
The Role of Engineering and Technology in Agricultural Development in Nigeria

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ABSTRACT

One of the most impactful area of modern technology driven by the fundamental need for production of food is Agricultural Technology. It has led to the development of multipurpose machines such as tractors, groundnut shelling machines, seed planters, thresher machines including a variety of engines, pumps and other specialized gear used for provision of water quickly and in high volume to large areas of land. The economic growth of any state can be more easily fostered through sustaining sufficient food production in the Agricultural Sector. Agricultural machines have been designed practically for every stage of the agricultural process. Technology in agriculture has led to improved production; through servicing and development of agricultural machinery and equipment, supply of crop processing machines and equipment for small farmers and sustainable source of water for irrigation. Priority should be placed more on agricultural engineers by encouraging them to design low powered machines to improve agricultural practices and management.

Keywords: Agricultural Sector, Economic Growth, Engineering, Technology, Agricultural Machinery

INTRODUCTION

Nigeria is quietly blessed with abundant resources that will aid it to uplift technology and cottage industries. It will sufficiently sustain food production in the agricultural sector and economic growth. Experience has shown that the level of human resources particular engineering, science and technology. A senior expert Bill Stout, state that "Adequate food supplies and a balance diet for everyone will require a significant contribution from Agricultural Engineer around the globe". Agricultural Engineers are trained to design agricultural machinery, equipment and structures. To improve agricultural practices, the use of

machinery and farm power must be combined with soil conservation and management to minimize erosion. The utilization of local resources will solemnly enable us to achieve speedy development and food sufficiency. Whereby, higher and middle level manpower will be gainfully employed.

Agricultural Engineering is manipulation of farm power (tractors) and farm machinery for production of crop and animals. Engineer designs, fabricates, and installs agricultural machines, construction of farm structures, processing and storage of product. Food production is accelerated in Great Britain, Saudi Arabia, Thailand, France etc, with join effort of farmers and agricultural engineers. Engineers are directly or indirectly involved in influencing human resources in making decision to take agriculture to higher height.

Contribution of Technological Development in Agricultural Sector

Technological Development is generally regarded as a catalyst for national development, because it offers among other things the necessary support for change in all the major sectors of the economy, most especially in agriculture and industrial sectors. Therefore, it is unarguably the prime source of change, that is, of innovations and adaptations required for improving production methods needed to propel growth and development.

Engineering Technology in Agricultural Sector plays a huge role in today's modern agriculture. The creation of machines has enabled farmers to work large fields with less people in shorter amount of time. Other advances include bioengineering, which enables us to genetically engineer plant that will grow better in tougher conditions, be resistant to diseases and produce more plant than they did in the wild. While there are some concerns about the safety of biologically engineered crops, they have helped to reduce some of the risks inherent in agriculture. The industrial revolution led to advances in agricultural technology that greatly increased food production allowing large number of people to pursue other types of work.

HISTORY

The first people to turn from hunting and gathering lifestyle to farming probably relied on their bare hands, perhaps aided by sticks and stones. Once tools such as knives, scythes, and ploughs were developed, they dominated agriculture for thousands of years. During this time, most people worked in agriculture, because each family could barely raise enough food for themselves with the limited technology of the day. With the coming of the industrial revolution and the development of more complicated machines, farming method took a great leap forward, instead of harvesting grain by hand with a sharp blade; wheeled machines cut a continuous swath.

Instead of threshing the grain by beating it with sticks, threshing machines separate the seeds from the heads and stalks. These machines require a lot of power, which was originally supplied by horses or other domesticated animals. With the invention of steam power tractor, a multipurpose, mobile energy source that was the ground crawling cousin of the steam locomotive.

Agricultural steam engines took over the heavy pulling work horses. The next generation of tractors was powered by gasoline (and later) diesel engines. These engines also contributed to the development of the self-propelled, combined harvester and thresher or combine, for short. Instead of cutting the grain stalk and transporting them to a stationary threshing machine, this combines could cut, thresh, and separate the grain while moving continuously through the field.

New Technology and the Future

The basic technology of agricultural machines has changed little through the last century. Though modern harvesters and planters may do better job than their predecessors, the combine of today cost about (US\$250,000) cuts, threshes, and separates grain essentially the same way earlier versions had done.

However, technology is changing the way that humans operates the machines, as computer monitoring system,(GPS) locators, and self-

steer programs allow the most advanced tractors and implements to be more precise and less wasteful in the use of fuel, seed, or fertilizer. In the foreseeable future, some agricultural machines may be made capable of driving themselves, using GPS maps and electronic sensors. The industrial revolution led to advances in agricultural technology that greatly increased food production allowing large number of people or pursue other types of work.

METHODS

The main source of methodology used here as information is Agricultural Engineering in third world countries by may (1985). Engineering for tomorrow Agriculture using experimental methods is a challenge to present situation and contemporary engineers. In (1960) Hoffen stated that farmers in developing countries have been using hand tools for thousand year's draught animals for centuries and mechanical powered machines for decades. Farm implements were designed 50 years ago does not fit our modern farming system. Thus, agricultural engineers in contemporary time should be challenged with aid of state government to increase food production; using the following experimental methods.

Servicing and developing agricultural machinery and equipment.

This method has led to development of low powered machines for shelling maize, groundnut and cowpea. However, these machines have transformed fatigue and labour from famers and grossly improved post harvest operation from 2012 to 2016. The aim of servicing farm machinery is to prolong its estimated useful life. Old fashion tools, implements and machines should be redeveloped to fit the current trend in food production. If machines continue to work its tear and wear it will be unequipped for training future engineers and production of goods and services.

Sustainable source of water for Irrigation

The method of sustainable source of water which was developed through earth dams had partially met the following requirement.

-Adequate for crop

- Economically accessible
- Legally available
- Suitable quality

Water is a fundamental requirement for both plant and animal. For instance Saudi Arabia in 1975 with help of oil boom had developed deep-well irrigation technology. Agricultural lands increased from 150,000 to 26 million hectares of productive land in 1987. Despite acidity, salinity, infertility condition and labour differences in the kingdom. They are now boasting of food sufficient such as wheat, milk, production of poultry and fish farming etc.

If irrigation projects are executed and sustained, it will provide and create job opportunities for agricultural engineers, raw materials for cottage industries. Chinsuwa and Chochran (1986) highlight effective methods to long time water problem in Saudi Arabia of arid region is solved by effort of civil and agricultural engineers. They also worked massively (1981) on Syria's Euphrates irrigation to achieve international standard. The Euphrates dam will irrigate 640,000 hectares of land for 30 years.

Supply of Crop Processing Machines and Equipments for Small Farmers

In this methodology we look at improve agricultural practices through developed model machines. Supply of simple operated low powered machines such as single axle combine harvester, corn sheller, groundnut shelling machine, cowpea thresher, grain and starch processing machine and tricycle for handling farm produce.

The above simple machines have transformed agricultural production in our country. With these inventions, it will attract youths to participate in agricultural activities and accelerated food production in the state.

CONCLUSION AND RECOMMENDATION

Agriculture may be one of the oldest profession but with the development and use of agricultural machinery, there has been a

dramatic drop in the number of people who can be described as "farmers". Technological development in Agricultural Sector has led to removal of drudgery in the farm work. A tractor for instance, can work for six hours without getting tired and related diesel engines and model farm machinery to improve production practices. Agricultural Technology is among the most revolutionary and impactful areas of modern technology, driven by the fundamental need for food and for feeding an ever-growing population. It has opened an era in which powered machinery does the work formerly performed by people and animals.

However, the following recommendations are put forward for government to influence production of goods and services in agriculture.

1. More development of low-powered and multipurpose machines.
2. Fabrication of simple machines and equipment to transfer suffering and intensive labour to machines.
3. Sustainable source of water for irrigation and solar energy pumps.
4. Construction of earth dams in rural area for irrigation, fishery and animal water supply.
5. Agricultural loan scheme for small-scale farmers to boost production and supplies of low-powered machines.

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