



FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

AGRICULTURAL PRODUCT VALUE
ADDITION FOR FOOD SECURITY, JOB
CREATION AND POVERTY ALLEVIATION

By

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Introduction

I give glory to God almighty, the creator of heaven and earth, for giving me life and for enabling me to achieve this feat to stand before this distinguished gathering of men and women to deliver the 40th Inaugural Lecture of this great University. This is made possible by the special Grace of God and by two persons who played special role in my life.

When I finished my secondary education, all I wanted as a young girl was to get my dream job and start earning money. However, my beloved father who himself being a teacher knew the value of education, had a different plan for my life. He insisted that I must proceed to acquire University education. It was of course not even a matter for discussion, as it has already been decided and I had to simply obey. After completing my University education and after a lot of water had passed under the bridge, I found myself in the employment of the Federal University of Technology, Minna in May 1990. Those who were with the university system in the early 1990s knew how difficult life was then, being a lecturer with the very poor salary. I still remember the popular slogan of ASUU at that time ***"my take home pay cannot take me home"***. It was indeed a time of frustration. However, I was again frustrated from another angle. In contrast to my other colleagues who were offered tenured appointment, I was given a contract appointment which had to be renewed every two years. I was told then that I can't be given a tenured appointment as a non Nigerian. Well that is still ok. The problem however was I was also not to enjoy the privileges attached to contract appointments. When I applied for those privileges, I was told that as a foreigner married to a Nigerian my domicile is my husband domicile so I cannot enjoy those privileges. This discrimination affected me negatively culminating in my lack of enthusiasm neither to pursue a PhD programme nor even to remain in academics. It took the intervention of my husband at

this point, with regular counselling and advices that made me pull myself together to take up the challenge of pursuing a PhD programme in this university, and of course the rest is history as they say.

Mr. Chairman, distinguished audience, I stand here today to present the 40th Inaugural Lecture of this University. This is the tenth Inaugural lecture from the School of Engineering and Engineering Technology, the fourth from the Department of Agricultural and Bioresources Engineering, (the only Department in the University to achieve this feat for now), the first by a sitting Chairman of the University Seminar and Colloquium Committee, the fourth by a female Professor in the University and the first by a female professor in School of Engineering and Engineering Technology.

Mr. Chairman, the topic of my lecture "*Agricultural Product Value Addition for Food Security, Job Creation and Poverty Alleviation*" was chosen to show how we can achieve food security, job creation and poverty alleviation by adding value to our agricultural products at the right time and at the right place. When we talk of food security the first thing that comes to mind is increase in food production. However, the problem of food security is not just a matter of food production alone. High post-harvest food losses constitute a major problem constraining food security in Nigeria and in other developing countries where food preservation and storage remains a major challenge.

Value addition generally is an economic terminology, however the Agricultural and Bioresource Engineer has a lot to do with agricultural product value addition. Thus, I start my lecture by defining what the profession of Agricultural and Bioresources Engineering is.

Agricultural and Bioresources Engineering Profession

Agricultural and Bioresources Engineering is a profession that deals with the set of techniques, systems and machines concerned with the application of engineering principles and technology in agricultural production, processing, transportation and storage in a sustainable way. It deals with the utilization of any or all branches of engineering, science and technology, in the art, science and business of crop production, animal husbandry, as well as in handling, processing and preservation, storage, manufacture and distribution of products that feed, shelter and cloth mankind (Odigbo, 1985). It involves the design, development, testing, manufacturing, marketing, operation, maintenance and repair of all agricultural tools, implements, machines and equipment which are used in agricultural operations, with the objective of raising the productivity of human labour and the land and protect the natural resources essential for agricultural production. In the past and even presently, the tendency is to take Agricultural Engineering as being synonymous with tractor technology or farm mechanization. But the definition above has shown that it is much more than that. It is a profession that ensures that engineering principles and technology are utilized to achieve sustainable agricultural production. Prof. Pandya, a renowned Indian Agricultural Engineer, stated that agricultural engineering may prove to be the "Aladdin's lamp" in the task of feeding the growing population and agricultural based industries of the world particularly in the developed world (Ojha and Micheal, 2006).

The scope of Agricultural and Bioresources Engineering is both wide and varied, covering a diverse area. It is as extensive as agriculture and as diversified as engineering. Various authors have listed a number of options in Agricultural and Bioresources Engineering. However, according to Ojha and Michael (2006), all

can be summarized into four main areas of the discipline. These are:

- Farm Power and Machinery Engineering
- Soil and Water Engineering
- Farm Structures and Environmental Control Engineering and
- Agricultural Product Processing and Storage (or Post Harvest) Engineering.

Farm Power and Machinery Engineering also known as Agricultural Power and Machinery Engineering deals in part with sources of power used for all phases of agricultural production, processing and distribution; and also with the design, construction, operation, maintenance of machines particularly those used for field operations.

Soil and Water Engineering deals with the harnessing and management of the basic natural resources used in agricultural production - land and water. It therefore covers soil erosion and conservation, design and operation of irrigation and drainage works and systems, land reclamation, water supply, hydrology of watersheds and hydraulics.

Several structures are used in agriculture. These include structures for farm families, animals, storage of farm products and machinery, as well as farm roads. These structures require specialized design and also the environment in this structures (temperature, humidity and air composition) need to be controlled for their optimum performance. Planning of farm buildings layout, structural design of farm buildings and structures, mechanization and control of the environment within the buildings are the responsibilities of the Farm Structures and Environment Control expert.

Agricultural Product Processing and Storage Engineering also

known as Post-harvest Engineering deals with the process and machines required for converting agricultural raw materials or products into finished consumer goods. Agricultural processing includes those operations which maintain or raise the quality of raw material, change its form, or prepare it for market. It is also understood as value addition or conditioning of agricultural products including food grains, oil seeds, fruits and vegetables, fodder crops etc. The operations connected with this include unit operations like cleaning, grading, drying, decortications, soaking, steaming, boiling, concentration etc. Ojha and Micheal, (2006) stated that any physical, mechanical, thermal, hydrothermal, pneumatic, operations performed on the food material will improve the quality and increase the shelf life of the product. Consequently, the usefulness of the finished or semi finished product is improved. During these operations or at all the stages of processing, value is added to the product. Storage is done to fulfil the domestic cum national need for food, feeds and seed between two consecutive harvests.

Aworh (2010) stated that post-harvest technology can be said to be the most important aspect of food production. In most cases, especially in developing countries, the importance of post-harvest technology has been either neglected or underestimated. Much attention is paid to improving the species or strains of crops for pest resistance or increase in area of production. The result is that millions of dollars have been spent on producing food while this has not been matched either by investment or an awareness of the need to reduce post-harvest losses due to poor and inadequate post-harvest technology.

Mr. Chairman, this is my area of specialisation and this will be the main focus of my discuss for the next few minutes.

Agricultural Product Processing, Storage and Value Addition

Agricultural processing can be defined as any treatment given to the agricultural product from the time it is harvested to the time it goes to the market. Igbeka (2013) stated that agricultural processing and storage are value added processes, and accomplishing these efficiently is a function of the process and equipment used. The rising demand by consumers for better quality crops, food products and fibre has made agricultural processing of crops inevitable. The processing of agricultural raw materials is increasing both on the farm and in the central location. This has created new industries to supply better quality products in more easily available forms. The need to make products available all year round calls for processing into stable products or storage of the raw products.

Post-harvest actions are all succeeding actions after harvest. The post-harvest period of time thus begin at separation of the food item from the medium of immediate growth or production. It is defined here as ending when the food enters the process of preparation for final consumption (Igbeka, 2013). This period also corresponds to the agricultural marketing and distribution period. In all the ways of value addition to agricultural product during the post-harvest period, engineers, food scientist, food technologist, nutritionist, agricultural economists, marketers and other related professionals have a role to play. The processing and storage engineer or post-harvest engineer approaches the value addition from the engineering perspective, this is because the operation involved are closely linked with thermodynamics, fluid flow, heat and mass transfer, reaction kinetics and other engineering principles. The engineer not only designs and develops processing equipment, storage methods and structures but also optimizes processing parameters.

In general, adding value is the process of changing or transforming a product from its original state to a more valuable

