

Food security and options in agricultural biotechnology

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More food needs to be produced with less water and land. The challenges of a growing population, changing diets, and the unquenchable thirst of agro-energy puts increasing pressure on the limited land, water and environmental resources at both the global and local scales. Poor countries need to frame important strategies for agricultural development through biotechnology which will offer new opportunities for increased sustainability, profitability, and international competitiveness in agriculture.

The pursuit of the Federal Government of Nigeria to re-engineer the system of farm sector as part of the present administration's commitment to the implementation of the seven-point agenda of which food security is a vital point has not succeeded in achieving self-sufficiency in food grains production and food security. The Minister for Agriculture and Water Resources has also admitted that the government's efforts at guaranteeing food security for the nation had all ended up as failed attempts. This has resulted in the huge import bill of food

grains wasting precious foreign exchange which would have been otherwise utilized productively for the progress of agricultural sector.

In the context of the spiraling price level of food grains which is beyond the reach of the common man, the poor Nigerians lack access to sufficient and affordable food. Agricultural biotechniques hold the key for the alleviation of poverty, hunger and the attainment of food security. In the modern day world where population growth is outstripping food supply agricultural and especially plant biotechnology, needs to be swiftly implemented in all its segments. Achievements today in plant biotechnology have already surpassed all previous expectations, and the prospect is even more promising.

The rapid pace of scientific advancement in agricultural biotechnology has not only yield improved agricultural product with quality, but also supports the increasing human demand for a variety of foods. Genetic manipulation of the plants by plant breeding has resulted in quantum jump in food grains production leading to Green Revolution. There after many countries such as India and China achieved prosperity through self sufficiency in food grains

production. After this, increase in production has slowed down forcing the bio technologists to find out new methods of food production under molecular breeding.

Biotechnology was revolutionized, when DNA was cloned in 1973. Genetically-modified crops, in which a gene of desired characteristic is transposed from one plant to another, are the most extreme and controversial output of the biotechnology. A genetically modified organism (GMO) is an organism in which one or more genes called transgenes have been introduced into its genetic material from another organism. The genes may be from a different kingdom, a different species within the same kingdom or even from the same species.

Pointing out extreme poverty conditions in Nigeria, the World Development Report 2007 stated that the percentage of population spending less than two dollar a day on consumption accounted for 70.8 percent and less than one dollar a day stood at 92.4 percent in the survey of year 2003. Further, the World Development Report adds that one of the indicators of poverty and hunger namely prevalence of child malnutrition is also acute in

Nigeria and the percentage of children under the age of five has gone down marginally from 39 per cent in 1994 to 29 per cent in 2004.


Food shortages generally occur in areas characterized by poverty, high population growth rate, inadequate economic and social infrastructure, war, and political instability. Food security is defined by access to sufficient and affordable food; it can relate to a single household or to the global population.

Despite the political commitment to reduce world hunger and the people's right to food, the number of poor people lacking access even to the minimum diet of 2000 calories per day has risen from 824 million in 1990 to 1020 million in 2009. Hunger and food security are complex issues and that they are caused by declining investments in agriculture, lack of access to credits and other agricultural inputs, rural infrastructure, poor irrigation as well as other economic, social, political and technical factors. To reduce hunger, poverty has to be reduced too and that hunger is due to the fact that people do not have the money to buy food.

Further, food security was determined by the population carrying capacity of the environment, i.e., that there

are biological and physical limitations to the number of people that the environment can support, which ultimately limits expansion of the human population. Growth of the human population is thus central - if it continues to grow then, even if natural resources are shared equally, the limit will eventually be reached.

Transgenic techniques may reduce poverty and hunger and promotes equity in many of the world's poorer countries. Biotechnology will not solve all the problems in the developing world because of its many faceted challenges. It is just one more tool in modern agriculture and the need of the hour is how to harness its full potential to achieve self sufficiency in food grains production. Biotechnology is just one of the best possible solutions to hunger and food insecurity in developing countries.



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