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Contribution of Nigeria

to the CSTD 2016-17 priority theme on 'The role of science, technology and innovation in ensuring food security by 2030'

NIGERIA'S INPUTS FOR CSTD 2016 -17 PRIORITY THEME 2: THE ROLE OF SCIENCE, TECHNOLOGY AND INNOVATION (STI) IN ENSURING FOOD SECURITY BY 2030

1.0 Introduction

It is crucial to note that considering the relevance of sustainable development to the socio-economic development of the entire globe, the United Nations has come up with the Sustainable Development Goals (SDGs) which are a new, universal set of goals, targets and indicators designed for member states to use to frame their development agenda and political policies over the next 15 years (from 2015 – 2030). The current Administration of His Excellency, President Muhammadu Buhari, GCFR, in line with the SDGs has resorted to economic diversification with emphasis on job/wealth creation and poverty/hunger eradication through building a robust, effective and resilient National System of Innovation (NSI) and fostering sustainable/productive industries in particular Agro-allied processing small and medium scale industries. This is informed by the fact that over 70% of Nigerians sustain themselves through subsistence agriculture and other Agro-allied related activities.

Science, Technology and Innovation (STI) has been recognized as a key tool for implementation of SDGs. This is because, it is intrinsically linked to most, if not all, sectors of the economy and is a powerful driver of economic growth through creation, adoption, development, diffusion of new inventions, technologies and associated know-how. STI is central to feeding a world with a growing population and limited natural resources. One of the key areas of focus by the current Administration in Nigeria is Food/Nutrition Security and hunger eradication. This is underpinned by the fact that providing sufficient and safe food to all people is one of the major global concerns especially among African and Asian countries with rural dwellers having least access to safe and nutritious food. Apart from the obvious cost in terms of lost of human lives and well-being, Food insecurity gives rise to malnourished people who are less productive and are unable to make any significant contribution to economic growth.

The Nigerian Government in order to ensure food security through deployment of STI has adopted an approach that prioritizes nutrition and economic growth through agricultural development, and a deep commitment to partnerships to make an impact against hunger and starvation. The Government is poised to support safe, proven and appropriate technologies and use a strategic and focused approach to implement innovative projects and programmes as well as intensify efforts to scale up promising agricultural technologies to millions of farmers and other technology users throughout the value chain in commercially sustainable ways that would enhance food security.

2.0 Science, Technology and Innovation (STI) Policy Strategies

The Nigeria's revised STI Policy articulates specific sectoral strategies designed to enhance agricultural productivity and food security. The following strategies are salient:

A. Agriculture

i. Enhancing agricultural productivity through cultivation of improved crop varieties and breeds of livestock and fisheries.

ii. Encouraging technology uptake and diffusion of agricultural innovations to farmers.

iii. Encouraging labour-saving and low-cost gender-sensitive processing agricultural technologies.

iv. Developing appropriate and innovative technologies for breeding, feeding, health and management of livestock and poultry.

v. Encouraging agricultural waste management and utilisation.

vi. Developing indigenous technologies for value addition of agricultural produce.

B. Biotechnology Research

i. Promoting the understanding of biotechnology and its applications for national development.

ii. Building capacity and capabilities in biotechnology research and its applications.

iii. Harnessing indigenous knowledge on natural products and commercialising discoveries as well as positioning Nigeria in the biogenetic market.

iv. Ensuring growth and opportunities in the application of advanced bio-processing and bio-manufacturing processes.

v. Facilitating brand recognition for Nigerian biotechnology products and benchmark progress.

vi. Promoting the documentation and use of bio-genetic resources and eliminate bio-piracy.

vii. Ensuring compliance with bio-safety and bioethics guidelines in biotechnology R&D.

3.0 Relevant Projects/Programmes Addressing Food Insecurity

Some projects and programmes have been developed to address all the dimensions of food security which entail Food availability, Food accessibility, Food utilization/increased nutritional value and Food stability. These projects/programmes are generally geared

towards enhancing agricultural productivity in a sustainable manner. These projects/programmes are tailored around the following:

i. Conventional Cross-Breeding for Improved Plant and animal Varieties and Increased Crop Yields/animal production. This apart from high yields/production could generate varieties with fortified nutrient, tolerance to drought, herbicides, diseases, or pests. National Biotechnology Development Agency (NABDA) and Sheda Science and Technology Complex (SHESTCO) have done a lot in this area.

ii. Application of biotechnology technique for generation of Genetically Modified Organism (GMO) which involves the insertion of genetic organisms from unrelated organisms that cannot be crossed by natural means to generate crops with a number of benefits, including tolerance to biotic (insects and disease) and abiotic (drought) increase in size, stresses, improved nutrition, taste and appearance, herbicide tolerance. NABDA and SHESTCO are both doing a lot in these areas. Presently, sensitization campaigns are ongoing to get Nigerians adequately informed about GMO products. Already, bio-safety law has been put in place to ensure proper regulation of this subsector. Furthermore, plans are underway to establish Bio-safety Level–2 Containment Facility For Transgenic Research In Nigeria

iii. Micro-propagation of plantlets of tolerant tree species (Eucalyptus, Neem and Acacia trees) using tissue culture and temporary immersion bioreactor system (TIBS) for the purpose of combating desertification and reclamation of more land for agricultural purpose. NABDA and SHESTCO are doing a lot in this direction.

iv. Sustainable soil management for increased yields through replacement of Synthetic fertilizers which are not sustainable due to their large ecological footprint with more environmentally sustainable biological fertilizers. The National Research Institute for Chemical Technology (NARICT) has developed neem based fertilizer and Organic fertilizer from Moringa Oleifera which are more environmentally friendly.

v. NABDA and NARICT are working assiduously on effective management of Organic Waste for Biomass Energy Production and Soil Nutrient Enhancement.

vi. Post-harvest loss technologies minimize losses that could be incurred during storage, handling, refrigeration, transport, and processing. The National Agency for Engineering Infrastructure (NASENI), Project Development Institute (PRODA), Federal Institute of Industrial Research (FIIRO), Raw Materials Research and Development Council (RMRDC), National Board for Technology Incubation (NBTI), National Office for Technology Acquisition and Promotion (NOTAP), NARICT have come up with agro-allied processing technologies for processing of cassava, palm oil, tomato, soy beans, millet,

meat, fish, diary, fruits and other grains with a view to reducing waste to minimal level especially among small holder farmers. There is a Gamma Irradiation Facility in SHESTCO which is also applied for preservation purpose.

vii. NOTAP facilitates linkages between Fulani Cattle rearers and Milk producing companies in Nigeria eg. (Fiesland Campina WAMCO plc) on large scale collection and preservation of raw milk from across the country in order to boost the production of dairy products in Nigeria.

viii. Under the NOTAP-Industry linkages, PZ Nigeria plc has upgraded the research laboratory of various universities and research institutes in Nigeria including University of Calabar, MAU Tech, Yola and NARICT. This has repositioned these institutions to offer various laboratory/research services to SMEs and large scale industries addressing various challenges related to food processing/preservation.

ix. Scale-up of completed R&D projects by FIIRO to catalytic Model plant/factory level including High Nutrient Density (HND) & Ready-to-Use-Therapeutic Foods model plant, Tomato Processing model plant, Food Packaging Model Plant, Integrated Cassava Processing Model Plant, Fruit processing (Banana, Oranges, Mangoes) into cordials and concentrates for the use of small and medium enterprises, pilot scale production of industrial enzymes others. Other agro-allied technologies developed by Research Institutions in Nigeria include; Mobile Cassava Grater, Cassava Chipping Machine, Cassava Peeling Machine, Rotary Dryer, Cassava Pelleting Machine, Palm Oil Milling Machine, Palm Fruit Digester, Palm Fruit Bunch Stripper, Seed Oil Expeller, Multi-Grain Thresher, Cabinet Solar Food Dryer, Rice Threshing Machine, Smokehouse Device; among others.

x. There is plan underway to establish Agricultural Machinery Development Institute in Nigeria in order develop agro-allied technologies/machineries required for enhanced agricultural productivity and food security in Nigeria. The Institute will also develop and promote the usage of low cost and adaptive technologies for agricultural processing and food preservation

xi. The Ward Based Technology Cluster (WBTC) Programme via deployment of requisite technologies developed by various Research Institutions/Agencies for value addition to the raw materials available in the 9555 political wards in Nigeria is ongoing. This is intended to empower small holder farmers, cooperative groups, rural communal groups with technologies to enhance the economic value of raw materials available in their areas and thereby creating job and wealth.

xii. Bio-fortification which implies breeding of critical micronutrients and vitamins into staple crops in order to generate high nutrient staple crops.

xiii. Promotion of cattle ranching under severe tsetse fly and animal trypanosomiasis challenges in Nigeria as well as Implementation of PATTEC-Nigeria activities to increase milk and meat production, hide and skin, calving rate, improve health and well-being of human and livestock, and reduction in calf mortality rate. This initiative is facilitated by the Nigerian Institute of Trypanosomiasis Research (NITR).

xiv. Nigeria presently has observatory satellites in the space. Detailed Natural Resources Inventory developed using the space science and technology will be strictly applied to disaster management, Agricultural early warning, Environmental monitoring, cadastral, climate change etc. This is in pursuit of precision farming leveraging satellite and meteorological data to provide early warning systems to predict and adapt to changing climatic and environmental conditions. These technologies especially the weather forecasting technology will help predict and advise farmers on when and how to farm.

4.0 Conclusion

STI can be applied across all dimensions of food security through effective application of new and emerging technologies that can be used throughout all phases of agriculture, with focus on farmers, agro-allied SMEs and large scale industries. These technologies can be adapted, diffused, and applied such to address local food security related challenges. It is therefore imperative to focus on developing the innovative capabilities to apply knowledge in agricultural development.

It will interest you to know that in line with the revised STI Policy, the Nigeria's Ministry of Science and Technology has created a robust coordination platform, the **National Research and Innovation Council (NRIC)** chaired by Mr. President with Honourable Ministers of the cognate Ministries as members. The Ministry is currently in the process of creating a funding arrangement ie **National Research and Innovation Fund (NRIF)** that will ensure sustainable and competitive funding of STI in Nigeria covering various areas including commercialization of successful research results and support for emergence of new knowledge and skills which will have specific practical application for development of new or improved materials, products, devices, processes and services. Research activities bordering on biotechnology, improved agricultural productivity and food security are among the key priority areas of focus to be addressed by the fund.