



ROLE OF CROP BREEDING TOWARDS DEVELOPMENT OF FOOD SECURITY AND SUSTAINABILITY IN NIGERIA

Usman Yusuf

Department of Chemistry, School of Secondary Education, Sciences
Federal College of Education Katsina

Abstract

Crop breeding is an important tool for developing sustainable and secure food system in Nigeria. Through the selection of desired traits, crop breeders can produce plants with desirable characteristics that can allow for increased production, improved nutrition and resource use efficiency. In Nigeria, food security and environmental sustainability are closely intertwined. Crop breeding can address both of these needs by exploiting genetic diversity to develop with traits that can help reduce pressure on a wide range of resources such as water, soil and climate. For instance, the development of drought tolerant varieties can reduce the need for irrigation, salt and nutrient-tolerant varieties can allow for production in soil with low nutrients availability. Various biotechnology tools have become available to breeders in recent years to allow for more efficient and targeted selection of desirable traits. These include genetic engineering, marker assisted selection and metabolite profiling. For example, marker assisted selection has been used to breed high yielding, drought tolerant and pest resistant maize in Nigeria. Furthermore, the development and deployment of these improved varieties must be accompanied by the promotion of agricultural practices that can help to ensure the success of crop cultivation in an environment that is constrained by limited resources. Such as practices includes integrated pest management, crop rotation and conservation agriculture among others. In conclusion, crop breeding has an important role to play in developing food security and sustainability in Nigeria. However, this must be accompanied by the promotion of appropriate agricultural practices and the deployment of improved varieties.

Key words: Crop breeding, Development, Food Security, Sustainability

1.0 Introduction

Crop breeding is the science of improving important agricultural plants for the benefits of mankind. Crop breeder's work to make our food more productive and nutritious, human life and genetic are connected at many levels. The welfare of human beings depends on the quality of food they eat and the healthiness of their environment. The genetic crops have a direct impact on both these factors, the nutritional content of the crops determine the quality of the food we eat, crop genetic can be used to improve the nutritional value of crops for example golden rice is a variety of rice that has been genetically modified to contain higher level of vitamin A, this can help to prevent vitamin A deficiency which is a leading cause of blindness in children. The health of

our environment depends on the presence of crops, they play an important role in carbon cycle, which is responsible for regulating the amount of CO₂ in the atmosphere they do this by absorbing O₂ during photosynthesis, crop genetics can be used create plants that are more efficient at this process which help to reduce the amount of CO₂ in the atmosphere and also improve air quality at the same time.

Food security is the ability to provide more food to the whole population of the entire country at all the times and this paper discussed the role of crop breeding towards food security and sustainability in Nigeria. All human being needs food not just for energy giving but to sustain life in general. The issue of food security should not be over mphasized because of its necessity to life

through sustainable agricultural development. (World food summit) sees food security as the availability of people to nutritionally adequate and safe water and food. It can also be seen as a state of affairs where all people at all times have access to adequate supply of food.

The need for food security and sustainable agriculture in Nigeria

A country with abundant food tends to live a happier way of life, improves the living standard of people reduces social ills and improve health conditions of people especially the children and vulnerable ones in the society it project the image of people and community, it help to create a conducive atmosphere for healthy governance.

It gives rooms for consumers to make choice of the types of food consumes. Food security reduces spread of diseases and problems in the society and increase cooperation, love and understanding among people.

More than 800 million people worldwide are chronically hungry, and million are micro nutrients-deficient (FAO 2019). Food insecurity and low dietary quality cause huge public health problems. Malnutrition's is responsible for physical and mental development impairments, various infectious diseases and unacceptably high numbers of pre mature death (Development initiatives 2018). Reducing these problems and achieving sustainable development goals i.e zero hunger and improved nutrition requires major transformations in global food systems. Crops breeding has contributed to considerable yield growth, especially during the last 100 years (Huang, pray, and Rozelle 2002; Evenson and Gollin 2003). In addition, massive increases in in the use of chemical fertilizer, pesticide, irrigation water and other yield enhancing inputs have helped to raised food production.

New plant breeding technologies (NPBTs) including genetically modified organisms (GMOs) and gene edited crops

could possibly be game changer (Zaidi et al 2019).

Challenges of food security and sustainable agricultural development in Nigeria includes: Soil problems, climate conditions, forest zone challenges, policy change and lack of effective implementation and evaluation strategy in agricultural policy.

2.0: Method of crop breeding

The following methods are the suitable method used in crop breeding:

- (i) In breeding: this is the process of crossing two crops that are closely related to each other such as two siblings or parent and child. And this types of breeding result in offspring that are very similar to their parents
- (ii) Out breeding: Is the process of crossing two crops that are not closely related to each other. This types of breeding result in offspring that are less similar to their parents and more varied.
- (iii) Back crossing: this is the types of breeding that involves crossing a plant with one of its parents or grandparents, this types of breeding is often used to reintroduce desired traits that have been lost in a population.
- (iv) Hybridization: Is the process of crossing two plants that are not closely related to each other and this types of breeding result in offspring that are more vigorous and hardy than their parents.
- (v) Mutation breeding: Is the process of exposing crops to radiation or chemicals in order to create random mutations, this types of breeding can be used to create new crop variety with desired traits.
- (vi) Cross-breeding: Is a crop breeding techniques in which two different varieties of crops are bred together to produce offspring that have desired traits from both parents.

2.1 Roles of crops breeding

1. Plant breeding can be used to improve the yield quality of crops
2. It can be used to improved resistance of crops to pests and diseases
3. It can be used to improved nutritional value of crops
4. It can be used to developed new varieties of plants that are better adapted to their environment
5. Crop breeding can be used to create crops that are more aesthetically pleasing
6. Is used to create crops that have longer shelf life
7. It can be used to create more resistant crops to environmental stress
8. It used to produce crops that require less water or fertilizer

9. Used to improve the taste or smell of crops
10. Used in producing crops with desired traits such as disease resistance or higher yield

References

- Everson, R.E, and D. Gollin. (2003). Assessing the impact of the Green Revolutions 1960-2000. *science* 300: 758-762
- FAO. (2019). *The state of food security and Nutrition in the World*. Rome: Food and Agriculture Organization of the United Nations.
- Gilbert, N. (2013). A Hard look at GM Crops. *Nature* 497:24-26
- Development initiatives. (2018). *Global Nutrition Report 2018: Development Initiatives*