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# Engineering Prospects and Challenges for Today's Crop Scientist and the way forward

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***ABSTRACT :*** *The global trend in engineering is a wake-up call for all especially the crop scientist to embark on intensive food production, processing and storage for sustenance of mankind. Hence, averting threats to economic development and attaining the Millennium Development Goals (MDG) and Sustenance (SDG). It is envisaged that through engineering mechanization, 100 million people not having enough foods or crops to consume at different continents in the world would be salvaged if adequate measures are implemented (WHO, 2018). Engineering prospects if well imbibed will enable crop scientists launch into a green revolution to combat the challenges encountered. The reasons for these challenges could be attributed to inappropriate and inadequate engineering approaches. Engineers and Crop Scientists are challenged to design, develop and come out with appropriate transferable technologies and agro-based industries to meet with the increasing food crops and fibre production. Mechanization if properly implemented will be instrumental particularly in saving energy, time, resources and productivity of other farm inputs. This topic is elaborated using these sub-topics; What is Engineering?, Who is a Crop Scientist and their works, Crop Science and its relevance, Prospects of Crop Scientist with regards to Engineering, Challenges of today's Crop Scientist and engineering and the way forward. It is recommended in conclusion that with engineering, Crop Scientist can be empowered to conserve soil, water, human and natural resources being their raw materials for optimum outputs.*

***KEYWORDS*:** *Engineering, Prospects, Challenges, Crop-Scientist, Way-forward*

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## I. INTRODUCTION

The engineering prospects and challenges for today's crop scientist capacity to adjust to new environment seems to be high. The engineering prospect has the potentials to combat the crop scientist challenges based on the understanding that engineering is the backbone of all profession through critical analyses. Challenges facing the groups are technical, organizational and managerial. On the technical aspect, members of the groups must improve their skills, on the organizational aspects, the groups have to strengthen representation for linkage and affiliation to upper level of unions, and then on management, reinforcement is needed in their ability for mobilization and orientations of personnel's in these professions.

Exponential advances in knowledge, instrumentation, communication and computational capabilities have created mind-boggling possibilities, cutting across traditional disciplinary boundaries in unprecedented ways.

One may ask, what is Engineering? Engineering is an application of science. According to Oluka,S.I;Onwualu,A.P and Eneh,I.I.(1999), it is defined as a profession which uses the knowledge of mathematics and natural sciences gained through training and experience to develop means of utilizing materials and other gifts of nature in efficient and economical way for the maximum benefits of mankind. Understudy, "Prospects" are successful moves or achievements. "Challenges" are difficulties encountered. Who is a scientist? He/she is a person who indulges in the systematic study of nature and behaviour of the materials with physical universe based on observations, experimentations and measurements as well as formulation of laws to describe these facts in general terms for the well-being of crops (Ifeanyichukwu, 2022). A crop scientist is one handling crops as it pertains to science. Unfortunately, engineering is bisected or besieged with myriads of problems e.g poor funding, poor educational infrastructures, paucity of quality lecturers, polluted learning environments, social vices (examination malpractices, cultism, hooliganism, corruption). Parents/guidance and students/pupils need a re-orientation towards achieving the goals of engineering. For engineering prospects to be fully imbibed, its learning must be affordable for all and sundry. The current monolistic approach to knowledge acquisition that is building a structure called school and going there without acquisition of skills must be changed. Innovation and adaptation centers must be encouraged and well-funded to move to higher technological and scientific independency. Government and private sectors must as well fund research programmers, inventions and mass production of invented products encouraged. The evolution of engineering has mirrored changes in technology and society. Disciplines have been added and curricula modified to yield a workforce capable of meeting the needs of society. Considering the wide range of occupations and work activities that currently engage the nation's engineering workforce, the occupational flexibility of degreed engineers, the demographics of the workforce, the pace of technological change as well as the powerful trends in the global distribution and organization of engineering work must be sustained. We cannot deny this fact associated with enjoying engineering prospects that is very capable of proffering solutions to challenges of a crop scientist. The pertinent question is how well is engineering prospects enterprise adapting to meet crop scientists demands using engineering skills and knowledge throughout economy and society? Generally, engineering can be x-rayed as the application of science for the efficient utilization of natural resources to produce wealth. Society is asking for solutions to pressing problems for mankind. The engineering sector is suited to addressing many of these challenges; some of these problems include: inadequacy of quality irrigation water, renewable energy supplies, quality public storage infrastructures, best species and breeds of crops inventions, best agricultural practices etc.

### A. Who is a Crop Scientist and Their Works?

A crop scientist works to increase the yield of field crops by improving farming methods and developing new plant strains. A crop scientist is known as soil and plant scientist. He is a person who applies scientific knowledge to develop better and more efficient methods of growing crops. They focus on plants around the world. As a crop scientist, you will conduct research on crops aimed at improving farming techniques. It is concerned with the selection, improvement and production of crops, addressing planting, maintenance, protection and harvesting. He develops and maintains the safety and quality of food products. A crop scientist contributes to the production of food world over. The work of a crop scientist is to increase the yield of field crops by improving farming methods and developing new plant strains. Crop scientists work as farmers, as quality control inspectors and as field representatives for food processors. They can as well engage in research or are self-employed as consultants to corporations, farmers and farm cooperatives. They work for government, agencies, companies (seed/grain suppliers and fertilizer manufacturer, universities or teaching jobs). He recommends the best type of pesticides for pest control practices, determines the best climate suitable for a production of a particular crop. He can manipulate climate conditions with the aid of his green house. A crop scientist can produce hybrid crops. He knows the best soil nutrient that will support growth of any particular crop. A crop scientist can produce organic crops/foods when he decides to avoid applying synthetic chemicals in his production system. He formulates and dilutes agrochemicals for use in the farm. He works as an agricultural extension agent, advising the farmers on improved methods of farming. He can be an agricultural attached to Nigerian embassies. He produces improved specie of crops through breeding practices as well as stores up crops perfectly.

### B. Areas of a Crop Scientist

The crop scientist career areas are agribusiness, biotechnology, crop and food production, plant breeding and genetics, horticulture. He can be an agro ecology specialist, conservationist, crop advisors, plant breeders, soil scientist, environmental specialist, precision agriculture specialist, waste management specialist, farm manager, ecologist, erosion control and athletic turf personnel.

Engineering guarantees the prospect of crop scientist in all fronts. Major problems militating against proper effective engineering and the progress of a crop scientist include poor funding, inadequate laboratory equipment, and lack of high-quality manpower (trainers/teachers) ill-implemented industrial training exacerbated by poor attitude of employers.

### C. Crop Science and Its Relevance

Crop science is the study of agricultural issues, challenges, resource use with sustainable production of food, feed, turf, fiber crops together with the environment which entails breeding, genetics, production and management (Ifeanyichukwu, 2022). It is a set of practices describing how to grow crops as to optimize the yield of the plant parts required. The importance or relevance of crop science can be felt in it helping to identify and to develop new strains and breeds which are more resistance to specific pests, leading to a decrease in application of pesticides typically subjected to the plants to prevent reduction or even destruction of the harvest due to pest. It is all about production or processing and marketing of high quality foods and non-food products.

### D. Prospects of Crop Scientist with Regards to Engineering

Crop scientists are exposed to engineering through technology. The practical aspects of crop science are undertaken by technology. The engineering profession is not static but a dynamic one. It must be adaptable to the needs and aspirations of the crop scientist at any given time. The prospects of crop scientist with respect to engineering can be felt in these aspects:-

1. "*Catch them Young" Programmes* – We have every need to encourage scientists who are already in the knowledge of mathematics, physics, chemistry, biology, geography etc to apply and exhibit them as they are in tandem with engineering basics for greater benefits.

2. *Funding* – There should be adequate funding into the researches embarked upon to foster crop science and engineering to come out with meaningful approaches to life even with the maintenance of equipment in laboratories and workshops. We should avoid paucity of funds or gross inadequacy. The provision of Education Trust Fund (ETF) would take care of other updated miscellaneous like boosting the morale of teaching staff guaranteed with conducive working environment, payment of sustainable wages etc. This should be captured into the budgetary allocations. For instance, Poyi (2003) said that banks have always been willing partners in the development of our economy. Federal and State government are rigorously promoting the establishment of SMEs through provisions of grants, tax relief or tax holidays. Most of the research findings are left in the research stage without adoption.

3. *Improved Approach to Living*: This will be open-door to very many things innovatively. That is, it will be enterprisingly encouraging to become professional in proffering solutions to human problem. The industry of crop scientist and engineering and vice versa will make beneficial inputs to society since it is a work space for them. The researches made by such organizations like Federal Institute for Industrial Research Oshodi (FIIRO) are used to solve problems and sustain biological infrastructures. The gathering of interpretations and evaluation of information about the chemistry, the biology and the physics of soil using the information obtained from these analyses will inform and influence on diverse issues such as; agricultural production, biodiversity, climate change, environmental quality, human health, land remediation etc.

4. *Expertise*: The expertise and know-how in modern agriculture is enormous. These experts has the political and patriotic will to move crop science and engineering forward, if they are challenged so as to handle pertinent issues. Government policies leverages a lot especially through established institutions like National Centre for Agricultural Mechanization (NCAM), National Agency for Science and Engineering Infrastructure (NASENI), National Coordinated Research Programmes (NCRP), Agricultural Development Projects (ADPs) etc. These are where the experts express their crop science and engineering prowess.
5. *Access to Information*: The capacity of crop scientists and engineers to adjust to new environment seems to be far-fetched. It becomes effective as long as they get the right information especially with the trending artificial intelligence. The policy makers regarding our socio-economics, lead to series of prospects in respect to the group's dynamics. With information, they have affiliations to upper level of

organizations, reinforcing their ability to mobilize credit-sourcing, production, processing, designs, marketing, management of raw materials, decision making, planning etc. With information, the prospects of crop scientist with regards to engineering is boundless.

## E. Challenges of Today's Crop Scientist and Engineering

These can be handled using the following:-

1. Not Being Exposed to Practical's: For a student of crop science and engineering, one should so much be imbued with the practical aspects of these two professions. The need to get exposed and have the technicality matters. It is expected that they should be given enough time in between studies to go on repeated internship programmes for necessary exposure. Even with the on-the-job-training, most companies do not recruit graduate engineers and crop scientists, so not giving room for gaining of experiences.

2. No Motivation for Research and Development: Engineers should be given grants and enabling environment to research and give lasting solutions to problems. There is no motivations to boost talents and dreams coming to realities. The need for skills has never been as pressing as it is today.

3. Inconsistent Government Policy: Policy makers should look inward and work on the benefits of crop science and engineering. Government ought to create suitable job opportunities especially for our young energetic graduates through policies for their recruitment.

4. Lack of Improved Facilities: The needed facilities should be available as to carry out the necessary operations. Currently, modern logistics should be employed for increased productions and other activities. We need improved facilities to be in tandem with the trend of current times through non-governmental organs or government.

5. Attitudes of Personnel's: The Luke warmness is so much felt in taking very sound decisions, planning, co-ordinations and communications etc. These professionals should operate with standards that is there should be a code of conduct guiding them. They should be made to understand their relevance in the society. They should make do with funds given them for that purpose and not diverting them.

## F. The Way Forward

There is a huge hope when one have a good grip or is knowledgeable about something, he comes out with a lot of inventions and manufactured goods. The engineering prospects and the conquered challenges of today's crop scientist way forward can be approached with the under listed:

1. Their internal structure on different levels in order to facilitate mechanisms of internal consultations and representations to forestall setbacks.

2. Their level of awareness, so that they can express a well thought-out points of view on the questions that concern them about which they are solicited about.

3. Their management capacities to manage resources including public and private assistance they may receive.

4. To create true partnership with outsiders.

5. Technical support to contain resources which will help overcome problems.

More so, all these militating factors against engineering prospects and today's crop scientists aggravated by poor attitudes of these personnel's should be monitored and evaluated to meet up with accepted standards. It is in upholding elements of good engineering practices embedded in knowledge, ethics and etiquettes that the way forward can be charted, i.e. quality built-up into holistic professions under case study.

## II. CONCLUSION

In order to advance the frontiers of knowledge of a crop scientist with regards to engineering, as the three basic needs of man which are clothing, food and shelter are met through crop science and engineering, these people's (i.e scientists and engineers) interventions are required. Recognizing the role of competence in service delivery, there is need to review their existing curriculum to widen scope. It is suggested that a network be formed to facilitate information exchange among them. Bigger and lofty heights can be attained by considering these points below:-

1. They can be funded
2. Be allowed to do more furthering of programmes
3. Research grants given them
4. Allowing collaborations
5. They should be dynamic in their approaches and then be all inclusive.

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