





Policy Brief

Nigeria, is the Giant of Africa yet food insecure: Can Agri-Biotech be the Game Changer?

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Executive summary:

Hidden hunger that has continued to result in diseases and underdevelopment has continued to ravage the majority of Nigeria's population despite the country's vast agricultural land with over 85 million hectares. Over 90 million Nigerians live below the poverty line, unable to meet their basic food needs.

This irony of a hungry nation with huge agribusiness capability results from myriad historical, political, and economic factors. Advances in agricultural



Managing Director, ECO Basic Nigeria, Dr Brighton Karume carrying out a training for indigenous seed companies in Nigeria, Nasarawa State, Nigeria, 2021

biotechnology can potentially catalyze Nigeria's green revolution by overcoming challenges like pests, drought, low yields and malnutrition. Genetically modified (GM) crops tailored to African conditions could significantly raise productivity, incomes, food security and nutrition if an enabling policy environment is created.

However, adoption of biotech crops in Nigeria remains restricted due to inadequate research capacities, poor public awareness, stringent biosafety regulations and anti-GM activism. For Nigeria to harness the benefits of agri-biotech, a comprehensive reform agenda is imperative. This would entail increased funding for biotech research, streamlining the biosafety approval process, public outreach on GM crops, and formulating policies to attract private sector investments.

With the right political will and public-private partnerships, agricultural biotechnology can drive the transformation of Nigeria's agriculture. If integrated with improved inputs, financing and extension services, GM technology can catalyze Nigeria's progress to becoming the undisputed Giant of Africa in food production. After decades of unfulfilled potential, agri-biotech has the scope to be the game changer that launches Nigeria's agricultural revolution.

Introduction:

Nigeria is endowed with vast agricultural potential and has over 84 million hectares of arable land, yet it struggles with food insecurity (Okojie 2023). Over 90 million Nigerians live below the poverty line and are unable to meet their basic food needs (World Bank, 2023). This paradox of a nation with immense agricultural resources but pervasive hunger and malnutrition has complex historical, political, and economic roots.

Approximately 25 million Nigerians are experiencing a hunger epidemic, according to the Food and Agriculture Organization (FAO 2023). This is the sad commentary on the country rated as Africa's largest economy, and a major oil producer with a current population of over 212 million people. Worse still, Nigeria relies mostly on imports to meet its food and agricultural product needs, including wheat, rice, poultry, fish, food services, consumer-oriented foods, spending about \$10 billion annually (Nigeria - Country Commercial Guide, 2023).



Research Scientists doing backcrossing between a transgenic herbicide tolerance soybean and conventional soybean at the OFAB Nigeria Farms, NBRDA, Abuja, Nigeria in 2021

The Research Problem:

The declaration of a state of emergency on food security on the 13th July 2023 by President Tinubu is a perfect stitch that could rescue Nigeria from the brink of a food crisis; the last decade has been challenging for food production in Nigeria. Farmers and herders have found themselves in constant fatal clashes and retrogressive outcomes that is linked to food shortage. Climate change has continued to trigger insect pest infestation, soil infertility and reduced crop yield.

Nigerian farmers have continued to suffer from multiple loses which have cumulated to poverty and hunger crisis. The application of biotechnology in Agriculture can however change the scenario: the application of genetic modification technology can be used to develop climate resilient crops that can help farmers combat the multi-dimensional tragedies of climate change and other inherent agricultural challenges.

Taking the Nigeria's biotech PBR Beans as a typical case study, thousands of farmers including the farmers president, have continued to share the experience of how the biotech crop has turned their live around.

No country can become food secure by solely relying on the age-long traditional ways of farming (Clapp 2017). It has been proven beyond any reasonable doubt that, that with the right application of modern technology in agriculture, a country can become food self-sufficient and export hub for crops (Osabohien et al., 2018).

However, the success of President Tinubu's effort towards making Nigeria food secure is linked to biotechnology. Biotechnology offers new tools for increasing agricultural productivity and protecting food crops from, pests, climate change effects such as heat, flood, and drought. Nigeria stands ready. The country has made remarkable advancements in the indigenization, domestication, and deployment of biotechnology, which the world has acknowledged as scientific breakthroughs of note.

Advances in agricultural biotechnology present new opportunities to boost Nigeria's agricultural productivity and improve food security. Genetically modified (GM) crops tailored for African conditions could be a game-changer if political will and enabling policies are enacted. GM crops with pest resistance, drought tolerance, and biofortification can overcome longstanding challenges like pest infestations, droughts, and malnutrition that have lowered yields and incomes.

In 2001, Nigeria established the National Biotechnology Development Agency (NABDA) to promote, carry out research and development, facilitate, coordinate, domesticate and deploy biotechnology products.



From the Left, Abraham Isah (Program Officer, OFAB Nigeria) and Chijindum Victory Odi-Akpa (Chief Scientific Officer, NBRDA) carrying out backcrossing experiment between a transgenic herbicide tolerance soybean and conventional soybean at the OFAB Nigeria Farms, NBRDA, Abuja, Nigeria in 2021

The country also signed the Biosafety Bill into law, establishing the National Biosafety Management Agency (NBMA), which assumed biotech regulatory authority from the NABDA in 2015. These two agencies have situated Nigeria in a perfect position to make the best of biotechnology in enhancing the country's food production.

"With the current state of emergency declared in the Food and Agricultural Sector of Nigeria, the integration of biotechnology tools into the Nigerian Agriculture has become a necessity," says Prof. Abdullahi Mustapha, the Director General and Chief Executive Officer of NABDA.

Nigeria has successfully developed Genetically Modified versions of local varieties of commonly consumed food and other crops, solving some of the age-long problems that compromise their productivity.

So far, Nigeria has approved the commercial release of Pod-Borer Resistant Cowpea, a Genetically Modified version of the local black-eyed beans developed by scientists at the Institute for Agricultural Research (IAR) at the Ahmadu Bello University (ABU), Zaria, Kaduna State. This variety of beans is resistant to the pest that destroys the pod of the black-eyed beans plant and is a major source of livelihood and food for many farmers across the country. Scientists have gone a step further. They are on the verge of using genetic engineering to make cowpea resistant to weevils. On October 8, 2020, the NBMA approved the cultivation of TELA maize, spearheaded by Institute for Agricultural Research (IAR) and African Agricultural Technology Foundation (AATF). This maize is both drought tolerant and insect resistant to fall army worm (FAW) and the stemborer.

No trace of ill health or safety concerns have been traced to any of the already two commercialised biotech crops: Bt Cotton and PBR Cowpea, in the country.

"Although Agricultural Biotechnology alone is not going to be an all-sufficient approach, it will for sure, revolutionise national food production," noted Prof. Mustapha.



Managing Director, ECO Basic Nigeria, Dr Brighton Karume carrying out a training for indigenous seed companies in Nigeria, Nasarawa State, Nigeria, 2021A

Other genetically modified crops in the pipeline are potato developed for bacterial blight disease-resistance by the National Root Crops Research Institute (NRCRI), Umudike; Cassava resistant to Cassava Brown Streak Disease (CBSD) and Cassava Mosaic Disease (CMD) at the same time nutritionally enhanced with iron and zinc. Umudike. The crops are undergoing various levels of field trials and verification prior to their release for commercialization.

Although Agricultural Biotechnology alone is not going to be an all-sufficient approach, it will for sure, revolutionise national food production.



Advice to Policy Makers and Conclusion:

Taking the bold step forward, Nigeria's Policy Makers can facilitate the country's journey to zero hunger by investing in research and development of biotech crops suited for Nigerian conditions. This includes crops with higher yields, pest/disease resistance, drought tolerance etc. Setting up advanced biotech research centres and building scientific manpower can help develop innovative crop varieties.

Furthermore, Policymakers can formulate laws that will aid the provision of incentives for private sector participation in biotech research, seed production and distribution. Tax breaks, subsidies and public-private partnerships can stimulate commercialization of biotech crops. The Federal Government of Nigeria can further increase funding for extension services to train farmers on safely adopting new biotech crop varieties and agronomic practices to maximize yields.

With biotechnology, Nigeria is certainly on her way to achieving zero hunger, but the Government must intensify efforts that is geared towards amplifying the existing gains that Agricultural biotechnology has brought to our country.

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From the left; Current Commissioner of Agriculture, Ogun State Mr Ebenezer Boluwade; Former Counsellor for Agricultural Affairs USDA, Dr Gerald Smith; and Director, Agricultural Biotechnology Department, NBRDA, Dr Gidado Rose on the Bt Cotton Farms within the NBRDA Premises, Abuja Nigeria, 2021





