	X	X		
2.	Center for Basic Space and Technology Education, (CBSTE), Ile Ife							X	X			X	X		X	
3.	Center for Adaptation of Technology, (CAT), Akwa		X		X	X					X			X		
4.	Energy Training Center (ETC) Nsukka				X	X						X			X	
5.	Center for Energy Research and Development (CERDI), Ile Ife				X	X					X	X	X			
6.	Centre for Energy Research and Development (CERDZ), Zaria				X	X					X	X	X	X		
7.	Centre for Energy Research (CERS), Sokoto				X	X					X	X	X	X		
8.	Centre for Geodesy and Geodynamics (CGG), Bauchi			X		X	X	X	X			X			X	
9.	Centre for Satellite Technology Development (CSTD), Abuja				X	X	X	X			X	X	X	X	X	
10.	Centre for Space Science, (CSS), Nsukka				X	X	X	X			X	X	X	X	X	
11.	Centre for Space Transport and Propulsion, (CSTP), Lagos							X				X	X	X	X	
12.	Cocoa Research Institute of Nigeria (CRIN), Ibadan	X										X	X	X	X	
13.	Engineering Materials Development Institute (EMDI), Akure		X	X		X						X	X	X	X	
14.	Federal College of Chemical and Leather Technology (CHELTEC), Zaria		X			X			X		X	X	X	X	X	
15.	Forestry Research Institute of Nigeria (FRIN), Ibadan	X							X			X	X	X		
16.	National Horticulture Research Institute (NIHORT), Ibadan	X							X			X	X	X	X	
17.	Hydraulic Equipment Development Centre (HEDEC)		X	X							X	X	X	X		
18.	Institute for Agricultural Research (IAR), Zaria	X							X			X	X	X	X	
19.	Institute of Agricultural Research and Training (IART), Ibadan	X										X	X	X	X	

S/N	NON-FMST UNITS AND AGENCIES OF THE FEDERAL AND STATE GOVERNMENTS OF NIGERIA	KEY SOCIO-ECONOMIC SECTORS							NSTIR 2030 ROLES							
		AGRIC.	MANU.	MINING	ENERGY	OIL & GAS	CIVIL INF.	ICT	ENV., WATER & HEALTH	POLICY	INFRAC.	R&D	TRAINING & TALENT	TECH. & COMM.	SCIENCE LIT.	MONIT. EVAL. IMPROV.
20.	Lake Chad Research Institute (LCRI), Maiduguri				X		X		X			X	X	X	X	
21.	National Agricultural Extension Research and Liaison Services (AERLS), Zaria	X							X			X	X	X	X	
22.	National Animal Production Research Institute (NAPRI), Zaria	X							X			X	X	X	X	
23.	National Centre for Genetic Resources and Biotechnology (NACGRAB), Ibadan	X	X									X	X	X	X	
24.	National Centre for Remote Sensing (NCRS)							X				X	X	X	X	
25.	National Metallurgical Development Centre (NMDC), Jos		X	X							X	X	X	X	X	
26.	National Cereals Research Institute (NCRI), Badegi	X							X			X	X	X	X	
27.	National Engineering Design Development Centre (NEDDEC)		X						X			X	X	X	X	
28.	National Institute for Freshwater Fisheries Research (NIFFR), New Bussa								X			X	X	X	X	
29.	National Root Crops Research Institute (NRCRI), Umidike	X							X			X	X	X	X	
30.	National Stored Products Research Institute (NSPRI), Ilorin	X										X	X	X	X	
31.	National Veterinary Research Institute (NVRI), Vom	X										X	X	X	X	
32.	Nigerian Institute for Oceanography and Marine Research (NIOMR), Victoria Island, Lagos								X			X	X	X	X	
33.	Nigerian Institute for Oil Palm Research (NIFOR), Benin City	X									X	X	X	X	X	
34.	Nigerian Institute of Pharmaceutical Research and Development (NIPRD), Abuja		X						X			X	X	X	X	
35.	Nigerian Institute for Medical Research (NIMR), Yaba, Lagos								X			X	X	X	X	
36.	National Centre for Agricultural Mechanization (NCAM), Ilorin	X	X								X	X	X	X	X	
37.	Regional Programme for Technology Management (REPTEM)		X					X		X	X	X	X	X	X	X
38.	Rubber Research Institute of Nigeria (RRIN), Benin City	X	X									X	X	X	X	

S/N	NON-FMST UNITS AND AGENCIES OF THE FEDERAL AND STATE GOVERNMENTS OF NIGERIA	KEY SOCIO-ECONOMIC SECTORS								NSTIR 2030 ROLES						
		AGRIC.	MANU.	MINING	ENERGY	OIL & GAS	CIVIL INF.	ICT	ENV., WATER & HEALTH	POLICY	INFRAC.	R&D	TRAINING & TALENT	TECH. & COMM.	SCIENCE LIT.	MONIT. EVAL. IMPROV.
39.	Scientific Equipment Development Institute (SEDIE), Enugu		X								X	X	X	X	X	X
40.	Scientific Equipment Development Institute (SEDIE), Minna		X								X	X	X	X	X	X
41.	National Mathematical Centre, (NMC), Abuja							X				X	X		X	X
42.	Centre for Management Development (CMD), Maggodo, Lagos	X	X	X	X	X	X	X	X	X		X	X	X	X	X
43.	Arable Crops Research Institute (ACRI)	X							X			X	X	X	X	
44.	Agricultural and Rural Management Training Institute (ARMTI), Ilorin	X						X	X	X	X	X			X	X
45.	International Institute for Tropical Agriculture (IITA), Ibadan	X							X			X	X	X	X	
46.	Social Sciences Academy of Nigeria (SSAN)	X	X	X	X	X	X	X	X	X		X	X		X	X
47.	Nigerian Institute of Social and Economic Research (NISER), Ibadan	X	X	X	X	X	X	X	X	X		X			X	X
48.	Nigerian Educational Research Council (NERC), Yaba, Lagos	X	X	X	X	X	X	X	X	X		X			X	X
49.	International Livestock Research Institute (ILRI), Ibadan	X							X			X	X	X	X	
50.	Institute of Archaeology and Museum Studies (IAMS)							X							X	
51.	Institute of Advanced Medical Research and Training, Ibadan								X			X	X		X	
52.	Institute of Oceanography, Calabar								X			X	X		X	
53.	FCT Agency for Science and Technology, Abuja	X						X		X	X	X	X	X	X	X
54.	Institute of Research and Innovation in Africa (IRIA)							X	X			X			X	X
55.	Natureworks International Research Institute, Abuja	X							X			X	X	X	X	
56.	Niger Delta Science and Technology Bio Industrial Park	X	X					X	X	X	X	X	X	X	X	X

• APPENDIX 4: RELEVANT PROFESSIONAL BODIES AND ASSOCIATIONS IN NIGERIA AND THEIR APPROPRIATE ROLES IN THE IMPLEMENTATION OF THE NSTIR 2030

S/N	PROFESSIONAL BODIES AND ASSOCIATIONS IN NIGERIA	KEY SOCIO-ECONOMIC SECTORS								NSTIR 2030 ROLES						
		AGRIC.	MANU.	MINING	ENERGY	OIL & GAS	CIVIL INF.	ICT	ENV., WATER & HEALTH	POLICY	INFRAC.	R&D	TRAINING & TALENT	TECH. & COMM.	SCIENCE LIT.	MONIT. EVAL IMPROV.
1.	Institute of Chartered Accountants of Nigeria <a href="http://www.ican-ngr.org">http://www.ican-ngr.org</a>		X							X						X
2.	Nigeria Institute of Estate Surveyors & Valuers <a href="http://www.niesv.org">http://www.niesv.org</a>							X			X					
3.	Association of General & Private Medical Practitioners of Nigeria <a href="http://www.agmpn.org">http://www.agmpn.org</a>								X		X	X				
4.	Centre for Law & Development <a href="http://www.clds.org">http://www.clds.org</a>	X	X	X	X	X	X	X	X	X						X
5.	Chartered Insurance Institute of Nigeria <a href="http://www.ciinigeria.com">http://www.ciinigeria.com</a>	X	X	X	X	X	X	X	X	X	X					X
6.	Medical & Dental Consultants Association of Nigeria <a href="http://www.mdcan-ng.org">http://www.mdcan-ng.org</a>								X			X	X			
7.	Nigeria Institute of Quantity Surveyors <a href="http://www.niqs.org">http://www.niqs.org</a>							X			X					
8.	Nigerian Institute of Social and Economic Research <a href="http://www.niser.org">http://www.niser.org</a>	X	X	X	X	X	X	X	X	X			X		X	X
9.	Nigerian Institute of Town Planners <a href="http://www.nitp-ng.org">http://www.nitp-ng.org</a>				X		X	X	X		X		X			
10.	Nigerian Medical Association <a href="http://www.nigerianma.org">http://www.nigerianma.org</a>								X	X						
11.	Nigerian Society of Engineers <a href="http://www.nse.org.ng">http://www.nse.org.ng</a>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12.	Science Teachers Association of Nigeria <a href="http://www.stan.org.ng">http://www.stan.org.ng</a>	X	X	X	X	X	X	X	X				X		X	
13.	Strategic Management Centre <a href="http://www.smgngigeria.org">http://www.smgngigeria.org</a>	X	X	X	X	X	X	X	X	X		X				X
14.	Manufacturers Association of Nigeria <a href="http://www.manufacturersnigeria.com">http://www.manufacturersnigeria.com</a>	X	X	X	X	X	X	X	X	X	X		X	X		

S/N	PROFESSIONAL BODIES AND ASSOCIATIONS IN NIGERIA	KEY SOCIO-ECONOMIC SECTORS								NSTIR 2030 ROLES						
		AGRIC.	MANU.	MINING	ENERGY	OIL & GAS	CIVIL INF.	ICT	ENV., WATER & HEALTH	POLICY	INFRAC.	R&D	TRAINING & TALENT	TECH. & COMM.	SCIENCE LIT.	MONIT. EVAL. IMPROV.
15.	The Nigerian Institute of Safety Professionals <a href="http://www.nispnigeria.com/">http://www.nispnigeria.com/</a>								X	X						X
16.	Pharmacist Council of Nigeria <a href="http://www.pcng.org">http://www.pcng.org</a>								X				X			
17.	Nigeria Computer Society <a href="http://www.ncs.org.ng/">http://www.ncs.org.ng/</a>							X			X	X	X	X	X	
18.	The Institute of Certified Geographers of Nigeria <a href="http://www.icgnig.org">http://www.icgnig.org</a>								X	X	X	X			X	
19.	Pipeline Professionals' Association of Nigeria (PLAN) <a href="http://plan-ng.com/index.php">http://plan-ng.com/index.php</a>				X	X	X		X		X		X			
20.	Pharmaceutical Society of Nigeria <a href="http://www.ps-nigeria.org/">http://www.ps-nigeria.org/</a>								X		X	X	X			
21.	Council for the Regulation of Engineering in Nigeria (COREN) <a href="http://www.corenng.org/index.html">http://www.corenng.org/index.html</a>	X	X	X	X	X	X	X	X	X	X			X		X
22.	Nigerian Institute of Architects <a href="http://www.niarchitects.org/">http://www.niarchitects.org/</a>					X	X	X			X	X	X	X		
23.	Nigerian Institute of Building <a href="http://www.niobuilding.org/">http://www.niobuilding.org/</a>							X			X	X	X	X		
24.	Nigeria Computer Society <a href="http://www.ncs.org.ng/aboutus.html">http://www.ncs.org.ng/aboutus.html</a>								X		X	X	X	X	X	
25.	Information Technology Association of Nigeria <a href="http://www.itan.org.ng/aboutus.htm">http://www.itan.org.ng/aboutus.htm</a>								X		X	X	X	X	X	
26.	Institute of Industrial Security & Safety of Nigeria <a href="http://iissn.org/about_us.html">http://iissn.org/about_us.html</a>								X	X			X			X
27.	Nigerian Institute of Safety Professionals (NISP) <a href="http://www.nispnigeria.com/">http://www.nispnigeria.com/</a>								X	X			X			X
28.	Society of Construction Industry Arbitrators of Nigeria <a href="http://www.sciarb.com/index.html">http://www.sciarb.com/index.html</a>					X				X	X		X	X		X

## • APPENDIX 5: LIST OF ACCREDITED UNIVERSITIES IN NIGERIA WITH CONTACT & WEBSITES

### List of Federal Universities in Nigeria

This list comprises of all the Federal Universities in Nigeria including Federal Universities of Agriculture and Federal Universities of Technology.

Ahmadu Bello university, Zaria. ABU

Tel: 069-550811

Website: [www.abu.edu.ng](http://www.abu.edu.ng)

University of Abuja,

Mailing Address: P.M.B. 117, Gwagwalada, F.C.T Abuja.

Tel: 09-8821380

Website: [www.unibuja.edu.ng](http://www.unibuja.edu.ng)

Bayaro University

Mailing Address: P.M.B 3011, Kano

Tel: 064-666021-3

Website: [www.kanoonline.com/buk](http://www.kanoonline.com/buk)

University of Benin. UNIBEN

Mailing Address: P.M.B 1154, Benin City

Website: [www.uniben.edu](http://www.uniben.edu)

University of Calabar. UNICAL

Mailing Address: P.M.B 1115, Calabar

Tel: 087-232695

Website: [www.unical.edu.ng](http://www.unical.edu.ng) [www.unicaledu.com](http://www.unicaledu.com)

University of Ibadan, Ibadan. UI

Tel: 400550-614

Website: [www.ui.edu.ng](http://www.ui.edu.ng), [www.dlc.ui.edu.ng](http://www.dlc.ui.edu.ng)

University of Ilorin. UNILORIN

Mailing Address: P.M.B .1515 Ilorin

Tel: 031-221691, 031-221551-3

Website: [www.unilorin.edu.ng](http://www.unilorin.edu.ng)

University of Jos. UNIJOS

Mailing Address: P.M.B. 2084, Jos, Plateau State

Tel: 073-610936

Website: [www.unijos.edu.ng](http://www.unijos.edu.ng)

University of Lagos, Akoka, Lagos State. UNILAG

Tel: 01-820310-20

Website: [www.unilag.edu.ng](http://www.unilag.edu.ng)

University of Maiduguri. UNIMAID

Mailing Address: P.M.B 1069, Maiduguri,

Tel: 076-231730, 232949

Website: [www.unimaid.edu.ng](http://www.unimaid.edu.ng), [www.unimaid.org](http://www.unimaid.org)

Obafemi Awolowo University, Ile-Ife, Osu State. OAU

Website: [www.oauife.edu.ng](http://www.oauife.edu.ng)

University of Port-Harcourt. UNIPORT

Mailing Address: P.M.B 5323, Port-Harcourt, Rivers State

Tel: 084-230890-9

Website: [www.uniport.edu.ng](http://www.uniport.edu.ng)

Usmanu Danfodiyo University,

Mailing Address: P.M.B. 2346, Sokoto.

Tel: 060234039

Website: [www.udusok.edu.ng](http://www.udusok.edu.ng)

Nnamdi Azikiwe University. UNIZIK

Mailing Address: P.M.B 5025, Awka, Anambra State.

Tel: 046-55082

Website: [www.unizik.edu.ng](http://www.unizik.edu.ng)

University of Nigeria Nsukka. UNN

Tel: 042-771911, 771920, 711939, 77941, 771951

Website: [www.unn.edu.ng](http://www.unn.edu.ng)

University of Uyo. UNIUYO

Mailing Address: P.M.B. 1017, Uyo, Akwa-Ibom State.

Website: [www.uniuvo.edu.ng](http://www.uniuvo.edu.ng)

Federal University of Agriculture, Makurdi

Tel: 044-533204-5

Website: [www.uam.edu.ng](http://www.uam.edu.ng)

University of Agriculture. UNAAB

Mailing Address: P.M.B. 2240, Abeokuta.

Tel: 039-200170-77

Website: [www.unaab.edu.ng](http://www.unaab.edu.ng)

Michael Okpara University of Agriculture, Umudike,

Mailing Address: P.M.B 7267, Umuahia, Abia State.

Tel: 052-440555

Website: [www.mouau.edu.ng](http://www.mouau.edu.ng)

Abubakar Tafawa Balewa University, Bauchi

Mailing Address: P.M.B. 0248, Bauchi.

Tel: 077-543500-1

Website: [www.atbu.edu.ng](http://www.atbu.edu.ng)

Federal University of Petroleum Resources, Effurun. FUPRE

Mailing Address: P.M.B.1221, Effurun, Delta State.

E-mail: [fupreifo@gmail.com](mailto:fupreifo@gmail.com)

Website: [www.fupre.edu.ng](http://www.fupre.edu.ng)

Federal University of Technology, Akure. FUTA

Mailing Address: P.M.B 1526, Ondo State.

Tel: 034-243490-4

Website: [www.futa.edu.ng](http://www.futa.edu.ng)

Federal University of Technology, Owerri. FUTO

Mailing Address: P.M.B. 1526, Owerri.

Tel: 083-230974, 233456

Website: [www.futo.edu.ng](http://www.futo.edu.ng)

Federal University of Technology, Minna

Mailing Address: P.M.B 65, Minna.

Tel: 066-222397, 222887

Website: [www.futminna.edu.ng](http://www.futminna.edu.ng)

Federal University of Technology, Yola

Mailing Address: P.M.B 206, Yola, Adamawa State

Tel: 075-25332, 24532

Website: [www.mautech.edu.ng](http://www.mautech.edu.ng)

Federal University, Dutse, Jigawa State. FUD

Mailing Address: P.M.B 7156, Dutse, Jigawa State.

Tel: 08076591349 or 08076590476

Website: [www.fud.edu.ng](http://www.fud.edu.ng)

Federal University, Dutsin-Ma, Katsina State. FUDUTSNMA

E-mail: [support@fudutsinma.edu.ng](mailto:support@fudutsinma.edu.ng)

Tel: 08177451899, 08025350544, 08106876614

Website: [www.fudutsinma.edu.ng](http://www.fudutsinma.edu.ng)



Federal University, Kashere, Gombe State. FUK  
E-mail: [fukgombe@yahoo.com](mailto:fukgombe@yahoo.com)  
Tel: +2348036293642  
Website:  
<http://federaluniversitykasheregombe.gnbo.com.ng>  
[www.fukashere.edu.ng](http://www.fukashere.edu.ng)

Federal University, Lokoja, Kogi State. FUL  
Website: [www.fulokoja.edu.ng](http://www.fulokoja.edu.ng)  
Federal University, Ndufu-Alike, Ebonyi State. FUNAI  
Mailing Address: Abakaliki, Ebonyi P.M.B 1010  
E-mail: [info@funai.edu.ng](mailto:info@funai.edu.ng)  
Website: [www.funai.edu.ng](http://www.funai.edu.ng)

Federal University, Otuoke, Bayelsa. FUOTUOKE  
Website: [www.fuotuoike.edu.ng](http://www.fuotuoike.edu.ng)

Federal University, Oye-Ekiti, Ekiti State. FUOYE  
E-mail: [info@fuoye.edu.ng](mailto:info@fuoye.edu.ng)  
Website: [www.fuoye.edu.ng](http://www.fuoye.edu.ng)

Federal University, Wukari, Taraba State. FUWUKARI  
Website: [www.fuwukari.edu.ng](http://www.fuwukari.edu.ng)

#### List of State Universities In Nigeria

This list comprises of all the State Universities in Nigeria including State Universities of Technology.

Adekunle Ajasin University. AAUA  
Mailing Address: P.M.B 01, Akungba-Akoko, Ondo State  
Website: [www.adekunleajasinuniversity.edu.ng](http://www.adekunleajasinuniversity.edu.ng)

Ambros Alli University. AAU  
Mailing Address: P.M.B. 14, Ekpoma, Edo State.  
Tel: 055-98448  
Website: [www.aauekpoma.edu.ng](http://www.aauekpoma.edu.ng) [www.myaau.com](http://www.myaau.com)

Abia State University, Uturu. ABSU  
Mailing Address: P.M.B. 2000 Okigwe, Abia State.  
Website: [www.absuu.net](http://www.absuu.net)

Adamawa State University State, Mubi. ADSU  
Mailing Address: P.M.B. 25, Mubi, Adamawa State.  
Website: [www.adsu.edu.ng](http://www.adsu.edu.ng) [www.adamawastateuni.com](http://www.adamawastateuni.com)

Akwa Ibom State University, Ikot-Akpaden. AKSU  
Mailing Address: Mkpai Enin L.G.A Akwa Ibom State  
Website: [www.aksu.edu.ng](http://www.aksu.edu.ng)

Bukar Abba Ibrahim University. BAI  
Mailing Address: Sir Kashim Ibrahim Road, P.M.B. 1144, Damaturu, Yobe State  
Website: [www.baiu.edu.ng](http://www.baiu.edu.ng)

Benue State University. BSU  
Mailing Address: P.M.B. 102119, Makurdi, Benue State  
Tel: 044-533811, 531162, 532550  
Website: [www.bsum.edu.ng](http://www.bsum.edu.ng)

Cross Rivers University of Technology. CRUTECH  
Mailing Address: P.M.B. 1123, Calabar, Cross River State.  
Tel: 087-232303  
Website: [www.crutech-nig.net](http://www.crutech-nig.net)

Delta State University. DELSU  
Mailing Address: P.M.B 1 Abraka, Delta State

Tel: 054-66009.  
Website: [www.deltastate.edu.ng](http://www.deltastate.edu.ng), [www.deltastate.edu](http://www.deltastate.edu),  
[www.delsuonline.com](http://www.delsuonline.com)

Ebonyi State University. EBSU  
Mailing Address: P.M.B.53. Abakaliki, Ebonyi State.  
Tel: 043-221337, 043-221093.  
Website: [www.ebsu.edu.net](http://www.ebsu.edu.net)  
Gombe State University. GSU  
Mailing Address: P.M.B. 27, Tudun Wada, Gombe, Gombe State.  
Tel: 072-22091  
Fax: 072-221097  
E-mail: [vcgsu@yahoo.com](mailto:vcgsu@yahoo.com)  
Website: [www.gomsu.org](http://www.gomsu.org)

Evan Enwerem University,  
Mailing Address: P.M.B. 2000, Owerri, Imo State.  
Website: [www.imsu.edu.ng](http://www.imsu.edu.ng), [www.imsuonline.com](http://www.imsuonline.com)

Kaduna State University. KASU  
Mailing Address: Tafawa Balewa Way, P.M.B. Kaduna State.  
Website: [www.kasuportal.net](http://www.kasuportal.net)

Kogi State University. KSU  
Mailing Address: P.M.B. 1008, Anyigba Kogi State.  
Tel: 009-87-762538-275,08035959687  
Website: [www.myksuportal.com](http://www.myksuportal.com)

Umaru Musa Yaradua University. UMYUK  
Mailing Address: P.M.B.2218, Katsina.  
E-mail: [info@umyu.edu.ng](mailto:info@umyu.edu.ng)  
Website: [www.umyu.edu.ng](http://www.umyu.edu.ng)

Kano University of Science and Technology, Wudil. KUST  
Mailing Address: c/o Kano State Coll. of Art, Science and Remedial Studies, P.M.B 3244, Kano.  
Tel: 064-241175,241149,648029,241175  
Website: [www.kustuportal.edu.ng](http://www.kustuportal.edu.ng)

Kwara State University, Malete, Ilorin, Kwara State. KWASU  
Website: [www.kwasu.edu.ng](http://www.kwasu.edu.ng)  
Lagos State University, Ojo. LASU Mailing Address: P.M.B. 1087, Apapa, Lagos.  
Tel: 01-884043,884048  
Website: [www.lasunigeria.org](http://www.lasunigeria.org)

Ibrahim Badamasi Babangida University, Lapai, Niger State. LAPAI  
Tel: 066-220646, 08036650914  
Website: [www.ibbuniversity.com](http://www.ibbuniversity.com), [www.ibbu.edu.ng](http://www.ibbu.edu.ng)

Nasarawa State University, Keffi,  
Mailing Address: P.M.B. 1022, Keffi, Nasarawa State.  
Website: [www.nasuk.edu.ng](http://www.nasuk.edu.ng) [www.nasukonline.net](http://www.nasukonline.net)

Niger Delta University. NDU  
Mailing Address: P.M.B. 071, Wilberforce Island, Bayelsa State  
Tel: 089-490484, 089-490899, 490900  
Website: [www.ndu.edu.ng](http://www.ndu.edu.ng)

Olabisi Onabanjo University. OOU  
Mailing Address: P.M.B. 2002, Ago-Iwoye, Ogun State.  
Website: [www.oouagoiwoye.edu.ng](http://www.oouagoiwoye.edu.ng), [www.oou-ng.com](http://www.oou-ng.com)

Tai Solarin University of Education, Ijagun. TASUED  
Mailing Address: P.M.B. 2118, Ijebu-Ode, Ogun State.  
Tel: 037-432770, 431547, 431994  
Website: [www.tasuedu.org](http://www.tasuedu.org)

The University of Education, Ikere-Ekiti. TUNEDIK  
Mailing Address: P.M.B 250 Ikere-Ekiti, Ekiti State.  
Tel: 030- 600020,610152  
Website: Nil

Ekiti State University, Ado-Ekiti. EKSU  
Mailing Address: P.M.B 5363, Ado- Ekiti, Ekiti State.  
Tel: 030-250370, 250711,250026  
Website: [www.eksu.edu.ng](http://www.eksu.edu.ng)

Osun State University, Osogbo, Osun State  
Tel: 035203095, 0305203097  
Website: [www.uniosun.org](http://www.uniosun.org)

University Name: Anambra State University, Uli  
Mailing Address: P.M.B. 02, Uli, Anambra State.  
Website: [www.ansu-edu.net](http://www.ansu-edu.net), [www.ansu.edu.ng](http://www.ansu.edu.ng)

Taraba State University, Jalingo TSUJ  
Mailing Address: P.M.B. 116, Jalingo, Taraba State  
Nigeria.  
Website: [www.tsujalingo.com](http://www.tsujalingo.com)

Enugu State University of Science and Technology,  
ESUTECH  
Mailing Address: P.M.B 1660, Enugu, Enugu State.  
Tel: 042-451319, 451253, 451244, 451264  
Website: [www.esut.edu.ng](http://www.esut.edu.ng), [www.esutportal.net](http://www.esutportal.net)

Kebbi State University of Science and Technology, Aliro,  
Kebbi State. KSUSTA  
Website: [www.ksusta.edu.ng](http://www.ksusta.edu.ng)

Ladoke Akintola University of Technology, LAUTECH  
Mailing Address: P.M.B. 4000, Ogbomoso, Oyo State.  
Tel: 038-710340, 710776.  
E-mail: [tsuja@gamail.com](mailto:tsuja@gamail.com)  
Website: [www.lautech.edu.ng](http://www.lautech.edu.ng)

Rivers State University of Science and Technology,  
Mailing Address: P.M.B. 5080, Port-Harcourt, Rivers State.  
Tel: 084-338508, 335823.  
Website: [www.ust.edu.ng](http://www.ust.edu.ng)

Ondo State University of Science and Technology,  
Okitipupo, Ondo State. OSUSTECH  
Website: [www.osustech.edu.ng](http://www.osustech.edu.ng)  
University of Science and Technology, Ifaki-Ekiti, Ekiti  
State. USTI  
Website: [www.usti.edu.ng](http://www.usti.edu.ng)

#### List of Private Universities In Nigeria

This list comprises of all the Private Universities in Nigeria.

Afe Babalola University, Ado-Ekiti. ABUAD  
Mailing Address: KM 85 Afe Babalola Way, Ado-Ekiti, Ekiti  
State Nigeria, P.M.B.5454,  
Tel: +234-80-35684692, +234-80-33509150, +234-80-  
54300473  
Website: [www.abuad.edu.ng](http://www.abuad.edu.ng)

Achievers University Owo, Ondo State. ACHIVERS

Website: [www.achievers.edu.ng](http://www.achievers.edu.ng)

Al- Hikmah University, Adeta Road, Adewole Housing  
Estate,  
Mailing Address: P.O.BOX 3340, Ilori, Kwara State  
Website: [www.alhikmah.edu.ng](http://www.alhikmah.edu.ng)

American University of Nigeria, Lamido Zubairu Way ,Yola,  
By-Pass,  
Mailing Address: P.M.B. 2250, Yola, Adamawa State  
Website: [www.americanuniversitynigeria.org](http://www.americanuniversitynigeria.org),  
[www.aun.edu.ng](http://www.aun.edu.ng)

Ajayi Crowther University,  
Mailing Address: P.M.B. 10066, Oyo, Oyo State  
Website: [www.acu.edu.ng](http://www.acu.edu.ng)

Babcock University, Ilishan-Remo,  
Mailing Address: P.M.B. 21244, Ikeja.  
Tel: 037- 432799, 630148/9  
E-mail: [babcock@infoweb.abs.net](mailto:babcock@infoweb.abs.net)  
Website: [www.babcockuni.edu.ng](http://www.babcockuni.edu.ng)

Bells University of Technology,  
Mailing Address: KM 8, Idiroko Road, P.M.B. 1015, Ota,  
Ogun State.  
Tel: 017949216  
Website: [www.bellsuniversity.org](http://www.bellsuniversity.org)

Bingham University,  
Mailing Address: P.M.B. 005 Karu, Nasarawa State,  
Tel: 09- 6720785, 08055024585.  
E-mail: [binghamuniversity@yahoo.com](mailto:binghamuniversity@yahoo.com)  
Website: [www.binghamuni.edu.ng](http://www.binghamuni.edu.ng)

Benson Idahosa University,  
Mailing Address: P.M.B. 1100 Benin City, Edo State.  
Tel: 052-253764  
Website: [www.biu.edu.ng](http://www.biu.edu.ng)

Bowen University,  
Mailing Address: P.M.B. 284 Iwo, Osun State  
Email: [info@bowenuniversity.edu.ng](mailto:info@bowenuniversity.edu.ng)  
Website: [www.bowenuniversity.edu.ng](http://www.bowenuniversity.edu.ng)

Caleb University  
Mailing Address: KM 15, Ikorodu- Itokin Road, Imota,  
P.M.P.B. 21238, Ikeja, Lagos State.  
Tel: 01-8517711, 01- 764712  
Email: [info@calebuniversity.edu.ng](mailto:info@calebuniversity.edu.ng)  
Website: [www.calebuniversity.edu.ng](http://www.calebuniversity.edu.ng)

Caritas University,  
Mailing Address: P.M.B. 01784, Enugu, Amorji-Nike,  
Enugu State.  
Tel: 042-555546, 0803470312  
Website: [www.caritasuni.edu.ng](http://www.caritasuni.edu.ng)

Crawford University of Apostolic Faith Mission Faith City,  
Mailing Address: KM 8, Atan- Agbara Road, P.M.B. 2001,  
Igbesa, Ogun State.  
Tel: 234-18134785, 8502828,  
80865296600,08056098953, 0805608902  
E-mail: [info@crawforduniversity.edu.ng](mailto:info@crawforduniversity.edu.ng)  
Website: [www.crawforduniversity.edu.ng](http://www.crawforduniversity.edu.ng)

Crescent University,

Mailing Address: KM 5 Ayetoro Road, Lafenwa, P.M.B. 2082, Abeokuta, Ogun State.

Tel: 08030644731.

E-mail: [crescentuniv@hotmail.com](mailto:crescentuniv@hotmail.com)

Website: [www.crescentuniv.com](http://www.crescentuniv.com)

Covenant University, Canaan Land

Mailing Address: KM 10, Idiroko Road, P.M.B. 1023 Ota, Ogun State

Tel: 01/7947546-8, 7900724

E-mail: [registrar@covenantuniversity.org](mailto:registrar@covenantuniversity.org)

Website: [www.covenantuniversity.edu.ng](http://www.covenantuniversity.edu.ng)

Fountain University, Oke-Osun,

Mailing Address: P.M.B 4491, Osogbo.

Tel: 08034928614, 035- 2074335

E-mail: [enquiries@fountainuniversity.org](mailto:enquiries@fountainuniversity.org)

Website: [www.fountainuniversity.edu.ng](http://www.fountainuniversity.edu.ng)

Godfrey Okoye University, Urgwuomu- Nike

Mailing Address: P.M.B. 01014 Thinkers' Comer, Enugu, Nigeria

Tel: 048-482891

Website: [www.og-uni-enugu.net](http://www.og-uni-enugu.net)

Igbinedion University, Okada,

Mailing Address: 69, Airport Road, P.M.B. 0006, Benin City, Edo State

Tel: 052-254942

Website: [www.iuokada.edu.ng](http://www.iuokada.edu.ng)

Joseph Ayo Babalola University, Ikeji-Arakeji, Osun State

Website: [www.jabu.edu.ng](http://www.jabu.edu.ng)

Katsina University,

Mailing Address: Dutsinma Road, P.M.B 2137, Katsina State.

Tel: 065-434785

Website: [www.katsinauniversityportal.net](http://www.katsinauniversityportal.net)

Lead City University,

Mailing Address: Oba Otudeko Avenue, P.O.BOX 30678, Secretariat, Toll Gate Area, Ibadan

Tel: 02-7510681

E-mail: [registrar@lcu.edu.ng](mailto:registrar@lcu.edu.ng)

Website: [www.lcu.edu.ng](http://www.lcu.edu.ng)

Madonna University

Mailing Address: P.M.B 407, Okija, Anambra State

Tel: 046-463724

Website: [www.madonnauniversity.edu.ng](http://www.madonnauniversity.edu.ng),

[www.madonna.edu](http://www.madonna.edu), [www.madonnau.edu.ng](http://www.madonnau.edu.ng)

University of Mkar

Mailing Address: P.M.B. 017 Gboko, Benue State

Tel: 044-470631

E-mail: [mkaruni@yahoo.com](mailto:mkaruni@yahoo.com)

Website: [www.unimkar.edu.ng](http://www.unimkar.edu.ng)

Novena University Ogume

Mailing Address: P.M.B. 2 Kwale, Delta State

Tel: 08033302376 ,08037167418, 08066568533,

080624111131, 08082852293,01-4973603,

104977717

Website: [www.novenauniversity.edu.ng](http://www.novenauniversity.edu.ng)

Nigeria Turkish Nile University

Mailing Address: Plot 681 Cadastral Zone Coo, Research & Institution Area Airport Road Bypass, Abuja

Tel: 08138616589

Website: [www.ntnu.edu.ng](http://www.ntnu.edu.ng)

Obong University, Obong, Ntak

Mailing Address: P.O.BOX 25, Abak, Akwa Ibom State

Tel: 08028915795

Website: [www.obonguniversity.net](http://www.obonguniversity.net)

Oduduwa University, Ipetumodu

Mailing Address: P.M.B. 5533 Ile Ife, Osun State

Website: [www.oduduwauniversity.com](http://www.oduduwauniversity.com)

Paul University, Awka

Mailing Address: P.M.B. 1674, Awka, Anambra State

Website: [www.pauluniversity.edu.ng](http://www.pauluniversity.edu.ng)

Rhema University

Mailing Address: Obeama Asa, Oyigbo L.G.A, River State

Tel: 07028544752, 082865276

Website:

[www.rhemauniversityng.com](http://www.rhemauniversityng.com)

[www.rhemauniversityng.com](http://www.rhemauniversityng.com)

Redeemers University

Mailing Address: KM 46, Lagos/Ibadan Express Way,

Redemption City, P.O.BOX 7914, Ikeja- Lagos

Tel: 01- 8502921, 08023978672

Website: [www.run.edu.ng](http://www.run.edu.ng)

Renaissance University, Ojiagu-Agbani, Enugu State

Mailing Address: P.M.B. 1019, Enugu

Tel: 08036023768

Website: [www.rnu.edu.ng](http://www.rnu.edu.ng)

Salem University

Mailing Address: KM 16, Lokoja-Ajakuta Road, P.M.B. 1060, Lokoja, Kogi State

Tel: 08072881598, 07033480414, 08081242631

Email: [info@saleuniversity.org](mailto:info@saleuniversity.org)

Website:

[www.saleuniversity.org](http://www.saleuniversity.org),

[www.saleuniversity.edu.ng](http://www.saleuniversity.edu.ng)

Tansain University,

Mailing Address: P.O. BOX375, Oba, Anambra State

Tel: 0806974789, 08052222875, 046-302390

Website: [www.tansain.edu.ng](http://www.tansain.edu.ng)

Wellspring University,

Mailing Address: Irhihi/Ogbaneki Layout, G R A Benin City, Edo State

Tel: 07042683282, 08191189031

Website: [www.springuniversity.net](http://www.springuniversity.net)

Western Delta University, Oghara, Delta State

E-mail: [westerndeltauni@yahoo.com](mailto:westerndeltauni@yahoo.com)

Website: [www.wduniversity.net](http://www.wduniversity.net)

Wesley University of Science and Technology, Ondo

Mailing Address: P.M.B 507, Ondo-Ife Road, Ondo

Tel: 034-204395

Email:

[wustondo\\_vc@mai2methodist.com](mailto:wustondo_vc@mai2methodist.com),

[Wutondo\\_vc@yahoo.com](mailto:Wutondo_vc@yahoo.com)

Website: [www.wusto.com](http://www.wusto.com), [www.wustoportal.edu.ng](http://www.wustoportal.edu.ng)

Wukari Jubilee University, Wukari,

Mailing Address: P.M.B. 1019, Wukari, Taraba State.

Tel: 08036023768.

Website: [www.wukarijubileeuniversity.org](http://www.wukarijubileeuniversity.org)

Veritas University, Abuja

Website: [www.veritas.edu.ng](http://www.veritas.edu.ng)

**• APPENDIX 6: FUNDING AGENCIES FOR SCIENCE AND TECHNOLOGY PROGRAMS IN AFRICA**

	ORGANISATION NAME/PROGRAM AND WEBSITE INFORMATION	FOCUS
1.	<p>ADDAX AND ORYX FOUNDATION  <a href="http://www.addax-oryx-foundation.org/en/submit-a-project/selection-criteria.php">http://www.addax-oryx-foundation.org/en/submit-a-project/selection-criteria.php</a></p>	<ul style="list-style-type: none"> <li>The Addax and Oryx Foundation funds projects focused on environment, health, education, community development in Africa and the Middle East                     <ul style="list-style-type: none"> <li>Topic: Ecology; Agriculture; Awareness raising; Biodiversity; Climate change; Drought; Food security; Forests; Gender; Land degradation and restoration; Land management; Poverty reduction/Development; Soil science; Water management</li> </ul> </li> </ul>
2.	<p>AFRICAN DEVELOPMENT BANK  <a href="http://www.afdb.org/en/">http://www.afdb.org/en/</a></p>	<ul style="list-style-type: none"> <li>The AfDB contributes to poverty reduction and economic and social development in the least developed African countries by providing concessional funding for projects and programs, as well as technical assistance for studies and capacity-building activities. The Fund has cumulatively invested UA 29.4 billion (USD 45 billion) over its 40 years of operationalization on the African continent.</li> </ul>
3.	<p>ALCOA FOUNDATION  <a href="http://www.alcoa.com/global/en/community/foundation/info_page/home.asp">http://www.alcoa.com/global/en/community/foundation/info_page/home.asp</a></p>	<ul style="list-style-type: none"> <li>A significant percentage of our grants originate in Alcoa communities. Four distinct Areas of Excellence provide thematic focus to the global allocation of our philanthropic resources. The majority of our grants fit within one of the following areas: Conservation and Sustainability, Safe and Healthy Children and Families, Global Education and Workplace Skills, and Business and Community Partnerships.</li> </ul>
4.	<p>CARNEGIE CORPORATION OF AMERICA  <a href="https://www.carnegie.org/grants/grantseekers/">https://www.carnegie.org/grants/grantseekers/</a></p>	<ul style="list-style-type: none"> <li>Provides grants for international development and education within the U.S. and in countries of the former British Commonwealth. International Development Program (IDP) focuses on Commonwealth Africa with initiatives to strengthen African universities.</li> </ul>
5.	<p>CARNEGIE CORPORATION OF NEW YORK  <a href="http://www.carnegie.org">www.carnegie.org</a></p>	<ul style="list-style-type: none"> <li>The Carnegie Corporation of New York was created to promote "the advancement and diffusion of knowledge and understanding." Under Carnegie's will, grants must benefit the people of the United States, although up to 7.4 percent of the funds may be used for the same purpose in countries that are or have been members of the British Commonwealth, with a current emphasis on Commonwealth Africa.</li> </ul>
6.	<p>CITIGROUP FOUNDATION  <a href="http://www.citigroup.com/citi/">http://www.citigroup.com/citi/</a></p>	<ul style="list-style-type: none"> <li>Working with a global network of colleagues and partners, the Foundation gives grants focused in three main areas: Financial Education, Educating the Next Generation, Building Communities and Entrepreneurs.</li> </ul>
7.	<p>FOGARTY INTERNATIONAL CENTER, US NATIONAL INSTITUTES OF HEALTH (NIH)  <a href="https://www.fic.nih.gov/Funding/Pages/default.aspx">https://www.fic.nih.gov/Funding/Pages/default.aspx</a></p>	<ul style="list-style-type: none"> <li>The Fogarty International Center is dedicated to advancing the mission of the National Institutes of Health (NIH) by supporting and facilitating global health research conducted by U.S. and international investigators, building partnerships between health research institutions in the U.S. and abroad, and training the next generation of scientists to address global health needs.</li> </ul>
8.	<p>FORD FOUNDATION  <a href="http://www.fordfoundation.org/work/our-grants/">http://www.fordfoundation.org/work/our-grants/</a></p>	<ul style="list-style-type: none"> <li>The Ford Foundation awards grants in support of their mission to strengthen democratic values, reduce poverty and injustice, promote international cooperation and advance human achievement.</li> </ul>
9.	<p>FORD FOUNDATION  <a href="http://www.fordfound.org">www.fordfound.org</a></p>	<ul style="list-style-type: none"> <li>Grants and PRIs are given in the Foundation's fields of interest through a program division encompassing three broad areas: Asset Building and Community Development; Education, Media, Arts, and Culture; and Peace and Social Justice.</li> </ul>
10.	<p>GATES (BILL AND MELINDA) FOUNDATION  <a href="http://www.gatesfoundation.org/">http://www.gatesfoundation.org/</a></p>	<ul style="list-style-type: none"> <li>Provides funding for projects in the areas of global health, poverty and development, and education and information.</li> </ul>
11.	<p>GE FOUNDATION  <a href="http://www.ge.com/foundation/index.jsp">http://www.ge.com/foundation/index.jsp</a></p>	<ul style="list-style-type: none"> <li>As the philanthropic organization of GE, GE Foundation works to solve some of the world's most difficult problems. In coordination with its partners, it supports U.S. and international education, the environment, public policy, human rights and disaster relief. In addition, GE Foundation supports GE employee and retiree giving and involvement in GE communities around the world.</li> </ul>

12.	GERMAN FEDERAL MINISTRY FOR ECONOMIC COOPERATION AND DEVELOPMENT(BMZ) <a href="https://www.bmz.de/en/">https://www.bmz.de/en/</a>	<ul style="list-style-type: none"> <li>Germany is currently involved in development cooperation activities in five regions round the globe, covering 58 partner countries. Other individual countries also receive assistance as part of regional programmes or programmes dealing with specific sectors, such as fighting HIV/AIDS, climate and forest protection, and crisis prevention. Cooperation between the Federal Republic of Germany and its partner countries is based on bilateral agreements that are binding under international law. These agreements are negotiated in <b>close talks between the partner countries' governments approximately every two years.</b></li> </ul>
13.	GOLDMAN SACHS FOUNDATION <a href="http://www2.goldmansachs.com/foundation/">http://www2.goldmansachs.com/foundation/</a>	<ul style="list-style-type: none"> <li>The Goldman Sachs Foundation was funded in 1999 with a \$200 million donation from The Goldman Sachs Group, Inc. The Foundation's mission is to promote excellence and innovation in education worldwide.</li> </ul>
14.	GRANTS FOR LARGE-SCALE CONSERVATION PROJECTS <a href="http://www.bfn.de/0203_grossprojekte+M52087573ab0.html">http://www.bfn.de/0203_grossprojekte+M52087573ab0.html</a>	<ul style="list-style-type: none"> <li>The programme supports projects that serve in maintaining natural landscapes for the longer term and in securing and developing cultural landscapes that provide outstanding habitats for protected animal and plant species. <ul style="list-style-type: none"> <li>Topic: Biodiversity; Land degradation and restoration; Forests; Water management; Ecology</li> </ul> </li> </ul>
15.	H.F. GUGGENHEIM FOUNDATION <a href="http://www.hfg.org">www.hfg.org</a>	<ul style="list-style-type: none"> <li>Program Areas: Education, research. Africa Countries Funded Africa-Wide. The H. F. Guggenheim Foundation supports research in the natural and social sciences and humanities that promise to promote the understanding of the causes, manifestations, and control of violence, aggression and dominance. The Foundation places a priority on the study of urgent problems of violence and aggression in the modern world. Support has been given to study the aspects of violence related to youth, family relationships, intergroup conflict related to religion, ethnicity, and nationalism, and political violence deployed in war and sub-state terrorism.</li> </ul>
16.	HIDEYO NOGUCHI AFRICA PRIZE <a href="http://www.jsps.go.jp/english/enoguchiafrica/nomination.html">http://www.jsps.go.jp/english/enoguchiafrica/nomination.html</a>	<ul style="list-style-type: none"> <li>Honours individuals with outstanding achievements in the fields of medical research and medical services to combat infections and other diseases in Africa.</li> </ul>
17.	INTERNATIONAL DEVELOPMENT RESEARCH CENTRE <a href="http://www.idrc.ca">www.idrc.ca</a>	<ul style="list-style-type: none"> <li>Program Areas: Research Science/Technology, Economic Development, Environment and Natural Resources Management, Strengthening Institutions. Africa Countries Funded Africa-wide. The International Development Research Centre was created by the Parliament of Canada to help developing countries in Africa and elsewhere use science and technology to find long-term practical solutions to social, economic and environmental problems. The <b>Centre's grant-making</b> is for applied research by researchers on problems they identify as crucial to their communities. The Centre also provides expert advice to researchers and builds local capacity to undertake research and innovation.</li> </ul>
18.	INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC) <a href="https://www.idrc.ca/en/funding">https://www.idrc.ca/en/funding</a>	<ul style="list-style-type: none"> <li>Dedicated to funding research activities that are aimed at directly benefiting developing countries and their citizens.</li> </ul>
19.	INTERNATIONAL FOUNDATION FOR SCIENCE <a href="http://www.ifs.se">www.ifs.se</a>	<ul style="list-style-type: none"> <li>Program Areas: Education, environment, and research/science. Africa Countries Funded Africa-wide. The International Foundation for Science (IFS), founded in 1972, is a research council with international operations that helps build scientific capacity in Africa and elsewhere, related to the sustainable management of biological and water resources. Grant support is provided for a research scope that covers natural and social sciences research on agriculture, soils, animal production, food science, forestry, agro-forestry, aquatic resources, natural products and water resources.</li> </ul>
20.	JAPAN FOUNDATION <a href="http://www.jpf.go.jp">www.jpf.go.jp</a>	<ul style="list-style-type: none"> <li>The Japan Foundation invites individuals and organizations that are planning international exchange projects and activities to participate in programs of the Japan Foundation. The Japan Foundation carries out its programs and activities in the three major areas of Art and Cultural Exchange, Japanese-Language Education Overseas,</li> </ul>

		Japanese Studies Overseas and Intellectual Exchange, as well as strengthening the Cultural Exchange in Asia. Successful applicants are provided with grants, research scholarships, Japanese-language training programs, and other forms of support.
21.	JAPANESE INTERNATIONAL COOPERATION AGENCY <a href="https://www.jica.go.jp/nigeria/english/index.html">https://www.jica.go.jp/nigeria/english/index.html</a>	<ul style="list-style-type: none"> <li>Effectively combining the schemes of technical cooperation, ODA loans and grant aid, JICA will support Nigeria on: 1) realizing human security and achieving the MDGs, and 2) providing basic infrastructure for sustainable economic growth that is balanced. Nigeria, A major power and the third ranking in GDP, Nigeria is home to the largest population on the African continent (160 million people) and holds plenty of natural resources: oil and natural gas. Nigeria is also the largest country of exporting petroleum in Africa. There are large income disparities within the country, and the lack of development of social infrastructure prevents of improving living conditions and promoting business investment.</li> </ul>
22.	MACARTHUR (THE JOHN D. AND CATHERINE T.) FOUNDATION <a href="https://www.macfound.org/">https://www.macfound.org/</a>	<ul style="list-style-type: none"> <li>Supports individuals and institutions working to defend human rights, advance global conservation and security, make cities better places, and understand how technology is affecting children and society. Through its Program on Global Security and Sustainability, the organization offers grants in Population and Reproductive Health for projects in India, Mexico, Nigeria, and Russia.</li> <li>100&amp;Change Award by MacArthur Foundation</li> <li>The MacArthur Foundation launched a competition with an award of 100 million USD. It will be granted to the organisation proposing an outstanding and real solution to the most critical problems affecting people, places and the planet. <ul style="list-style-type: none"> <li>Topic: Climate change; Drought; Ecology; Gender; Land degradation and restoration</li> </ul> </li> </ul>
23.	ROCKEFELLER BROTHERS FUND (RBF) <a href="http://www.rbf.org/grantmaking/grant-opportunities">http://www.rbf.org/grantmaking/grant-opportunities</a>	<ul style="list-style-type: none"> <li>Awards grants to support a variety of charitable projects in the United States and abroad, seeking to expand knowledge, clarify values and critical choices, nurture creative expression, and shape public policy.</li> </ul>
24.	ROCKEFELLER FOUNDATION <a href="https://www.rockefellerfoundation.org/">https://www.rockefellerfoundation.org/</a>	<ul style="list-style-type: none"> <li>Has funded projects to create health research networks, to run biomedical research initiatives, and to organize scientific conferences.</li> </ul>
25.	SWEDISH INTERNATIONAL DEVELOPMENT COOPERATIVE AGENCY (SIDA) <a href="http://www.sida.se/English/?epieditmode=true">http://www.sida.se/English/?epieditmode=true</a>	<ul style="list-style-type: none"> <li>Offers research grants in natural sciences and health research for researchers in developing countries-Africa Programmes.</li> </ul>
26.	THE AFRICAN CAPACITY BUILDING FOUNDATION (ACBF) <a href="http://www.acbf-pact.org/index.php/en/ops-pro/ficad">http://www.acbf-pact.org/index.php/en/ops-pro/ficad</a>	<ul style="list-style-type: none"> <li>Instrument for Funding Innovative Capacity Development Initiatives (FICAD). The African Capacity Building Foundation (ACBF) has designed a new instrument to finance innovative ideas in Africa for up to \$100,000. <ul style="list-style-type: none"> <li>Topic: Biodiversity; Climate change; Land management</li> </ul> </li> </ul>
27.	THE AFRICAN, CARIBBEAN AND PACIFIC GROUP OF STATES (ACP) <a href="http://www.acp.int/">http://www.acp.int/</a>	<ul style="list-style-type: none"> <li>The ACP Group's main objectives are: sustainable development of its Member-States and their gradual integration into the global economy, which entails making poverty reduction a matter of priority and establishing a new, fairer, and more equitable world order; coordination of the activities of the ACP Group in the framework of the implementation of ACP-EC Partnership Agreements; consolidation of unity and solidarity among ACP States, as well as understanding among their peoples; establishment and consolidation of peace and stability in a free and democratic society.</li> </ul>
28.	THE HEWLETT FOUNDATION GRANTS <a href="http://www.hewlett.org/grants/grantseekers">http://www.hewlett.org/grants/grantseekers</a>	<ul style="list-style-type: none"> <li>This Foundation makes grants in five core program areas: education, environment, global development and population, performing arts, and philanthropy. <ul style="list-style-type: none"> <li>Topic: Ecology; Land management; Biodiversity</li> </ul> </li> </ul>

29.	<p>THE UK DEPARTMENT OF INTERNATIONAL DEVELOPMENT (DID)  <a href="http://www.unccd.int/en/programmes/Capacity-building/CBW/marketplace/Pages/GrantsItemView.aspx?ItemID=1052">http://www.unccd.int/en/programmes/Capacity-building/CBW/marketplace/Pages/GrantsItemView.aspx?ItemID=1052</a></p>	<ul style="list-style-type: none"> <li>Funded Competition in Agri Tech Catalyst for Developing Countries. It is organizing a funded competition with the aim of increasing the pace and scale of uptake of agricultural innovation by farmers in developing countries. <ul style="list-style-type: none"> <li>Topic: Agriculture; Awareness raising</li> </ul> </li> </ul>
30.	<p>THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT (USAID)  <a href="https://www.usaid.gov/work-usaid/get-grant-or-contract/opportunities-funding">https://www.usaid.gov/work-usaid/get-grant-or-contract/opportunities-funding</a></p>	<ul style="list-style-type: none"> <li>Opportunities for Funding: Grant &amp; Partnership Programs. Assistance to Foreign Countries.</li> <li>U.S. foreign assistance has always had the twofold purpose of furthering America's interests while improving lives in the developing world. USAID carries out U.S. foreign policy by promoting broad-scale human progress at the same time it expands stable, free societies, creates markets and trade partners for the United States, and fosters good will abroad. Spending less than 1 percent of the total federal budget, USAID works in over 100 countries to: <ul style="list-style-type: none"> <li>Promote broadly shared economic prosperity</li> <li>Strengthen democracy and good governance,</li> <li>Protect human rights</li> <li>Improve global health</li> <li>Advance food security and agriculture</li> <li>Improve environmental sustainability</li> <li>Further education</li> <li>Help societies prevent and recover from conflicts</li> <li>Provide humanitarian assistance in the wake of natural and man-made disasters.</li> </ul> </li> </ul>
31.	<p>THE WORLD BANK GROUP  <a href="http://www.worldbank.org">http://www.worldbank.org</a></p>	<ul style="list-style-type: none"> <li>The World Bank is a vital source of financial and technical assistance to developing countries around the world. We are not a bank in the ordinary sense but a unique partnership to reduce poverty and support development. The World Bank Group comprises five institutions managed by their member countries. The World Bank Group has set two goals for the world to achieve by 2030: <ul style="list-style-type: none"> <li>End extreme poverty by decreasing the percentage of people living on less than \$1.90 a day to no more than 3%</li> <li>Promote shared prosperity by fostering the income growth of the bottom 40% for every country.</li> </ul> </li> </ul>
32.	<p>TURING FOUNDATION-PROJECT FUNDING ( THE NETHERLANDS)  <a href="http://www.turingfoundation.org/contact_uk.html">http://www.turingfoundation.org/contact_uk.html</a></p>	<ul style="list-style-type: none"> <li>The Turing Foundation invites applicants for funding, supporting protection and sustainable management of natural resources <ul style="list-style-type: none"> <li>Topic: Agriculture; Climate change; Awareness raising; Biodiversity; Food security; Forests; Land degradation and restoration; Poverty reduction/Development</li> </ul> </li> </ul>
33.	<p>U.S. TRADE AND DEVELOPMENT AGENCY (USTDA)  <a href="https://www.ustda.gov">https://www.ustda.gov</a></p>	<ul style="list-style-type: none"> <li>The U.S. Trade and Development Agency helps companies create U.S. jobs through the export of U.S. goods and services for priority development projects in emerging economies. USTDA links U.S. businesses to export opportunities by funding project preparation and partnership building activities that develop sustainable infrastructure and foster economic growth in partner countries. Priority sectors include: <ul style="list-style-type: none"> <li>Energy</li> <li>Transportation</li> <li>Telecommunications.</li> </ul> </li> </ul>
34.	<p>UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD)  <a href="http://www.unccd.int">http://www.unccd.int</a></p>	<ul style="list-style-type: none"> <li>The Research Development Fund is offering grant opportunities to International Research Programs in Climate Change around the globe.</li> <li>Topic: Climate change</li> </ul>
35.	<p>WALLACE GLOBAL FUND (USA)  <a href="http://wgf.org/grants/">http://wgf.org/grants/</a></p>	<ul style="list-style-type: none"> <li>Wallace Global Fund offers core or project-specific support for non-profit organizations promoting sustainable planet. <ul style="list-style-type: none"> <li>Topic: Funding and resource mobilization; Awareness raising; Climate change; Poverty reduction/Development</li> </ul> </li> </ul>