

This is a specialized area of Agricultural Engineering which deal with the processes and machinery that are required for processing agricultural products into consumable foods. Areas covered by this option include operation of feed mills, rice mills, flour mills, vegetable oil processing, beverage manufacturing, and confectionaries machines for baking, sweet. In general, it involves the operation and management of food processing industries.

1.1.5 Wood Products Engineering

This field of specialization deals with the machines required for exploiting forest products such as timber and non-timber forest products. It also handles machinery for afforestation such as loggers, tree fellers/pushers etc.

1.1.6 Emerging Areas in Agricultural Engineering

The discipline of Agricultural Engineering is currently undergoing major and important changes as it responds to new developments and challenges These Emerging areas include: Information and communication Technology (ICT); Biotechnology; Environmental Engineering, Renewable Energy, Ecological Engineering.

ICT involves the use of computer and communications equipment for data acquisition, machines control, information management and simulation of agricultural systems. ICT enables information on genes, data bank on crops and similar data to be compiled uploaded on the internet. This information can be accessed or downloaded by farmers or researchers from any part of the world. Other applications of ICT in agriculture include weather monitoring and forecasting and tracking of soil nutrients using remote control systems, Hydrological monitoring network and precision farming.

Biotechnology involves the engineering of biological material. Applications include gene manipulation, waste recycling, fermentation, vegetable-based fuels etc. These require specialized equipment such as reactors and sensors.

Environmental Engineering involves all activities concerned with the conservation of the environment. Most agricultural processes impact negatively on the environment (soil, water air).Thus, Agricultural Engineering is becoming more important with the current world wide concern for soil and water degradation and pollution, as well as contamination of air as a result of increased application of technology for exploitation of natural resources. Problems of pollution of farm lands by crude oil production, urbanization and its encroachment agricultural land, conversion of urban waste into manure, etc are some of the issues that are addressed in this area.

Another area, which is not really new but which is currently engaging the nation of Agricultural Engineers is Renewable Energy Systems. These include the processing and utilization of Solar,

Water and Wind Energy for agricultural production, processing and handling. New projects in this area have addressed control of animal and of environment using solar energy, generating electricity using solar energy and wind is for power generating. Others include alternative bio-fuels for internal combustion engines and optimization of energy systems.

2.0 Contributions of Agricultural Engineering in National Development

Agricultural Engineering plays a pivotal role in the development of Nigeria. These are in the area of food security, reduction of drudgery in agricultural work, rural infrastructural development, soil and water resources management, environmental management, improvement in the quality of life of farmers, sustainable agriculture and industrial development.

2.1 Food Security

Food security has recently become an important concept in sub-Saharan Africa. In Nigeria, the idea of food security revolves around ensuring that there is readily available food in the right quantity and quality and at an affordable price. Food security can only be achieved if food is produced in abundant quantity and at commercial scale. Even when food is abundantly produced, if it is not properly processed, most of it will be lost to deterioration agents. Thus part of food security is to ensure that what is produced is preserved appropriately.

The Federal Government and some states in Nigeria have recognized the need for food security and so they established a number of institutions to ensure food security. These include the Federal Food Reserve Agency. In all these areas, Agricultural Engineering principles are practiced to ensure that there is adequate supply of food all year round.

2.2 Reduction of Drudgery in Agricultural Work

The traditional farming method and system in Nigeria is characterized by the use of primitive tools and technology. These include the hoe, machete, and axe. A visit to any rural farming community will reveal how tedious it is to work with hand tools. For toiling under the sun for hours, most farmers can only cover a few fractions of a hectare. The drudgery involved in Nigerian traditional agricultural system can be seen on the faces and body of farmers.

With the introduction of machines, tedious operations hitherto handled by man are mechanized. Operating machines is less tedious than manual operations. The reduction in drudgery that comes with the introduction of machine makes agricultural work to be more attractive to the younger generation. This has a number of implications including a reduction in rural – urban migration, and improved dignity of the agricultural worker.

2.3 Rural Infrastructural Development

Most large-scale agriculture development programmes involve the development of basic rural infrastructure. These infrastructures include water, roads, electricity, schools, markets, energy supply system, maintenance systems, processing systems and waste management systems. Thus Agricultural Engineering has been referred to as a catalyst for rural infrastructural development because the standard of living of rural dwellers is improved significantly as they have access to basic necessities of life

2.4 Natural Resources Conservation

The natural resources on which the practice of agriculture is based are soil, water and air. One of the important roles of Agricultural Engineering is to ensure an optimum management of these resources. This will ensure that these resources are conserved. If soil and water resources are used without conservation. Then one day, the resources will deplete to a point where they can no longer support plant and animal life.

Soil and Water Engineering option in Agricultural Engineering ensures that soil and water are conserved and reclaimed where necessary. Agricultural Engineering practices such as conservation tillage, terracing, erosion control, etc are used for soil and water conservation.

2.5 Industrial Development

Agricultural Engineering has contributed immensely to industrial development through the improvement of agricultural production leading to increased raw material production for agro allied industries

2.6 Employment Generation

Agricultural Engineering has contributed to creation of employment opportunities in the country. Apart from providing training in equipment production, the mechanization of agricultural operations has led to massive expansion leading to employment of personnel to boost production. Diversification has been created as many livestock farms now have capacity to produce their own feed

2.7 Others

Other contributions of Agricultural Engineering include: improved quality of life of farmers, Sustainable agricultural production and Environmental Management.