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**THE NIGERIAN FARMER AND THE
ELUSIVE CROWN**

BY

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The Nigerian Farmer and the elusive crown

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Distinguished Ladies and Gentlemen

Great UNAABITES,

1.0 Preamble

It is a great privilege and honour to be presenting the 30th Inaugural Lecture of the University of Agriculture, Abeokuta. This also happens to be the first since the splitting of our College into two. In essence, this is the first inaugural lecture to come out of the College of Agricultural Management and Rural Development (COLAMRUD) and indeed, the first ever from the Department of Agricultural Extension and Rural Development.

The focus of my inaugural lecture is the Nigerian farmer. It can hardly be otherwise since my specialization is Agricultural Extension and Rural Sociology. This is a discipline which presumes a direct and constant engagement with the farmer. It involves helping farmers to help themselves, analyzing farmer problems and stimulating innovations among them, identifying opportunities, offering advice, delivering and promoting new and or improved agricultural technologies, supporting and facilitating collective action among groups of farmers. Food security, sustainable use of resources, improved nutrition, wealth creation, equity, and poverty alleviation is central in the agenda of extension services. The farmer is presumed to be at the centre of this agenda.

The concern over the years has been the effectiveness of extension-famer engagement and the impact this has had on agricultural production, food security and the wellbeing of farm households. Although the Nigerian farmer's predicament may not be strange to the majority of the populace as they are in one way or the other linked with the farmer either as a relation, client or consumer of the farmer's produce, the deep appreciation of the causes and possible solution is limited. In Nigeria we have had a combination of good, bad, responsive and unresponsive

agricultural development policies over the years. In the end, it has always been the farmer that bears the brunt of all of them.

Today, the average Nigerian farmer portrays a pitiful and unenviable image. He is old, poor and bent by hard labour- invariably the result of the use of stone-age implements, the hoe and cutlass. Governor Bukola Saraki of Kwara State, Nigeria, seems to capture the typical face of the Nigerian farmer in this interesting story in a prelude to his speech at the National Economic Summit on June 8 2006. Here is the story.

“My name is Uzodinma Usman Obafemi. I am a Nigerian farmer. I am 60 years old. I have no formal education. I have been a farmer almost all my life because my parents and grandparents were farmers. Most of what we produced went into feeding ourselves. Some years, when the harvest is good, we have a little surplus from our farms, which we sell in the neighbouring markets and earn a little money.

When I was 20 years old, I took a patch of land of about 2 hectares near our village and I started my own farm. Since then, I have been farming the way I learnt it from my parents, using hoes and cutlasses and constantly waiting on the rains. Even though I have farmed for more than 40 years, I am still poor. I believe my condition should change because I work very hard, but I don’t know what to do to bring about this change. All my young children who could have assisted me in the farm have all gone to the city in search of other jobs. They consider farming a difficult and backward occupation.

I heard that one can borrow money from banks to buy new seeds, fertilisers and pesticides and to also hire tractors, but since I can’t read or write I don’t even know how to go about it. I depend on government to bring fertilisers, but most of the time, it does not come and when it comes, it is either too late or too little.

In some seasons when the yield is good, I get about 2 tonnes of harvest from my farm. But I heard that in some countries, they get up to 6 tonnes or even 8 tonnes from the same size of farms. I wonder how they do this. However, whenever the rain is late or is short I do not even get up to 2 tonnes. When this happens, I don’t get enough to feed my family not to talk of earning some money to pay for other things.

In the seasons that I get good harvest, I always have too much than my family can consume, and we don’t know what to do with the surplus. The only option left to me is often to sell it for cheap at the village market or it goes to waste.”

The foregoing story not only paints accurately the current image of the average Nigerian farmer, it also highlights in some way, the problems confronting him today. Yet the Nigerian farmer has not always had such a gloomy image. It is the sweat and prosperity from the Nigerian farmer that paid for the education of the first set of University graduates in some parts of this country. It is the sweat of the farmer that gave birth to such a huge edifice as the Cocoa House in Ibadan and much more. In traditional Nigerian communities, farming was a much dignifying occupation and the farmer was revered for his hard work, industry and productivity. Among the Yorubas of southwestern Nigeria, the farmer was often rhetorically portrayed as king with the common saying - *Oba lagbe or Agbe loba*. This, no doubt, used to be more than just an appellation. The

question however is: Can the Nigerian farmer of today be described as king? If not, what has happened to him? The answer to these questions is the treatise of this inaugural lecture.

2.0 Background

Mr. Vice-Chancellor Sir, in my twenty years and a few months as an academic in the Nigerian University system I have contributed in some measure to the implementation of government's agenda to improve agricultural production and presumably, the lot of Nigerian farmers. Indeed one can safely affirm that the essence of being an academic and a teacher in a University of Agriculture like ours is part of that agenda because one of the broad objectives of setting up the Universities of Agriculture is to promote improved agricultural production in Nigeria through training of manpower, research and extension services. In fact today there are hundreds of institutions, agencies, programmes and projects at Federal, State and Local Government levels with mandates for supporting the farmer in order to improve agricultural production. Perhaps a brief review of historical trend of agricultural development interventions in Nigeria could facilitate a better appreciation or shed some light on how the average Nigerian farmer acquired his present dismal image.

2.1 Historical trend of agricultural development interventions in Nigeria

Several authors (FAO, 1966; Ekundare, 1973; Wells, 1974; Watts, 1987; IAR, 1988, Shuaib *et al.*, 1997 and Omotayo, 2010) have sections in their studies where parts of the history of agricultural development interventions in Nigeria are chronicled. This section of the inaugural lecture is an attempt to bring together these fragmented pieces of historical information.

The period of the colonial administration in Nigeria, 1861-1960, was recorded to have been characterized by rather *ad hoc* attention to agricultural development. Most of the extension focus during this era was for interventions in export commodity development and dissemination of imported technologies. During the era, considerable emphasis was placed on research and extension services. The first notable activity of the era was the establishment of a botanical research station in Lagos by Sir Claude McDonald in 1893. This was followed by the acquisition of 10.4 km² of land in 1899 by the British Cotton Growing Association (BCGA) for experimental work at Moor Plantation in Ibadan. In 1912, a Department of Agriculture was established in each of the then Southern and Northern regions of Nigeria, but the activities of the Departments were virtually suspended between 1913 and 1921 as a result of the First World War and its aftermath.

From the late 1930s to the mid-1940s, there were significant intensification and expansion of research activities, and extension and training programmes of the Agricultural Departments. Facilities for training of junior staff in agriculture as well as scholarships for students of agriculture at Yaba Higher College were put in place. In the area of research, attention was devoted largely to the possibilities of evolving permanent systems of agriculture that were capable of replacing rotational bush-fallowing systems prevalent in the country at that time. The prospects for mixed farming in the North were a major focus of development. During this period, the West African Institute for Oil Palm Research (WAIFOR) now Nigeria Institute for Oil Palm Research (NIFOR) in Benin was established and research on cocoa was intensified at Moor Plantation Ibadan, Owena near Ondo and at Onigambari near Ibadan.

The livestock sub-sector took a slightly different path from that of the crop sector in its evolution and development in Nigeria. Livestock production in Nigeria was dominated by nomadic pastoralists long before the advent of the British Colonial administration. The immediate interest of the colonial government in livestock was with the health and hygiene of cattle. Thus, the Nigerian Veterinary Department was established in 1914 with its head quarters in Zaria. In 1924, a small veterinary laboratory was established in Vom for the production of rinderpest serum. Increased field services raised the demands on the laboratory hence the production of vaccines and other biological products was added to the functions of the laboratory. The recognition of the advantages of Vom as the centre for veterinary research and for vaccine production, coupled with the major emphasis on the health aspects of livestock production, led to the transfer of the head quarters of the Nigerian Veterinary Department from Zaria to Vom which later transformed into the National Veterinary Research Institute. (NVRI) .

The serious nature of trypanosomiasis (sleeping sickness) or what was referred to as *Nagana* disease among the local people was of great concern to the Colonial Administration in the West African Territories and the need to control this disease led to the establishment in 1947 of a West African Institute for Trypanosomiasis Research (WAITR) now National Institute for Trypanosomiasis Research (NITR) in Kaduna. A main laboratory was established in Vom on the Jos Plateau, an ideal location since the tsetse fly vector was absent in that area. Prior to 1951, the Nigerian Veterinary Department had its headquarters, laboratories and a school in Vom, with field offices in each Region. With the coming of regional governments, the Nigerian Veterinary Department was split into separate regional departments.

The immediate post-independence era, (1960 to 1965) witnessed an extensive planning and regional competition in agricultural development. The regional governments paid a lot of attention to developing agricultural commodities for exports. The imposition of taxation by the Commodity Marketing Boards on producers for financing development was the official policy in all the regions. Little attention was paid to developing food crop activities. By the middle of 1960s, a Federal Ministry of Agriculture and Natural Resources was set up, and a phase of consolidation and co-ordination of projects for agricultural development began. The 1962-1968 development plans was Nigeria's first national development plan. Among several objectives, it emphasized the introduction of modern agricultural methods through farm settlements, co-operative (nucleus) plantations, supply of improved farm implements (e.g. hydraulic hand presses for oil palm processing) and a greatly expanded agricultural extension service. By 1966 when the civil war broke out, a central control of the nation's agriculture by the Federal government were already set in motion.

The years of the early 1960s also witnessed the establishment of several agricultural research institutes with Extension and Research Liaison Services. Today there are about eighteen agriculture related research institutes each with a mandate for specific commodities located in different parts of the country. All the research Institutes are Federal government institutions with no specific roles for States and LGs. The creation of 12 States in 1976 led to increased efforts to evolve a coordinated programme for agricultural development in Nigeria

The introduction of the Agricultural Development Projects (ADPs) is a significant phase in the history of agricultural development in Nigeria and this has been well documented by Adedipe *et al.*, (1993) and Omotayo *et al.*, (2001). The experiment which started with World Bank funding, with projects at Funtua (1974), Gusau (1974) and Gombe (1974), on enclave basis i.e. covering a specific region of each state, were expanded to include similar enclave projects at Ayangba (1977), Lafia (1977), Bida (1979), Ilorin (1980), Ekiti-Akoko (1981) and Oyo-North (1982).

Following negotiations and agreement for the establishment of multi-state agricultural development projects with the World Bank in the 1980s, each state of the country, and the Federal Capital Territory, Abuja, adopted the ADP structure. The ADP has now become the major pivot for implementing government agricultural policies in all the states of the Federation.

The history of agricultural development and extension service interventions in Nigeria will not be complete without a mention of the flurry of programmes introduced between 1973 and the current democratic dispensation starting from 1999. They include, the National Accelerated Food Production Programme (NAFPP) 1973, River Basin Development Authorities (1975), Operation Feed the Nation (1976) Green Revolution programme, 1981, Establishment of the Nigeria Agricultural Cooperative and Rural Development Bank (NACRDB), the Nigeria Agricultural Insurance Scheme (1987), National Agricultural Research Project (NARP) 1993, National Fadama Development Programmes (Fadama I, II and III) 1996 to date, National Economic Empowerment Programme 2001, Presidential Initiatives on Rice, Vegetable oil, Sugar, Cassava, Tree crops and Livestock industry, the National Programme on Food Security (NPFS), the Root and Tuber Expansion Programme (RTEP) and the Multi-National Nerica Rice Production projects.

2.2 How the historical trend of interventions in agriculture affected farmers

The foregoing review of agricultural development interventions and extension services covering the period before independence and the present day reveals a specific trend in how the farmers' interest was rarely factored into the development equation. For instance, in the early days of the colonial period, the commodity extension approach was adopted. Farmers were engaged on the basis of the commodities that were to be promoted for export. Although most farmers were multi-commodity producers, this did not matter much in the extension messages designed and pushed to farmers.

For instance, in the southwest, cocoa was the major export commodity. Cocoa was therefore the focus of extension even though many farmers were involved in the production of yams, maize, cowpea, vegetables and different species of livestock. Consequently, improvement in the knowledge of food and livestock production among farmers did not grow alongside that of cash crop because of the minimum support for the former by the colonial administration. Although farmers involved in cocoa production at that time enjoyed some measure of prosperity, those who were not involved in the production of this cash crop suffered outright neglect by government extension agencies. This perhaps was the very foundation of the plight of the average Nigerian farmer today.

During the early days of the post-colonial period particularly in the sixties, the Training and Demonstration (T&D) approach was the major extension system in operation in most parts of Nigeria. This involved the use of large demonstration plots to convince farmers that a new practice or an innovation or set of innovations were superior to the farmers' practice. Such large demonstration plots established in various locations within each of the regions were too few in numbers to pass extension messages effectively to farmers. There was also the fact that it was too difficult for farmers to believe that the innovations in such large demonstrations could be replicated on their own farms. Adoption of such innovations was therefore likely to have been considered with extreme caution by the majority of farmers.

The Training and Visit (T&V) system of extension became popular in the early 70s following its successful trial in some Asian countries. The T&V system was introduced into Nigeria with the coming of the World Bank assisted Agricultural Development Project in the 70s. The T&V was progressively modified in Nigeria while it was adopted. The introduction of the T&V system in Nigeria coincided with the introduction of Farming Systems approach to Research and Extension (FSRE) delivery which emphasized the farm household as the central focus of research and extension. The Research-Extension-Farmers-Input-Linkage-System (REFILS) which is our own modified version of the T&V and the FSRE evolved from the many efforts at careful modification of the T&V system.

With REFILS which periodically brings together agricultural research and extension practitioners, input agencies, farmers, and other stakeholders for agricultural development intervention planning across the country we have a well organized technology transfer and extension delivery system firmly in place. Although the system begins and ends with the farmer, the logistics for realistic farmer involvement in the planning and implementation process is yet to be addressed fully. There are still serious challenges of implementation in the areas of human resource development and management succession issues. There is also the issue of high farmer - extension agent ratio which is commonly estimated to be 1:3000 on the average across the country. All these might have contributed to low adoption of innovations and the consequent low productivity resulting in poor income and low image of the farmer and farming as an occupation in Nigeria.

3.0 My Research Focus

Mr. Vice-Chancellor Sir, distinguished ladies and gentlemen, my specialization is such that demands being jack of all trades in agriculture and related disciplines and master of all. Thus my research focus has been quite diverse and varied. Nonetheless, I have endeavoured to focus on issues directly related to agriculture and livestock production, land use and tillage practices, farmers and pastoralists' welfare and health. In all the studies, the behavior of either the farmer or pastoralist and their households with regards to response to innovations, media access and use, access to production resources, resource use and management, are central in the analyses.

3.1 Research on agricultural innovation adoption

Innovation adoption research is premised on the theory of social change. Rogers (1969) defined social change as the process by which alteration occurs in the structure and function of social systems. This definition tallies with that of Hertton and Hunt (1980) who see social change as the

transformation of social structures and social relationships in society. Some analysts argue that the concept of social change converges around development and suggest that development takes place in a social system where social, political and economic structures serve as stimulus. In all the analyses and explanations on social change, four specific processes have been consistently identified, namely; discovery, invention, innovation and diffusion. Rogers (1969) broke these processes down into three steps: creation of new ideas, communication and spread of these new ideas and change occurring within the system as a result of acceptance or rejection of the new ideas and practices. The foregoing brief analysis of social change shows that the creation and introduction of new ideas or practices (invention) to traditional farmers, acceptance and use of these new ideas and practices (adoption and diffusion) and the change occurring within the system (impact or consequences) on farming and the farm household are distinct elements which bring about social change.

Innovation adoption is expected to lead to increased agricultural production, improvement in the income and welfare of farmers and their households. Many studies have documented farmers' innovation adoption behavior both in Nigeria and elsewhere. Our study, Chikwendu, Chinaka and Omotayo (1994) on the adoption of miniset technique of seed yam production indicated that level of education, farm size, years of farming, income, access to credit and extension contact were significant variables determining adoption of the technology among farmers in southeastern Nigeria. This result was consistent with the findings of other researchers on innovation adoption in Nigeria and elsewhere.

At a stage in our research effort, the gender dimension in innovation access and adoption was examined. The focus of our study on this was the role perception and performance of female Extension Agents (EAs) under the Training and Visit Extension system (Omotayo *et al.*, 1993) and the use of radio in the transfer of innovations to women farmers in selected villages in Kaduna State (Omotayo *et al.*, 1997). We found that female EAs understood their roles and significantly facilitated innovation access among women farmers particularly in the northern part of Nigeria where there exists cultural and religious barriers in interaction between male EAs and female farmers.

Access to various information media affects not just the farmers' knowledge of innovation but also the whole process of diffusion and adoption of an innovation. Our study on the use of some media such as radio (Omotayo, Chikwendu and Auta, 1997; Omotayo, Chikwendu, Zaria, Yusuf and Omenesa, 1997); Television (Omotayo and Arokoyo, 1993); and Publications (Chikwendu, Omotayo, Yusuf and Omenesa, 2000), confirm some of the widely held views that these media are important either singly or in combination in the transfer of improved agricultural practices to farmers. Our study shows that radio was particularly an important medium of innovation dissemination in the northern part of Nigeria as farmers faithfully followed scheduled farm broadcasts by the National Agricultural Extension and Research Liaison Services (NAERLS), and the ADPs on FRCN and other local radio channels in major towns. Our study on the use of publications in innovation dissemination revealed that the most limiting factor was the low level of literacy among farmers particularly in the northern part of Nigeria even when some publications were produced in local languages and dialects.

Most studies on the impact of different sources of information on adoption of agricultural innovations show that extension agents still represent the most important and effective means of innovation dissemination. For instance a part of one of our studies (Omotayo and Arokoyo, 1993) requiring farmers to rank some sources of information on agricultural innovations in order of importance showed that the extension agent was consistently ranked as the most important by the majority of famers, closely followed by neighboring farmers and contact farmers. This finding suggests that extension agents will continue to play very important roles in the dissemination of innovations to farmers in Nigeria for a long time to come. There is therefore the need to reduce drastically the extension agent-farmer ratio from the present average of 1:3000.

3.2 Research on farm land tillage using animal traction

Labour is a major limiting factor in agricultural production among small scale farmers in Nigeria as most households depend on family labour and utilize low level mechanization input. The basic land tillage tools are hoes, axes and cutlasses. In the northern part of Nigeria however, animal traction is used for land tillage by a large number of farmers particularly in the semi-arid and arid zones.

Animal traction is the use of animals for work purposes. It was first introduced into Nigeria in 1922 by the colonial government to improve agricultural production, particularly the production of export crops like groundnut and cotton in northern Nigeria where there is a tradition of keeping large ruminant animals adaptable for draught purposes (Musa, 1990). Farm training institutes were established in eight different locations in Adamawa, Borno, Kaduna, Sokoto, Katsina, Niger kano and Plateau States all in the northern parts of Nigeria to train farmers on mixed farming and the use of oxen or work bulls for farm work (Makanjuola *et al.*, 1991).

Although the diffusion of the technology has been relatively slow even in the arid and semi-arid areas of Nigeria, it is estimated that there are close to 500,000 draught animals spread across the northern parts of Nigeria and indeed it has become a permanent feature of the farming systems of that part of the country.



Plate 1: Draft animals being used for ploughing

The use of draught animals has a lot of benefits. It is labour saving. It has been shown that a man and his family with a pair of work bulls can cultivate 4 to 5 times the area of hand-cultivated farm land. It therefore allows land rich farmers to expand the area under cultivation. Although it is possible to apply animal traction in all common farm operations such as land preparation, weeding, planting, harvesting and threshing its application has been largely limited to land tillage in most of the places where the technology is adopted in Nigeria. Other benefits include profitability (Phillip, 1990), higher yield, though strongly disputed by Anderson, (1985), and timeliness in carrying out farm operations.

Our studies (Omotayo 1995; Omotayo *et al.*, 1996; Sanni and Omotayo 1996; Omotayo, 1998) on the utilization and impact of animal traction in Katsina State which has the highest concentration of work bull owners in Nigeria either confirmed or disputed some of the benefits listed above.

Table 1: Distribution of farmers according to the various applications of animal traction

Activity	<u>Independent Users (N=55)</u>		<u>Dependent Users (N=55)</u>	
	No	%	No	%
Ploughing	10	18.2	3	5.5
Ridging	55	100	55	100
Weeding	38	69.1	12	21.8
Carting or transport	22	40.0	8	14.5
Groundnut harvesting	3	5.5	0	0

Source: Omotayo, 1995

In the study, Omotayo (1995) classified users of animal traction as dependent and independent. Independent users are those who own the technology package and use it and the dependent users are those who did not own the technology but have access through hiring, leasing or borrowing. Data in table 1 show that while all independent and dependent users applied the technology in ridging very few of both groups of users applied the technology in weeding and groundnut harvesting. About 69% of the independent users applied the technology in weeding while only 21.8% of the dependent users applied the technology in weeding. The explanation here is that the independent users had unrestricted access to the technology and could use it anytime and for any purpose they considered necessary while the dependent users were at the mercy of the independent users for access and use of the technology. Thus having access to the technology for weeding by dependent users may be limited. In addition to this, the application of draft animals in weeding requires considerable skill and experience which only those who owned the technology and controlled it possessed.



Plate 2: Ox-drawn cart

Table 2: Average time taken for ridging and weeding using draft animals in four locations in Katsina State

Location	<u>Time for completing tasks (Hours/Ha)</u>	
	Ridging	Weeding
Funtua	80.2	88.0
Malumfashi	81.1	85.2
Daura	78	69.3
Jibiya	76.5	72.5

Source: Omotayo, 1995

The data in Table 2 show that using draft animals for ridging required between 76.5 and about 80 hours while weeding required between 69 and 88 hours per hectare in the four locations where the trials were conducted. For weeding, most farmers rearranged the popular Emcot plough by removing one of the blades to turn it to a weeding implement. It has been estimated that it requires about 132 hours per hectare to accomplish the same task manually (Twonlow, 1994). It has also been estimated that a similar task of weeding using draft animals could be accomplished

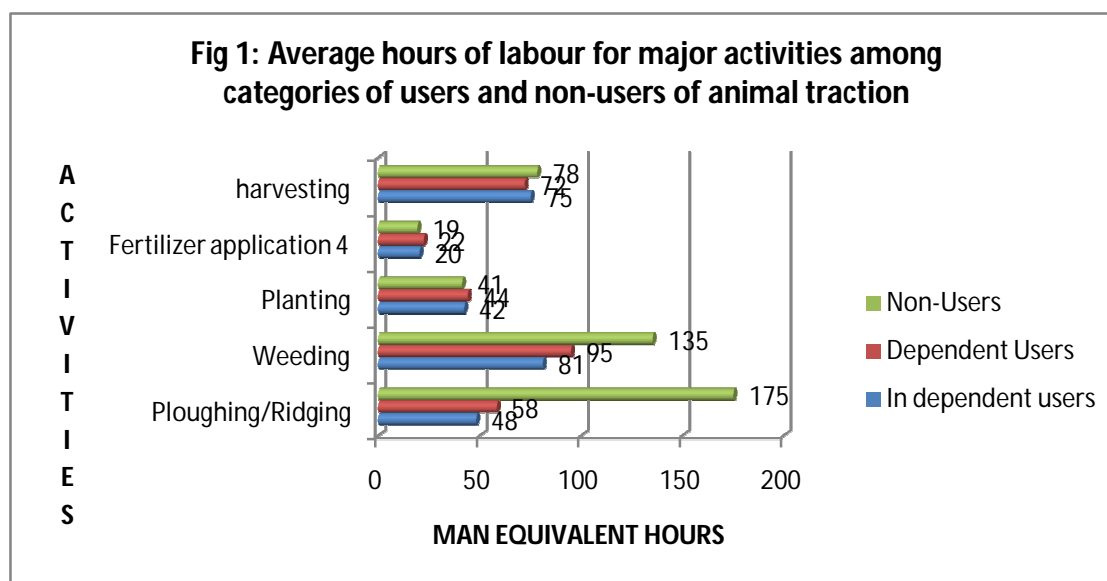
at the rate of 68 hours per hectare if the proper weeding implement or cultivator was used. In spite of these, the labour saving attribute of animal traction was evident from the trials as over 40% of man hours were saved in each operation as a result of the use of animal traction.

Carts are used extensively particularly in the northern most part of the state. Most of the carts are wooden framed, fitted with roller bearings and pneumatic tyres (See Plate 2). There were a few steel-framed carts mainly adapted from disused pick up vehicles. The carts were used for transporting farm produce, fertilizer, manure, water and all types of household items.

Results of further analysis (Omotayo *et al.*, 1997) on impact of animal traction on household labour use can be seen in Figure 1. It shows that total labour use per hectare was greater among non-users than users of animal traction. It further shows that even among users, there was a labour saving of about 24 man hours by independent users of the technology over dependent users. This is because some of the dependent users carried out some tillage activities such as mounding or remolding manually. Data in figure 1 shows that the use of animal traction for ploughing or ridging significantly reduced the labour requirement per hectare from 175 man hours if the hand hoe was used, to 48 man hours. The same goes for weeding, reducing the man hours from 135 under manual hoe weeding to 81 when animal traction was applied. The impact of animal traction on labour use for activities such as planting, fertilizer application and harvesting could not be ascertained since most households included in the trial carried out the operations manually. The same study (Omotayo *et al.*, 1997) shows that even though animal traction had positive and significant impact on household gross income, the impact on the yield of selected crops was not clear.

The study on the adoption of animal traction (Omotayo *et al.*, 1998) shows that ownership of cattle, access to credit, having training on animal traction and extension contact were significant variables that affected adoption. This study again confirms the role and importance of direct intervention of extension in technology adoption.

Our study on animal traction was not restricted to the northern part of Nigeria. On moving to the University of Agriculture Abeokuta in 1997, I noticed there were many Fulani pastoralists settled and practicing crop production as well as herding cattle. We (Adu, Omotayo and Aina, 1999) therefore conducted an exploratory survey of the potentials of animal traction in southwestern Nigeria. The result shows that even though the Fulani are settled, owned cattle and are involved in crop production, they were not familiar with the use of cattle for draft purposes. Among the indigenous farmers, there was no tradition of keeping large animals such as cattle and most of the local farmers had never seen animals being used for work before. Although they expressed interest in trying the technology, the major challenge was how to get their animals trained for work purposes and how they too could obtain training on the use of the technology. Another major problem was the huge and thick vegetation in this part of the country which would require massive land clearing before such technology could be tried. Wide spread mechanization using tractors have been limited in southwestern Nigeria for this same reason.



*Planting, fertilizer application and harvesting were done manually by all categories of farmers

Source: Omotayo *et al.*, 1997

In summary, animal traction has greater appeal now than ever before for agricultural development in a country like Nigeria. It is an appropriate, relatively affordable and sustainable technology. The benefits of animal traction are numerous. They include:

- providing smallholder farmers with vital power for land tillage and transport.
- making marketing and trading easier and relieving women of the burden of transporting water, farm inputs and produce by hand, head or wheelbarrow.
- improving fertility by ploughing manure from draught animals back into the soil.
- It is an affordable and sustainable technology. In comparison with mechanical systems, animal traction has the advantage to rural families of being available, timely and affordable particularly in the semi-arid and arid zones of Nigeria. It is also capable of providing employment and transport, and promoting food production and security, thereby leading to a higher income, better standard of living and the much needed improvement in the image of farming and that of the Nigerian farmer.

3.3 Research on land use in agro-pastoral production system

Our studies on land use and land tenure system (Omotayo *et al.*, 1999; Omotayo, 2002; and Omotayo, 2003) considered tenure arrangement, land use and the impact of agro-pastoral production system of settled Fulani in Ogun State. Using Geographical Information System (GIS) the location of settlements and the spheres of influence of pastoralists' activities were mapped.

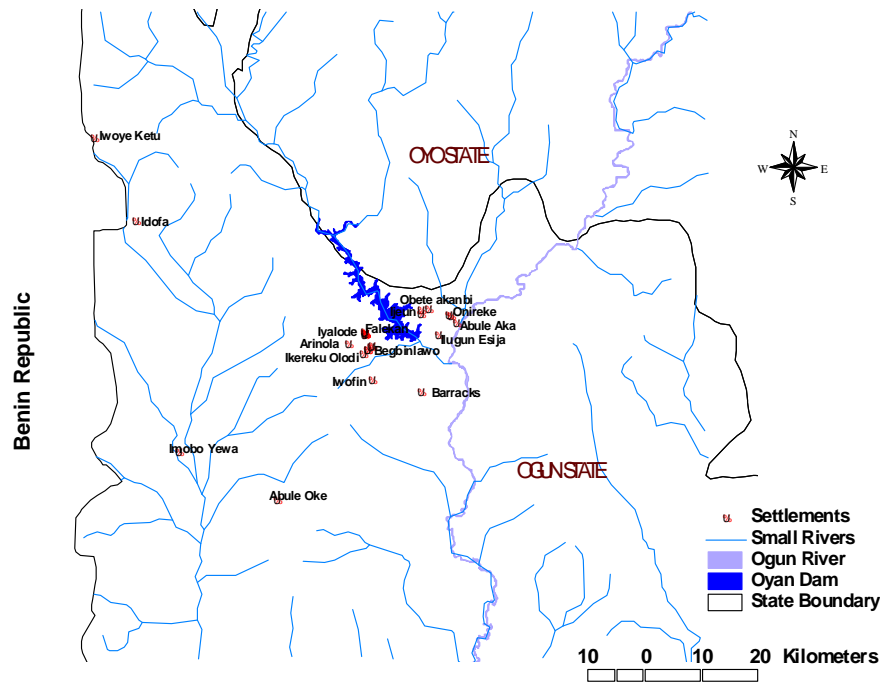


Figure 2: Map of a section of Ogun State showing Fulani pastoralist settlements

The study shows that although the Fulani cultivated between 1 and 5 hectares of land for crop production (Table 4) they operated under relatively secure land tenure arrangement on the short run, as most of them borrowed the land they used for farming. In fact it did appear that the local Yoruba land owners who allowed the Fulani to use their communal land did so to secure the land from land speculators and other land hungry elements from nearby cities and towns. However, this land tenure arrangement does not guarantee long term security of holding for the pastoral Fulani.

Results from our 2003 study on population dynamics and livelihood systems among Fulani pastoralists in southwestern Nigeria shows that there were 651 Fulani pastoral households with about 5,937 people in 28 settlements in Ogun State at the time of the survey in year 2002 (see Table 3). Out of these, about 400 households (61 per cent) are settled at Iwoye Ketu an area designated as grazing reserve by the Federal government in 1985. It was reported that the Ogun State government had been trying to secure funds for its full establishment from the Federal government. The settlement has a school and a non-functional health and veterinary clinic. The grazing reserve had a land area of 61,642 ha and hosts about 18,000 heads of cattle and 400 households who are both livestock herders and crop farmers. About 180 pastoral households are settled in various locations along the two sides of Oyan Dam (See Table 3 and Figure 2). This reservoir is about 27 km in length and about 1 km wide at its crest. It is the largest water body off the coast of southwestern Nigeria. The remaining 75 households are settled in other locations within the derived savannah areas of the State.

The study further shows that pastoral households relied mainly on family labour for both crop and livestock production. Land was tilled by pastoralists using hand hoe. They made ridges for yams, sorghum, maize and cassava unlike the indigenous Yoruba farmers who made mounds for their crops. Although over 90 percent of the pastoralist households owned cattle, the ox plough was not used at all for any phase of farm work. As in most other traditional production systems in Nigeria, yields varied according to location and management capability of households but were generally low as shown in Table 5. This was due mainly to the low potentials of most of the varieties planted, poor management and poor soil nutrient conditions. Although manure was applied to most of the fields by the Fulani pastoralists, the quantity available was usually limited and it was spread thinly across a large area of cultivated land thus, invariably ineffective in replenishing lost soil nutrients.

The pastoral Fulani believes that animal reproduction does not depend on the fecundity of the breed but rather on proper nutrition. Providing the herd with excellent nourishment therefore is considered the most important task of a serious herder. The decision to migrate or settle, choice of settlement location and the length of stay in a particular location are all part of the immediate and long term nutritional strategy of the herd. All livestock in pastoralists' herds are kept in fenced enclosures at night to prevent them wondering into crop fields. Depending on the time of the year, herding was done by different members of the households, men and boys and in very rare cases, girls. Cattle and sheep are usually herded together, while goats are kept separately. Seasonal variability in availability of grazing pasture or fodder resources in the settlement areas are not critical unlike in the semi-arid and arid zones.

Movement of the herd from one location to another within the grazing orbit is therefore to take advantage of the spatial and nutritional diversity of the pasture and fodder resources. The grazing route could be circular, triangular or semi-circular depending on physical structures such as hills, mountains, rivers or a nearby urban or village area posing as restriction to the grazing orbit. The distances herds travelled from the settlement depended on the time of the year and the various stages of growth of pasture within and outside the settlement area. During the rainy season for instance, herders moved within a very small area around the settlements often less than 5 km. In contrast, during the dry season, herders travelled as far as 15 km from the settlements. Herd mobility therefore could be seen as a way of assuring full and timely exploitation of the fodder resources to optimize the nutritional status of the herd.

Whether or not this elaborate and diligent tending of the herd translated to high herd productivity is shown in Table 6. On all parameters, productivity was similar to those in the literature under traditional production systems in Africa and elsewhere. Generally however, the productivity levels are low compared to results obtained from adaptive research. For instance, milk production per cow per day was less than 2 litres under the Fulani pastoral production system while the literature records a minimum of 10 litres. In more intensive livestock production system with improved dairy cattle, it is possible to have up to 15 litres of milk per cow per day. The low productivity levels could be attributed mainly to the poor nutritional quality of the natural pasture, the genetic potentials of the breeds and health status of the animals in the pastoral Fulani herd.

Mr. Vice-Chancellor Sir, we have gone this far to present detailed and elaborate data on crop and livestock production by settled Fulani pastoralists to demonstrate that neither the pure crop farmers who are Yoruba nor the Fulani who combined it with extensive livestock production fared better in terms of technology use, innovation adoption and productivity. Both groups suffer similar fate in terms of development intervention and access to production resources.

Table 3: Population of settled pastoralists and their locations in Ogun State

Geographical Coordinates			Number of households	Number of people	Number of cattle
Latitude	Longitude	Name of location			
7.289	3.307	Abule Mologede	20	180	400
7.290	3.304	Onireke	8	179	160
7.261	3.288	Ilugun Esija	12	169	350
7.278	3.316	Abule Aka	22	245	568
7.557	2.748	IwoyeKetu	400	3500	18000
7.432	2.812	Idofa	3	9	35
7.083	2.880	Imobo yewa	16	500	200
7.013	3.036	Abule Oke	3	18	65
7.247	3.146	Arinlola	3	18	65
7.262	3.173	Falekan	22	150	220
7.177	3.262	Barracks	7	22	56
7.262	3.173	Iyalode 2	3	20	36
7.232	3.170	Ikereku Olodi	2	10	40
7.262	3.173	Iyalode 8	7	15	29
7.262	3.173	Iyalode 3	9	9	22
7.262	3.173	Iyalode 1	3	7	16
7.262	3.173	Iyalode 5	3	15	36
7.260	3.171	Iyalode 7	2	7	16
7.193	3.183	Iwofin	2	7	6
7.265	3.171	Iyalode 4	3	8	6
7.238	3.177	Ikereku Olodi 2	3	10	34
7.243	3.182	Begbinlawo	7	32	240
7.299	3.272	Obete Akanbi	2	8	27
7.298	3.261	Ijeun 2	4	29	250
7.292	3.260	Ijeun 1	40	360	2000
7.265	3.171	Iyalode 6	8	72	400
7.238	3.177	Iyalode 9	7	63	350
7.243	3.182	Arinlola 1	40	600	1200
Total	-----	-----	651	5937	24762

Source: Omotayo *et al.*, 2003

Table 4: Distribution of settled Fulani pastoralists according to farm size

	Number of households (N = 651)	Percentage
Average size of Land		
Less than 5 ha	210	32.3
5 – 10 ha	313	48.1
Above 10 ha	128	19.7
Average crop farm size		
Less than 2 ha	298	45.8
2 – 5 ha	247	37.9
Above 5 ha	106	16.3

Source: Fieldwork 2000-01.

Table 5: Yield of major arable crops under Fulani's pastoralists' production system compared with improved systems

Crop	Yield on pastoralists' field (kg ha ⁻¹)*	Yield with improved technology (kg ha ⁻¹) **
Maize	1520	5200
Sorghum	975	2100
Millet	715	1250
Cowpea	670	1500
Soybean	655	1525
Maize/sorghum	1420/870	2140/1000
Sorghum/soybean	900/400	1250/720

Source: *Fieldwork, 2000 - -1: **compiled from various research reports.

Table 6: Herd productivity in pastoral household settlements (May 2000- April 2001)

Parameter	Cattle		Sheep		Goat	
	Survey	Literature	Survey	Literature	Survey	Literature
Average age at first						
Calving/lambing /kidding (years)	5.0	5-6	2.0	1-1.5	1.5	1-1.5
Average calving interval (Months)	26	19	11	5.2-11	13.0	8-11
Quantity of milk						
produced (liters/cow/day)	1.9	10	NA		NA	
*Reproduction rate (%)	45	62	70	90-115	78	140-240
Mortality rate (%)	5	2-10	15	2-10	4	2-5

NA = Not applicable

Reproduction rate (number of animals born per number of breeding female)

Source: Omotayo, 2003

3.4 Research on ecological implications of Fulani pastoralists' production system

Our study on the ecological implications of Fulani pastoralism in southwestern Nigeria (Omotayo, 2003) examined how the activities of the pastoral Fulani may have affected the ecology, land cover, land use and the environment in the region. The research draws on data from a national study on land use and land cover change between 1976 and 1995 by the Forestry Management and Evaluation Unit (FORMECU), implemented by Geomatics of Canada, and GIS data from fieldwork conducted by our research team between year 2001 and 2002. Part of the results is presented in Table 7 and Figure 3.

Eight classes of land use and land cover were distinguished in the data presented in Table 7. These classes include disturbed forest, undisturbed forest, grassland, major urban settlements, minor urban settlements, intensive crop farms, Teak and Gmelina plantations, pastoral household settlement locations and water bodies (dam, reservoir and rivers). Table 7 shows the summary of land use classes, the areas covered by the dominant vegetation and the land-use changes that have taken place between 1976 and 1995. A significant change is recorded under the Guinea savanna land-cover type, where 254 km² of the 874 km² of the land area was converted to extensive grazing agriculture. The period of this change coincides with the period of influx of settled pastoral households into the State, and the area much affected is the land area where pastoral households are presently settled in Ogun State.

Another significant change recorded in the land cover of the State between 1976 and 1995 is the development of a large patch of continuous grassland over a land area of 74 square kilometers, particularly on the plains of the northern part of Abeokuta along the Oyo State border (FORMECU, 1995). This is the area where a large number of pastoral households are settled. The transformation of the land cover of this area may have been due partly to the land-use practices of the pastoralists.

The present spheres of influence of pastoral households' activities in Ogun State are presented in Figure 3. The spheres of influence are presented in form of concentric circles with a distance of 2.5 km in between. This suggests that each pastoralist's settlement has a sphere of influence of at least 10 km radius of grazing orbit within the settlement area. The total land area around a distance of 10-km radius is about 539.2137 km square. Since most of the households actually herd their cattle beyond the radius of 10 km² at certain times of the year, we can safely infer that the area of land under the influence of pastoralists' activities is about 539 km square. The minimum area of land within the 2.5 km radius is about 222.2 km², the minimum area of land under the sphere of influence of settled pastoralists in Ogun State.

The sphere of influence of pastoral Fulani activities extends beyond the State boundaries in the northwestern and northeastern parts of the State. In the northeastern part, it extends into Oyo State. This is an area where clashes between herders and crop farmers have been recorded recurrently in the last few years, particularly in the last five years, around Oke-Ogun in Oyo State. Similarly, in the northwestern part, the area of influence extends beyond the Nigerian border into Benin Republic. Although a full blown conflict has not developed in this area, discussions with the pastoralists during the fieldwork point to a seeming conflict situation between the Fulani agro-pastoralists and some local farmers commonly referred to as *Oho*ri whom the herders claimed are not Nigerians but are farming on Nigerian land which was

originally grazing land for the Fulani. The fact is that most policy-makers are not even aware of the presence of a large population of settled pastoral Fulani households in these locations.

Some of the land-use practices of the pastoral Fulani such as seasonal bush burning along the grazing orbits for regeneration of pasture, periodic movement of the huts or dwelling place within the settlement area, intensification of land use, shifting cultivation with short fallow periods and lack of commitment to investment in long-term land improvement initiatives such as incorporation of leguminous species into pasture or grazing land, land-cover denudation and loss of bio-diversity is capable of compromising the integrity and resilience of the ecosystem. Some developments that resemble these can be seen in the results of our study on the ecological implications of Fulani pastorasism in southwestern Nigeria.

Table 7: Dominant vegetation and land-use changes between 1976 and 1995 in Ogun State Nigeria

Land use 1976	Land use 1995	Area affected Percent changed by change	(km ²)
Disturbed forest	No change	1.2	193
	Undisturbed forest	3.8	610
	Teak plantation	1.6	254
	Intensive crop agriculture	1.7	270
Guinea savanna	No change	5.4	874
	Extensive grazing agriculture	1.6	254
Undisturbed forest	No change	0	0
	Freshwater swamp	0.7	117
	Sudan savanna	0.8	134
Riparian forest	No change	0.1	16
	Intensive crop agriculture	1.7	279
Intensive crop agriculture	No change	62.6	10 069
	Continuous grassland	4.6	736
	Disturbed forest	2.5	399
	Freshwater swamp	1.5	236
	Urban (major + minor)	1.1	183

Source: FORMECU, 1996; Omotayo *et al.*, 2003

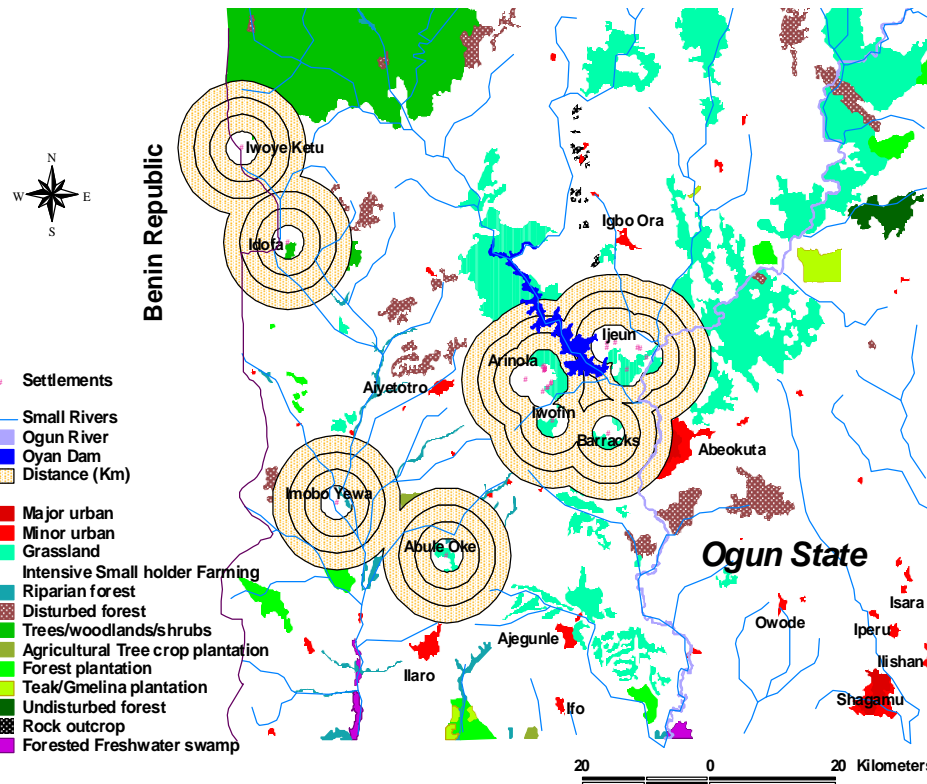


Fig 3: Map of a section of Ogun State showing the spheres of influence of Fulani pastoralists' activities

Source: Omotayo *et al.*, 2003

3.5 Research on health consequences of lifestyle changes among settled pastoral Fulani

Our study, Omotayo, Dipeolu and Ekpo (2005) on the health consequences of lifestyle changes among settled Fulani is premised on the fact that the change from nomadic to sedentary lifestyle could generate corresponding changes in living conditions, diets, food habits and health. The study which identified and described the various forms and sources of lifestyle changes, living conditions in pastoral settlements, examined access to health services and comparatively analyzed the health status of settled and nomadic pastoral populations in Oyo, Ogun, and Kwara States in Nigeria.

3.5.1 Health services usage among pastoral Fulani

Contrary to widely held views that the pastoral Fulani did not use modern health facilities, our study show that the Fulani made use of modern health care services as over 90 % of them indicated that they attended hospitals when they were ill. At the time of the survey they

identified a total of 14 health facilities they patronized in Oyo State, about 22 in Kwara State and 11 in Ogun State. Only 6 % in Oyo, 10 % in Ogun and 4 % in Kwara did not patronize a health facility. Most of such people utilized alternative health care services provided mainly by traditional medicine men. Most of the health facilities patronized by the Fulani were primary health care centres and some were privately owned. A common phenomenon in the Fulani settlements is the frequent visits of unqualified or quack doctors who regularly hawk, prescribe drugs and administer injections on them and their livestock.

On the average about 97 % of all those who reported attending one hospital, health clinic or the other in the three states are settled. Only about 3 % of those who attended hospitals are nomadic. This finding suggests one or two things. The first is that the sedentary Fulani group might have been predisposed to more disease infection than the nomadic group as is well known that most nomadic groups usually migrate away from disease prone areas to avoid diseases both for themselves and their livestock. The second is that sedentarization might have opened up the opportunity for the Fulani to obtain health care services close to their settlements.

3.5.2 Health attitude of the pastoral Fulani

Health attitude in our study refers to what the pastoral Fulani considered to be ill health, how he evaluated the symptoms of a disease condition and what steps he took when there was illness. During the survey the Fulani was required to describe what he considered as ill health and the cause. The pastoral Fulani considered pain and fever as two major symptoms of illness that drove him to see a doctor. He believes that certain illnesses are caused by god as part of everyday natural world and some by witchcraft. To the Fulani any illness that did not entail pain and fever are considered not to be symptomatic of a serious illness and therefore would not require immediate medical attention.

The Fulani also considers the level and intensity of the pain. If the pain was mild and not too discomforting, it would not be necessary to see a doctor. For such minor ailments, the Fulani resorts to self medication using local herbs, visits a traditional herbalist (*Alfaa*), visits a patent medicine store to buy drugs or ask relatives, acquaintances or neighbors for medicine. Some cases of ill health eventually taken to hospitals often become hopeless or too late by the time they reached the hospital. These attitudes and behaviors are however not culture specific to the pastoral Fulani. Such attitudes are found among most other populations in Nigeria

Table 8: Conditions and illnesses treated in hospitals by the pastoral Fulani

Illness treated	Oyo		Ogun		Kwara	
	Number and % of Household		Number and % of Household		Number and % of Household	
	Number	%	Number	%	Number	%
None	252	31.6			97	9.9
Malaria	339	42.5	150	52.4	568	58.1
Antenatal Services	60	7.5	8	2.8	13	1.3
Stomach ache	29	3.6	1	0.3	37	3.8
Cough	41	5.1	32	11.2	89	9.1
Diarrhoea	13	1.6				
Typhoid fever	7	0.9				
Measles	4	0.5	3	1.0	18	1.8
Skin rashes	8	1.0	3	1.0	23	2.4
Snake bite	4	0.5			16	1.6
Dysentery	9	1.1	1	0.3	21	2.1
Abortion					3	0.3
Heart problem					1	0.1
Hernia					1	0.1
Headache					2	0.2
Accident			1	0.3	6	0.6
Schistosomiasis			3	1.0	14	1.4
Eye problem					11	1.1
Pains/rheumatism			13	4.5	26	2.7
Sexually transmitted disease					3	0.3
Tiredness					1	0.1
Appendix problem					1	0.1
Bleeding					7	0.7
Child Delivery			25	8.7	6	0.6
Cholera					2	0.2
Hypertension					1	0.1
Tetanus			5	1.7	1	0.1
Tooth ache			3	1.0	8	0.8
Convulsion			2	0.7	1	0.1
Others	31	4.1				
Total	797	100	286	100	977	100

Source: Omotayo et al, 2005

3.5.3 Conditions and illnesses treated

Illnesses and conditions reported and treated in the health facilities in the previous six to twelve months from the time of the survey are indicated in Table 8. The data show that Malaria represents over 50 % of the illness treated in the three states. This is followed by ante-natal services, stomachache 3.6 %, Cough 5.1%, Diarrhoea 1.6 % and schistosomiasis 1.0 % in Ogun and 1.4 % in Kwara. Other sickness reported and treated were typhoid fever, skin rashes,

measles, dysentery and snake bite. There were three cases of sexually transmitted diseases in Kwara State. On further inquiry from the health center where these cases were reported, it was confirmed that gonorrhea and syphilis were the two diseases treated. The three cases were treated in adult male individuals.

Illnesses recorded among settled pastoral Fulani at the time of the survey cut across age groups and sex categories and differ mildly across the three states. In Oyo State, the age category 31 years and above recorded more illness (4.9%) than the other age categories while in Kwara state the age category 11 to 20years recorded more illness (3.6%) than the other categories. Seventeen (1.7%) cases of diarrhea were reported among children in Kwara State. In Ogun state however there were no obvious differences in the illness recorded among age categories. As for the sex of individuals affected by illness, there were no marked differences among male and female except in Kwara State where more female (5.7%) than male (2.8%) were ill.

All the cases of illness encountered at the time of survey were among settled pastoralists. It would be misleading however to assume that nomadic groups did not fall ill. The fact is that a sick nomad would probably be too weak to go out to herd animals. He would stay back at the encampment. This may explain our not encountering any sick nomad during the field survey. This position is also confirmed by the fact that a few nomads, particularly of the *Bororo* sub-ethnic group, were reported to have attended some of the hospitals and health clinics our research team monitored.

3.5.4 Vaccination and immunization

High levels of vaccination and immunization coverage is generally associated with low levels of communicable disease in a population. Information on vaccination was obtained from the vaccination cards, mother's report and primary health centers close to pastoral settlements. Result from our study show that in Oyo State about 51 % of the households immunized their children against Poliomyelitis, and less than 10 % of the population was immunized against each of Dipthera, Tetanus, Measles and Chicken pox. Similarly in Ogun state 51% received immunization against Polio, 43 % against Dipthera, 45 % each against Tetanus and Measles and about 55 % received immunization against Chicken pox. In Kwara state, 39% received immunization against Poliomyelitis, 11% against Dipthera, 6.6 % against Tetanus, 15 % against Measles, and about 7 % against Chicken pox.

In the three states, levels of immunization are quite low among the pastoral Fulani population below the national average in most states of the Federation. This may be due to the fact that most of their settlements are remote and inaccessible without the appropriate means of transportation. Settlements that were covered by the immunization programme were often close to major towns and in some cases the Fulani get immunized only when they visited hospitals or primary health care centres usually in distant locations from their settlements. The low immunization rates for poliomyelitis should be of particular concern because of its debilitating effect on the life of its victims and its wider effect on possible spread to areas where the disease had previously been eradicated.

3.5.5 Maternal health and child delivery

The level of household well being in any society depends on the health of its women. It has been shown in our study that the pastoral Fulani used modern health care services. This also includes the women. The state of maternal health was investigated in our study partly by examining the type of care Fulani women received during pregnancy and child birth. Table 10 shows the attendance of antenatal care services, the type of care received and the place of child delivery. The data in Table 10 show that about 30 % of settled pastoral women and 14 % of nomadic pastoral women received antenatal care services during pregnancy.

The number and timing of antenatal visits can be important factors in their effectiveness in preventing adverse pregnancy outcomes. Table 10 shows that over 69 % of settled pregnant pastoral women did not receive antenatal care services while about 14 % of pregnant nomadic pastoral Fulani women did not receive antenatal care services. The majority of those who received antenatal care services made just one visit to the health centre or hospital during their period of pregnancy. In some cases the visits were made because the women experienced problems with their pregnancy. This was common among the nomadic group. It would seem that the only reason why they sought antenatal care was because of the problems encountered during their pregnancy as over 85 % of the pregnant nomadic women attended antenatal care services just once. The remaining 15 % did not attend any antenatal care services. Among settled pastoral pregnant women who attended antenatal clinics however, there appear to be a clear understanding of the importance of regular attendance as a considerable percentage (at least 9%) of them attended the clinics regularly for up to four times before child delivery.

The quality of antenatal service received before and during child delivery depends on the source of care i.e. whether or not care is from medically trained personnel. Table 10 shows that only about 20 % of the antenatal care service providers were trained medically. All of them were either nurses or midwives. Medical doctors did not provide care for pregnant women in any of the health centers where Fulani women received antenatal care services.

Child delivery is a potentially hazardous process. The place of child delivery and the type of assistance a woman received during child delivery therefore are important components of reproductive health. Data in Table 10 indicate that only about 31 % of child delivery among settled pastoral women took place at either a hospital or health center. Among the nomadic group only about 14 % of child delivery took place in a hospital or health center. The remaining 85 % of child birth took place at home usually in the pastoralists' camp or hut. This may be responsible for the high maternal mortality and birth defects recorded among pastoral populations in the study area

Table 9: Maternal health and child delivery

<i>Antenatal Care</i>	<i>Settled</i>		<i>Nomadic</i>	
	Number	% age	Number	% age
Yes	67	30.88	05	14.30
No	150	61.12	30	85.70

	Number	%	Number	%
Quality of antenatal care				
Doctor	-	-	-	-
Nurse/Midwife	45	20.74	-	-
Birth Attendant	22	10.14	05	14.30
No one	150	69.12	30	85.70
Place of child delivery				
Hospital/Health Center	67	30.88	05	14.30
At Home	150	61.12	30	85.70

3.5.6 Mortality

One of the most stable indicators of the health of a population is mortality. Mortality was investigated in our study in two ways. The first is through verbal autopsy. Informants or household heads were asked to indicate the number of deaths recorded in the households in the last two years or as far back as they could recollect. The causes, circumstances surrounding the deaths, age and sex of the dead were also obtained.

The second method was through the hospital records obtained from health clinics and hospitals identified by pastoralists themselves. Table 9 shows the cases of mortality among the pastoral Fulani in the three states. Data in Table 9 indicate that over 43 % of cases of mortality were due to malaria among settled pastoral Fulani groups. Among the nomadic group, about 28 % of cases of mortality reported were due to malaria. Tuberculosis represents the second highest cause of mortality as over 10 % of cases of mortality among settled pastoralists were due to tuberculosis and over 48 % of the cause of death among nomadic pastoralists was due to tuberculosis.

Diarrhea was the cause of death among 6.8% of settled pastoralists. We found out during the survey that all cases of death due to diarrhea were among children below the age of twelve years. Other causes of mortality were child birth, birth defects, pulmonary/respiratory problem, typhoid fever and measles. Two cases of mortality due to motor vehicle accidents were recorded among settled pastoralists in Oyo State. Deaths recorded as a result of measles were among children in the three states. These deaths could have been prevented if there were higher levels of immunization among the pastoral Fulani. Deaths recorded as a result of child birth and birth

defects were perhaps due to very poor maternal/reproductive health and lack of ante-natal services for pastoral Fulani women.

Table 10: Mortality Among pastoral Fulani Households in the three States

<i>Cause of Death</i>	<i>Settled</i>		<i>Nomadic</i>	
	Number of Cases	*%age of cases	Number of Cases	*%age of cases
<i>Child Birth</i>	5	4.35	1	14.28
<i>Malaria</i>	15	43.48	2	28.57
<i>Tuberculosis</i>	12	10.43	3	48.86
<i>Birth Defects</i>	8	6.96	0	0
<i>Accidents</i>	2	1.74	0	0
<i>Diarrhea</i>	7	6.10	1	14.28
<i>Pulmonary/respiratory problems</i>	3	2.61	0	0
<i>Typhoid Fever</i>	8	6.99	0	0
<i>Measles</i>	12	10.43	0	0

Source: *Omotayo et al.,2005*

*Percentage of cases reported for each illness or condition.

3.5.7: Water supply

It is commonly established that there is a strong linkage between water supply, sanitation and health. As such, water supply was one of the areas investigated in our study. Tables 11a, b, and c show the various sources of water supply among the pastoral Fulani in Oyo, Ogun and Kwara States. Spring or river, hand dug well, borehole, and machine dug well, rain and pipe borne water were among the sources. The major source of water supply was rain water in Oyo as 65.9 % of households indicated that they obtained their water supply through it. There are only eight months of consistent rainfall annually in Oyo State. Rainfall as a source of water supply is therefore not reliable year round. The second most important source of water to the pastoral Fulani in Oyo state is stream or river. This again is not very reliable as many of the rivers in Fulani settlements are seasonal. Most rivers invariably dry up during the dry season.

For pastoralists in Ogun State, rivers provide water for the largest number of pastoral households. This could explain why most of them are settled along the two axis of the Oyan dam. It has been established however that most of the settlers along the dam risk exposure to schistosomiasis.

In Kwara State, hand dug well provides water for a large proportion of settled pastoralists. In the three states, very few households (0.9% in Oyo, 1.4% in Ogun and 0.2% in Kwara) had access to tap or treated water. In some of the settlements designated as grazing reserve in Ogun and Kwara, there were two locations with boreholes and deep wells. In a few of the settlements in the three states, there were hand dug wells. Water from hand dug wells were usually not well catered for and often contaminated. Water supply becomes very critical during the dry season when most wells and rivers dry up. As such many pastoral households travel long distances to obtain water for cattle and household domestic use

Table 11a: Sources of water supply for Patoralists in Oyo State

Use of water sources	Spring/River		Hand dug well		Borehole		Machine dug well		Rain		Tap water	
	No	%	No	%	No	%	No	%	no	%	No	%
Yes	91	11.4	178	22.3	31b	3.9	15	1.9	525	65.9	7	0.9
No	706	88.6	617	77.4	766	96.1	782	98.1	272	34.1	790	99.1

Table11b: Sources of water supply for Patoralists in Ogun State

Use of water sources	Spring/River		Hand dug well		Borehole		Machine dug well		Rain		Tap water	
	No	%	No	%	No	%	No	%	no	%	No	%
Yes	63	22.0	39	13.6	22	7.7	16	5.6	50	17.5	4	1.4
No	223	78.0	247	86.4	264	92.3	270	94.4	236	8.5	282	98.6

Table11c: Sources of water supply for Patoralists in Kwara State

Use of water sources	Spring/River		Hand dug well		Borehole		Machine dug well		Rain		Tap water	
	No	%	No	%	No	%	No	%	No	%	No	%
Yes	94	94.6	202	20.7	138	14.1	6	0.6	81	8.3	2	0.2
No	883	90.4	775	79.3	839	85.9	994	99.4	896	91.7	975	99.8

3.5.8 Spatial distribution of facilities

Physical accessibility of health services is determined by the geographical location of user residence in relation to available facilities, physical and topographical barriers and by the modes of transport that are available to reach these destinations (Tanser *et al.*,2003). Proximity to health care service center is commonly regarded as an important factor in access and usage. Considering the above we set out to determine the distances from pastoralists' settlements to selected service points related to human and livestock health. These service points are water supply points, health clinics/hospitals and veterinary centres.

Spatial analysis of access to facilities showed that the average distance from Fulani settlements in Oyo State to the nearest tarred road was 16km, nearest urban centre 11.9 km, nearest health clinic 7.1 km nearest potable water point 2.6km and to the nearest veterinary clinic was 9.7 km.

In Ogun state, the average distance from pastoral Fulani settlements to the nearest tarred road was 6.4 km, nearest urban centre 14.9 km, nearest health clinic 3.5 km nearest potable water point 1.6 km and the nearest veterinary clinic was 8.5 km. Kwara State presents a picture of relatively more widely dispersed pastoral settlements and distances from facilities as the average distance to the nearest tarred road was 6.6km, nearest urban centre 17.3 km, nearest health clinic 7.32 km, nearest potable water point 3.1 km and the nearest veterinary clinic was 18.3 km.



**Plate 3: A hand dug well in a pastoralist settlement in Kwara State
– Note the quality of water from the well**



Plate 4: A very shallow pond – Major source of water in a Fulani settlement

3.5.9 Changing lifestyle and nutrition among settled Fulani pastoralists

Nutrition among the pastoral Fulani of Nigeria is traditionally based on milk and dairy products complemented by grains obtained from trade or agro-pastoral production. Our study observed a high level of malnutrition of 38.7% among settled Fulani children. This is supported by similar studies in other parts of Nigeria where malnutrition was shown to be prevalent in semi-nomadic Fulani children.

Although the Fulani eats little, restricting caloric expenditure to about 1,700 kcal/day for male adults, and 1,540 kcal/day for female adults (Glew *et al.*, 2004), we observed that food habits and diets are changing, particularly among the settled pastoral Fulani. Dairy products are losing their dominance in the diets of settled Fulani as roots and tuber products are becoming increasingly dominant in their diet. It was observed that sedentarization has opened up new market opportunities for pastoral Fulani, and the increasing need for cash income to meet day-to-day requirements of sedentary living made it compelling to sell most of their dairy and milk products.

The sale of dairy and milk products are usually assigned to female members while the male member goes grazing with the herds. This has resulted in less availability of dairy and milk products for their children. This was also observed by Fujita *et al.* (2004), where starch was

replacing milk in the diet of sedentary pastoralists in northern Kenya. It is therefore likely that the reduction in the intake of milk products may be responsible for the high levels of malnutrition among settled Fulani children in our study.

These developments have implications for the nutritional status and health of settled pastoral Fulani populations. Contrary to the widely held assumption that settlement of nomadic pastoral Fulani's in grazing reserves will result in better nutrition, health and living conditions, studies elsewhere in Kenya among settled pastoralists indeed revealed that settlement diminished nutritional status.

In our study, out of the 331 pastoral children assessed, 38.7% were stunted, 38.7% underweight and 13.6% wasting. Since we did not assess children of host communities or fully nomadic Fulani children for comparison, it was difficult to determine if the levels of malnutrition observed were due solely to seditarization or not. Our study did, however, point to the fact that the change in food types and habits may have compromised the normally high protein diet often associated with the pastoral Fulani. This suggestion is supported by studies elsewhere, in which, for instance, among the children of settled and nomadic pastoralists in Kenya, malnutrition was three times higher in the settled children. Similarly, the percentage of children with severe and moderate malnutrition was four times less among nomads and pastoralists than among their settled counterpart in Somalia (Sheik-Mohamed *et al*, 1999). Recently, Schelling *et al.* (2005) also showed in a study in Chad that there was more malnutrition in settled pastoralist than in their nomadic group.

In our study, there was no variation in the level of malnutrition between boys and girls, suggesting that both genders were exposed to the same conditions of nutrition and dietary intake. However, there were variation in nutritional indicators between age groups for stunting and underweight, indicating that as settled Fulani children grew older, they are likely to become stunted and underweight.

Another possible factor for increasing malnutrition of settled Fulani children may be their living conditions. The Fulani lives in clusters of isolated settlements called "Gaa" with housing made up of mud and grass roofing. Boys who are of age are made to follow the herd from dawn to dusk with little food over long distances and difficult grazing terrains, while girls could hawk dairy products over long distances, to bring in cash for the family. The settlements are located very far from health care services that can provide health and nutrition education (Omotayo, 2003). Other nutritional indicators not assessed in this study but are also important, were iron and Vitamin A deficiencies. Nathan *et al.* (1978) reported iron deficiencies among women and children of Kenyan Turkana and Somali semi-nomads, while night blindness, probably due to vitamin A deficiency, was found among Fulani of Mali at the end of the dry season when milk production was lowest (Hilderband, 1985)

Plate 5: Typical Fulani hut – The door remains permanently open during the day because there is no window. This kind of structure predisposes the Fulani to mosquito bites



There is therefore the need to undertake a more comprehensive and in-depth analysis of nutrition and health of the settled Fulani children populations. Such studies become expedient, particularly as there is a growing number of settled Fulani population and sedentarization appear to have become gradually acceptable to the modern Fulani, not as a way of improving the pastoral production system in Nigeria, but because it offers new economic opportunities, such as trading and farming. For now, the use of food supplements and aggressive nutritional education by local health workers are necessary to reduce the current level of malnutrition observed in our study

We made some recommendations concerning the findings of this study. They include promotion of use of insecticide treated nets (ITN) as a first step in the fight against malaria, establishment of mobile or nomadic health posts, recruitment and training of pastoral community health workers from among pastoral Fulani households for human and livestock health services, participatory or joint development and ownership of facilities for water supply, special immunization programmes for pastoral populations, improvement in maternal and child health care services

and aggressive campaign on the prevention of HIV AIDS, and nutrition education for pastoral households settled in southwestern Nigeria.

Mr. Vice-Chancellor Sir, the foregoing presentation on the changing lifestyle, health, and nutrition of the pastoralist Fulani may appear unnecessarily lengthy. It can hardly be less than this as I have spent the last ten years of my career studying this exceptional but much misrepresented tribe of livestock producers in Nigeria. As we can see from this presentation, the challenges encountered by the pastoralist Fulani is not too different from that of the Yoruba, Ibo or Hausa crop farmer operating in any part of Nigeria

I would at this juncture like to focus on some of these challenges that have steadily contributed to the gloomy image of the Nigerian farmer in the last three decades. These challenges include climate change and economic meltdown.

4.0 Climate change

Let us introspectively consider the following statement by British naturalist and writer Richard Jefferies in his book *The Story of My Heart*:

“I verily believe that the earth in one year produces enough food to last for thirty. Why, then, have we not enough? Richard Jefferies (1848 - 1887)”

That statement suggests that the earth in its natural, pristine state, without the upset of development, is capable of producing enough food in one year to last humanity thirty years. Incredible as this might sound, it is incontestable that man’s inconsiderate and brutal handling of the earth over the years has brought notable changes and untold hardship to humanity particularly in the last three decades. The most profound of these changes are in the area of climate and its effect on food production.

4.1 What is climate change and how has it affected agricultural production?

Simply put, climate change is the alteration in the existing weather conditions over a period of time attributed mainly to greenhouse gas emissions and other causes. The manifestation of this change can be seen in the ecology, rainfall pattern, temperature, humidity, humans and livestock adaptation. Globally according to Altieri and Koohafkan (2008) humans have changed the ecosystems over the past 50 years more rapidly and extensively than in any comparable period of time in human history. It has been noted that food production increased by roughly two-and-a-half times, water use doubled, wood harvests for pulp and paper production tripled, and timber production increased by more than half (Stockholm Environment Institute 2007).

Coming closer home, some of the visible changes around our ecosystem in Nigeria linked to climate change in the last three decades are in the area of deforestation, declining areas of wetlands and seasonally inundated lowlands(i.e. *Fadama or Akuro*), shorter duration rainy seasons, and longer dry seasons, drought, flood, declining biodiversity, gradual disappearance and outright extension of some flora and fauna, changing response by crops and livestock to environmental changes and gradual adaptation of farmers to the changing bio-ecological system and the destabilization of long-established production systems via stresses such as water

shortages, salinity, aridity and heat which has increased, in the light of a growing demand for food.

Scientists have expressed further concern about the expected increase of bio-fuel monoculture production which may lead to increased rates of biodiversity loss and genetic erosion. Across the country, politicians, particularly State governments are scrambling for investors in the area of bio-fuel production in many States of the Federation. In Ekiti State for instance, about two major investors are in the process of establishing bio-fuel production plants. – The first one is with the use of cassava and the other with the use of sweet sorghum. Vast areas of land are being cleared with heavy duty equipment, much of the hugely forested areas appear to be the most attractive locations for these investors.

Forests are being converted to non-food production systems, water resources are becoming scarcer, and climate change plus shrinking biodiversity are threatening the viability and long established production systems of farming communities. Not much consideration is being accorded how to safeguard biodiversity for food and agriculture for future generations as well as maintain a broad gene pool which ensures ecosystem resilience.

Scientists have expressed major concern over areas where subsistence agriculture is the norm, because a mere one ton yield decrease could lead to major disruption of rural life (Jones and Thornton 2003). Conversely, some have suggested that small farms and traditional agricultural system can actually be part of the solution by contributing to climate change mitigation, through carbon conservation, sequestration and substitution, and establishing ecologically designed agricultural systems that can provide a buffer against extreme events. The diversity of these systems, and the creativity and knowledge of local farmers and other members of the indigenous communities are regarded as valuable assets for solving the daunting problems affecting agriculture as a result of climate change.

4.2: Specific signs or impact of climate change on farming observable locally

There is clearly no credible scientific evidence on the effects of climate change in Nigeria because there has not been any empirical study known to us to ascertain the impacts on it anywhere in the country. However, we see various changes around us which point to possible effects of climate change. Some of these changes from personal observations are highlighted below:

- Climate change disrupts cropping calendar. The cropping calendar in various ecological zones has been visibly altered in the last few decades. For instance, in the past it was very safe to go ahead and start planting some arable crops such as maize, rice, cassava, melon and others between February and March in much of the southwest farming system and ecological zone. Planting of these crops appear to have now been shifted permanently to late April and early May when rainfall become steady. This is because of late rains and shorter duration of raining season.
- Some localities where banana and plantain were freely cultivated rain fed in the past without supplementary irrigation particularly in some parts of the southwest and

middle belt farming system zones now require supplementary irrigation for these crops to do well because of shorter raining season and increased temperature.

- Frequent bush fires and the loss of several hectares of tree crop farms particularly cocoa, due to fire outbreaks point to increasing fragility of the ecosystem as a result of longer dry seasons and higher temperatures.
- Yield and fruiting calendar of some tree crops have been visibly altered. For instance from my personal observations, although not yet verified and documented scientifically the yield of mangoes appear to have decreased and mangoes now flower and fruit twice a year. In Ogun State for instance, Mangoes flower between November and December and fruit in March/April. Between April and May, mangoes begin a second round of flower production with the fruit maturing between June, July and August. This could probably be attributed to changes in temperature and perhaps photoperiod or day length both of which are parts of the elements of climate change.
- From personal observations water melon production which used to be exclusively confined to the northern parts of Nigeria where it is produced rain fed and through irrigation is now produced in much part of the southwest farming system zone where high humidity in the past might have restricted its production. There is evidence that humidity have been reduced considerably.
- From further personal observations, yam production which appeared to compulsorily require staking in the past in the southwest is now grown by migrant farmers without staking. Although there is no empirical investigation concerning its yield and performance using this method, there appears to be no major problem growing yam using this method in the farming system/of the southwest. This no, doubt, is an important subject of investigation for scientists.
- There is increased cropping of wetlands, lowlands and seasonally flooded areas particularly in the southern or coastal areas. Around Lagos and other states in the southwest, wetlands are increasingly being put to the cultivation of vegetables and garden crops. This may not be due entirely or directly to climate change but the most powerful consequences of climate change arise when a chain reaction magnifies the effects of rising temperatures. First there is water scarcity, water scarcity reduces the amount of arable land and thereby aggravates food security. This forces many people to migrate from their own places of origin to look for other means of livelihood or practice farming in other localities where the conditions are more favorable. What might have happened here is that lower levels of rainfall reduce the arable lands in the arid and semi arid areas of Nigeria forcing many farmers from that part of the country to migrate to the south. This might explain the reason for the large number of northerners involved in the use of wetlands for vegetable production in the coastal areas and southern states of Nigeria.
- Perhaps one group of people that appear to have been most knowledgeable and have taken decisive action about climate change in Nigeria for over three decades now are

the pastoralist Fulani. This groups who are mainly cattle herders were once practicing transhumance or nomadism i.e. moving seasonally with their cattle from the northern part, semi-arid and arid zones of Nigeria to the south parts, sub-humid and humid in search of pasture. That seasonal movement stopped a long time ago. Many Fulani pastoralists are now semi-sedentary or fully sedentary in the sub-humid and humid zones. Omotayo *et al.*, 2003 and Omotayo 2004 have extensive documentation of the changing lifestyle of the Fulani in the humid zone of southwestern Nigeria.

- Reduced crop yield results in loss of income for farmers and eventually malnutrition. Health issues arise that could further slow down economic activity as family members becomes too weak to work. With time, worsening environmental conditions combined with financial instability may force populations to migrate. Migration can then become a catalyst for social unrest if increased population density in the place of refuge causes resource scarcity. This has been partly responsible for the incessant restiveness and sometimes violent conflicts witnessed in the last two decades in Oke-Ogun area of Oyo State among sedentary farmers and pastoralist Fulani herders

Generally, studies in some other parts of the world indicate that climate change has brought in its wake increased levels of household food insecurity and poverty, reduction and loss of income, high food prices, intensification of migration out of agriculture, increased risk of conflict over use of resources, increased morbidity and mortality of humans and livestock as a result of changes in pest and disease regime and increased unemployment levels.

5.0 Economic Meltdown

The term “Economic meltdown” emerged in the development literature just recently. The concepts that most of us are familiar with is economic recession or depression. Broadly defined, it is a decline in a nation's economic activity. The consequences typically include increased unemployment, decreased consumer and business spending, vanishing demands, and declining stock prices. Recessions are typically shorter than the periods of economic expansion that they follow, but they can be quite severe even if brief. Recovery is slower from some recessions than from others. The global financial crisis started to show its effects in the middle of 2007 and into 2008.

Around the world, stock markets fell, large financial institutions collapsed, and governments, including the wealthiest nations had to come up with rescue packages to bail out their financial systems. In Nigeria, rise in food prices, the fall in stock markets, rising inflation, low capacity utilization by industries, high lending rates, scarcity of credit for the productive sector of the economy and the instability in the financial markets and banking sector were the major visible effects.

Commenting on the economic meltdown around the world and Nigeria, Soludo, (2009) noted that resource and capital flows around the world were frozen up. According to him, “Nigeria depends for more than 95 percent of its foreign exchange on oil and the price has crashed to the extent that from about July 2008 the outflow of foreign exchange has actually far outstripped the inflows”. The causes of this economic meltdown in Nigeria are overdependence of the nation on

petroleum as a source of income - Nigeria obtains over 95% of its revenue from oil; Resource mismanagement (not just petroleum but also natural gas); countries like Malaysia and Singapore in the 1970's had the same revenue with Nigeria, similar GDP, but today their revenue/and GDP is over ten times that of Nigeria; Niger-Delta militancy activities; this factor worsened the situation as the quantity of crude oil produced per day dropped due to the activities of militants such as kidnapping and damage to oil installations; dependence on imported goods including food; the debt game (on all levels); Nigeria as a country is still heavily indebted to The World Bank and International monetary fund (IMF); changing dynamics of population because of inadequate planning ; and outright corporate greed exhibited by Chief Executives of various companies and service providers.

5.1 How has Economic Meltdown Affected farming and the farmer in Nigeria?

Despite what appears to be a huge investment in agricultural development these past few decades, Nigeria is yet to attain self sufficiency in food production. A large proportion of the population is still food insecure. Agriculture is yet to be fully modernized. A large number of our farmers still do not have access to improved production means and techniques. Lack of access to credit by farmers has been worsened by the economic meltdown. Even with commodities in which we are reputed to be leading producers, for instance cassava, with about 35 million metric tons annually, Nigeria tops the list of major producers in the world our yield and production per hectare is still one of the lowest in the world. See Fig 4.

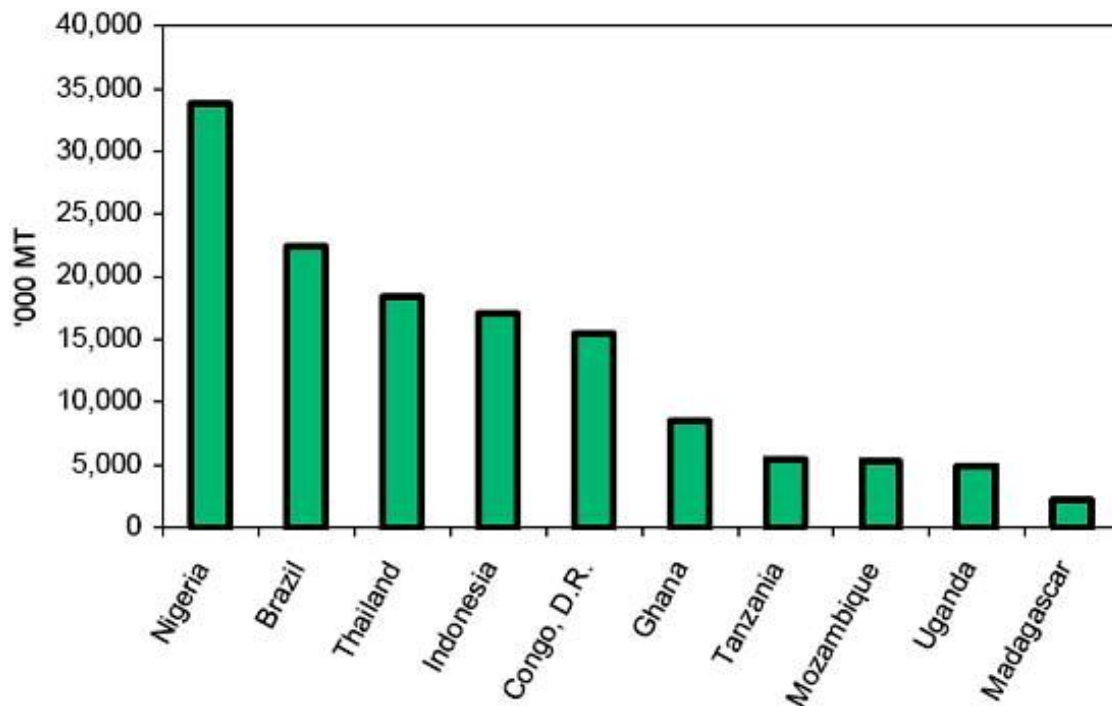


Fig 4: Cassava production in the world

Mr. Vice-Chancellor Sir, although the economic meltdown did not affect the funding of agriculture negatively in the last two years as the budgetary allocation to the sector increased to between 6 and 7 percent of the National budget from less than 3 percent in the past, the fact is that only a very small proportion of the budget actually goes into activities that support direct farm production. Much of the funding in the agricultural sector goes into paying salaries of civil servants and awarding contracts for procurement of goods and services which do not necessarily support farm production activities at the grassroots level.

In a recent review carried out by the International Food Policy Research Institute (IFPRI), it was concluded that agricultural spending in Nigeria followed government agricultural policies however spending was highly concentrated in a few areas. According to the study, three programs accounted for more than 81 percent of total spending: procurement and distribution of fertilizer, the National Special Program for Food Security (NSPFS), and buyer-of-last-resort grain purchase. Nearly 60 percent of total capital spending goes to government purchase of agricultural inputs and agricultural outputs alone. According to the study, in several instances, public funds are implementing approaches that differ significantly from those described in policy documents. And funding is very low for a number of activities considered vital for promoting agricultural productivity gains leading to pro-poor growth, such as basic and applied agricultural research, agricultural extension and capacity building, agricultural finance, irrigation development, and agribusiness development.

5.2 Food Crisis and the effects on the Nigerian farmer

The major sign of the food crisis in Nigeria is the rising food prices. Between the year 2007 and 2010 prices of major staples increased by over 50 percent. The price of rice in particular rose by over 100 percent. Early in year 2008 there was a severe shortage of rice in the market as major exporters of the produce such as Thailand, China and India banned the exportation of the commodity.

This development ordinarily should be good news to the Nigerian farmer since that should mean a bigger and more lucrative market for his produce. However, the combined conspiracies between the Nigerian elite who insists on eating imported rice, the smuggler who ensures that imported rice floods the market, and the Nigerian law enforcement agencies who look the other way while rice was being smuggled through our borders, after having their palms greased, ensured that the Nigerian farmer was denied that opportunity of earning higher incomes.

Although some people believe that there is no food crisis in Nigeria, the country was listed by the World Bank early in 2010 as one of the countries with the largest domestic large food price increase among 58 countries surveyed by the FAO. According to the FAO, the price of sorghum which supplies at least 13percent of the daily calories among the staples in Nigeria rose by 50percent.

Increases in the price of major staples are bound to affect food security and nutrition. If these price increases in domestic markets represent a general increase of similar magnitude across the cross section of caloric sources available, then the impact on food security and overall nutritional quality can be described as significant. Recent nutritional surveys particularly in the rural areas

in Nigeria indicate acute malnutrition among children (Ekpo *et al.*, 2008). Food prices are only one factor affecting undernourishment. It is commonly estimated that the down turn in global economic growth in 2009 may have led to an additional 41 million undernourished people compared to what would have happened if the economic crisis had not occurred. The combined possible effects of climate change, economic meltdown and food crisis on agricultural development in Nigeria is such that extension practitioners need to be alert and more focused in order to remain relevant in devising and implementing mitigation strategies in the years ahead.

6.0 Aging farm population

One other major problem with agricultural development in Nigeria is the aging farm population without sustainable replacement. The average age of the farmer in Nigeria according to literature is 65 years. In most societies including Nigeria, people who are 65 years and above are already retired from active work or service. This is because young people do not want to take on farming as a profession mainly because of its inherent association with poverty in Nigeria. A well articulated intervention programme should therefore be put in place to encourage young people to take farming as an occupation.

The Millennium Farmers Project (MFP) implemented in Ekiti State during the 2008 farming season is an example of such projects for encouraging young people to become farmers. The idea of the MFP is to introduce farming to young people such that they would earn incomes commensurate with that of their counterparts in the banking, telecommunications and petroleum sectors of the economy.

This idea was tried in Ekiti state during the 2008 farming season on a pilot basis with twenty young graduates. They were given a loan of between N1.5 Million and N2.0 Million under a carefully supervised integrated farming system established for each young farmer. Each farmer was given a two room detached house on the farm. The farm was equipped with a central 40kva generator, sporting and recreational facilities, and subscription for DSTV for one year. The report in Box 1 below was submitted to the State government by the officer in charge of the project after I had left Ekiti State as Commissioner for Agriculture in May, 2009.

Box 1: The Millennium Farmers Project in Ekiti State

The Millennium Farmers' Project (MFP) was introduced and formally launched by then Honourable Commissioner for Agriculture and Natural Resources, Prof. Akin Omotayo on Friday, 30th of May, 2008 at the Orin Farm Settlement. Twenty participants are currently involved in this pilot scheme and were given a 2-bedroom accommodation each, recreational facilities and a 40KVA generating set to make their production activities easy and provide leisure. Work started earnestly in June with land preparation for crop production. A total of 40Ha was cultivated for maize/cassava intercrop resulting in each participant having 2Ha. Each participant later had 0.5Ha of irrigated plantain and 1.0Ha of soybean as part of crop production venture of the project. The participants were encouraged to grow vegetables. The maize component of the maize/cassava intercrop had been harvested and sold at the time of filling this report. The yield (average 1.2 tons/ha) and income from maize alone appear promising being the very first time most of these farmers would get involved in farming. In the livestock component of the venture, each participant was allowed a choice between poultry and piggery production. 10 participants selected poultry and the remaining 10 piggery. For the participants in the poultry option, housing and cages were provided to accommodate the 180 point-of-lay birds allocated to each person. They were supplied feed for 70 days during which the birds reached about 70% laying efficiency. They are already getting 5 crates of eggs average per day as at now. Pig's pens, 1 boar and 3 in-sows were supplied to the piggery option participants. Feeding fee of N25, 000 per month was given to each participant for feeding the pigs under close monitoring. The pigs are 5 months old and more than 83% of the in-sows had given birth at the time of this report

.In the fisheries components of the venture, each participant was provided with 2 concrete tanks with the capacity of holding 1000 adult catfish in a flow through system of production. Each participant therefore had 2000 juveniles to rear to table size. Fish feed is to be supplied for 6 months before marketing. The first sets of juveniles were stocked on the 2nd December, 2008. The fish had normal growth and are healthy. However, shortage of water for frequent water replacement of the tanks has become a bit of a worry. Average fish weight versus their age was normal

The 10 bee hives each of the participants had been fully colonized by bees. The plantain and cassava farms are doing well. Most participants are very serious with the programme. Some have even extended the ventures allocated to them. For example, Mr. Sola Adeleye has bought extra 100 point-of-lay birds to increase his stock to 280 birds while a pig farmer, Mr. Kehinde Olatoye, who wants to have the poultry production experience, has completed a housing unit for poultry that could accommodate 400 birds.

The seriousness of each farmer continues to reflect in their performance and income. While absentee farmers such as Mr. Fagbuagun Samuel experienced losses in crops and animals, lazy resident participants such as Mr. Ojo Michael Omotunde was not spared the losses too. Effort is being made to increase supervision to those categories of participants. This was used to categorize each participant's loans to High Risk, Medium Risk and Low Risk.

It is pertinent to say that the Millennium Farmers' Project has achieved its objectives of creating employment and income for youths in Ekiti State. The attitude of youths to farming is changing and those that are very serious are having commensurate income.

I am extremely grateful to Governor Segun Oni of Ekiti State for appointing me as Commissioner for Agriculture and allowing me to put to test this wonderful idea in Ekiti State. I was informed that the Governor has continued to support the MFP even after I left Ekiti State. The lesson here is that Universities and particularly the Universities of Agriculture should take the lead in designing innovative strategies that would keep farming going without the kind of interruption envisioned as a result of aging farm population

7.0 The Farmer and the crown

Mr. Vice-Chancellor Sir, I did mention in the earlier part of this inaugural lecture that the farmer once had a splendid and enviable image in our traditional society. Then the farmer was rhetorically referred to as King among the Yoruba with the common saying- *Oba lagbe* or *Agbe loba*. If this was not just an appellation or mere label, or a comical flattery, the Nigerian farmer's image then, one can imagine, was almost similar to the kind of image the present day average American, British or Japanese farmer enjoys. The concept king infers royalty or a ruler vested with authority over a town, state, nation, or tribe, usually for life. What this means is that a king is powerful, influential and rich. He lives in affluence, preeminence and majestic splendor. One of the paraphernalia of a king is the crown. Considering the analysis on the dismal plight of the Nigerian farmer of today in this inaugural lecture, would it not be ludicrous to refer to him as King?

8.0 Recommendations and Conclusions

8.1. Subsidy

The issue of subsidy has been widely debated in Nigeria. Some have suggested subsidization of outputs rather than input because input subsidization have been found to be fraught with problems. Whichever system is adopted, there should be some sort of subsidy to protect the farmer and ensure that he continues to produce no matter the situation. This is the major secret that has kept farmers in business in some other parts of the world particularly the industrialized nations such as Britain, America, Germany, Japan and France.

8.2 Advocacy for improvement in farmers' support services and welfare.

We should understand that agriculturists and extension practitioners are in business simply because the farmer is there doing business. Extension practitioners should therefore not limit their operation to technology transfer. They should get involved in advocacy for the improvement of farmers welfare, rural infrastructure development and pro-farmer policy interventions particularly in the area of price support for farm products.

8.3 Irrigation development

Despite considerable potential for development and the emphasis placed on irrigation development in many development plans, only four percent of the cultivated area in Nigeria is presently irrigated. The area actually under irrigation is officially estimated at about 220,000 ha, or less than one percent of the total area under crops. The contribution of irrigated agriculture to total crop production continues to be small and is significant only with regard to specific crops, including wheat and sugarcane, and to some extent rice and vegetables. There should therefore

be emphasis on developing irrigated agriculture not just in Northern parts of Nigeria but also in the southern parts so that farming can go on year round. This will require a lot of retraining of extension personnel and irrigation experts particularly in the southern part of Nigeria. The establishment of the national water resources network for research and manpower development across the country recently is a right step in the right direction.

8.4 Involvement of Local governments in agricultural development and extension services

Extension is essentially grassroots activity. Reaching the farmers with innovations at the grassroots level should necessarily be in the remit of the Local governments which is the closest arm of the government to the grassroots. There is therefore no better arm of the government to get extension activities going than the local governments. Their involvement will help reduce the Extension-Farmer ratio which is presently unacceptably high.

Local governments in Nigeria have not been playing the roles assigned to them in the agriculture sector adequately. Some may argue that inadequate funding hampers LG involvement in agricultural development in Nigeria. It is on record that even when funds were available, Local governments did not manage their resources well. It is therefore important to find lasting solution to the problem. There is the need to leverage more funding for the LGs for them to perform effectively to achieve national food security on a sustainable basis. Given the experience about public fund management by local government agencies in the past, more funds may not necessarily translate to better performance if funds are not tied to projects or released conditionally.

The introduction of conditional grants will not only allow the LGs to actualize their constitutionally mandated roles in agriculture it will also ensure that funds allocated through such grants are spent specifically on projects they are meant for. It will also lessen the fiscal constraints of the LGs and allow them to invest in those important areas that will enhance service delivery and make visible and rapid impact in their locality. The Conditional grant scheme has been tried in the implementation of the Universal Basic Education Programme and some aspects of the MDG with visible success across the country.

8.5 Re-orientation of extension practitioners.

Extension is becoming a very attractive field to many scientists who did not have background in either Extension Education or Rural Sociology. Engineers, Health Scientists, Crop breeders, Animal Scientists, Economists and experts from other disciplines are branching into extension practice and are making a big success of it. In most cases, they are having much more visible impacts and better recognition by the donor community than those with basic training in Extension. Why is this so? It is simply because they often demonstrate deep knowledge of the subject matter and formulate effective means of getting their messages across to their clients more competently than those with training in the field.

What this means is that if care is not taken many professionals in extension could be edged out if there is no conscious effort to reinvent the profession in line with present day realities. Emphasis on strengthening subject matter competence and expertise should be accorded priority. It should serve as a condition for awarding degrees or for accreditation of practitioners in the field. We

should vigorously pursue a policy that would guarantee a future for present day practitioners in the field by strengthening their subject matter skills. The challenge of climate change in particular makes it imperative to diversify the extension practitioner's spheres of expertise. Areas such as agro-meteorology, Information and Communication Technology (ICT, Geographical Information Systems (GIS), Conservation farming, Organic Agriculture, Irrigation and Watershed management, among others should be incorporated into the core areas of competency training for extension workers in Nigeria. This can be achieved through short courses, seminars, workshops, and direct on the job training.

The combined problems of climate change, economic meltdown and the food crisis present new and more daunting challenges to extension service than ever before. In essence, more proactive strategies selected from best practices from around the world need to be considered to mitigate their effects.

8.6 E-Extension, Mobile phones and other mass media

There is need to make better use of the existing mass media, such as Television and radio, traditional communication media, workshops and conferences, the printed media, magazines, newspapers, web-based media, email messages and other internet media to continually empower the farmer for improved productivity.

The mobile phone is increasingly becoming a tool for grassroots mobilization and information dissemination in Nigeria. Over 20 percent of the rural areas in Nigeria can now be reached by mobile phones. This is expanding rapidly and in less than ten years from now, over 60 percent of the rural landscape in Nigeria will likely be covered by mobile phone networks. Extension practitioners should take advantage of the wide reach of the mobile phone and develop simple, flexible and accessible instruments that can make it a veritable resource for reaching farmers with timely extension messages. I read in a news bulletin recently that Nokia telephone Company is presently in the process of developing a mechanism for achieving this in collaboration with the National Agricultural Extension and Research Liaison Services (NAERLS), Ahmadu Bello University, Zaria. This is a right step in the right direction. I firmly believe that UNAAB as an institution with mandates for developing technology and reaching out to farmers with innovations that can help lift them out of their present poverty and dire situation should take the lead in developing instruments that will make the mobile phone an effective tool of innovation dissemination to farmers in Nigeria.

8.7 Training of agriculture graduates

One of the important reasons for setting up the Universities of agriculture is to train a cadre of men and women who will take farming as a profession rather than look for white collar jobs after graduation. With the current methods where the practical aspect relies completely on hoes and cutlass, very much like that of the peasant farmer in the village, it is impossible to get young people to develop interest in making a career in farming. We should therefore undertake a comprehensive review of the training curricular in line with the original objectives of setting up the Universities of Agriculture. We must train our students to become managers of farms that are fully mechanized. It is not feasible to operate on hoes and cutlass and expect young people to embrace farming as a career. It is also not realistic to rely on hoe and cutlass and expect that we

would someday be self sufficient in food production. The starting point should be to train our students on mechanized farming and empower them to be able to farm based on the best practices around the world.

8.8 Policy on livestock development should be broadened to take care of settled Fulani pastoralists in southern Nigeria

Nigeria's policy on livestock development has always had its main focus on the northern parts of the country. Our research on the pastoral Fulani has shown that there are close to 100,000 settled pastoralists in the southern part of Nigeria. Much of the literature on the Fulani still refers to transhumance and nomadism as the popular mode of livestock production among this group. Things have changed. The policy must therefore change. The nomadic school introduced in the 1990s is assisting the education of the Fulani. We suggested in a section of this inaugural lecture the establishment of mobile or nomadic health posts, recruitment and training of pastoral community health workers from among pastoral Fulani households for human and livestock health services, participatory or joint development and ownership of facilities for water supply, special immunization programmes for pastoral populations, improvement in maternal and child health care services. It is possible that some of the suggestions have been part of the livestock development policy in the northern part of Nigeria. If this is so, the focus of implementation should now be broadened to include the southern parts of Nigeria.

8.9: Minimum guaranteed price for farmers

A major problem with farming in Nigeria which has helped to reinforce and perpetuate the farmers' dismal plight over the years is the inappropriate pricing of farm produce. The average Nigerian farmer produces a cob of maize at ₦20 and is forced to sell at between ₦5 and ₦10. In essence the Nigerian farmer subsidizes every consumer to the tune of between 50 and 100%. This is as a result of many factors including lack of storage facilities, limited access to credit, and huge indebtedness of the average farmer during the production season, and lack of record keeping.

The day the Nigerian farmer starts keeping records of his production activities is the day he will start demanding for appropriate pricing of his produce. Although the minimum guarantee price scheme is already in place, it has not addressed the problem of pricing comprehensively. Cost of inputs, rural transport and storage are high, adversely affecting the adoption of modern and improved technology. Most farm and agro-processing operations are carried out manually, using locally made simple hand tools. The issue should be addressed if we must help the farmer to obtain that crown of glory that has been hitherto elusive.

9.0. Nigeria needs strong leaders to build strong institutions

Mr. Vice-Chancellor Sir, permit me to use this occasion to comment on some issues concerning development and leadership not just in politics but also in the Nigerian society at large. I strongly believe that every Nigerian has contributed in one way or the other to the crisis of leadership that we are all witnessing today and indeed with more coming from the followership than the leadership. Those of us who by accident of event found ourselves operating in the political arena, even if for a very short while, found out rather rudely that corruption does not only walk tall and

freely in broad daylight on the streets of our country, it receives warm and friendly embrace from everyone. Anyone who fails to embrace it quickly realizes that he or she is an outsider.

Although the searchlight on corruption has always been on the leadership, I have come to realize that if corruption must be fought to a standstill in Nigeria, we must first purge the followership of the terrible syndrome and mentality of “this is your time and chance”. Invariably it is the followership that instigate, aid and abet corrupt behavior in the leadership because of the little that usually accrues to them from its proceeds.

During his historic visit to Ghana in July 2009, President Obama of the USA had the following to say concerning leadership in Africa: “Make no mistake: history is on the side of these brave Africans, and not with those who use coups or change Constitutions to stay in power. Africa doesn't need strongmen, it needs strong institutions.” While agreeing completely with president Obama's position, I dare to affirm that Nigeria may not need “strongmen” but we need strong leaders to build strong institutions. America's enduring institutions which support its strong democratic systems were built by strong leaders. Indeed, America prides itself in electing and appointing strong leadership into political and public offices. By our reckoning, a strong leader is not that stereotypical tyrant or the prosaic weapon wielding soldier. Rather he or she is the one who understands and plays by the rules without cutting corners. The strong leader is knowledgeable, competent, forthright, fair, incorruptible, and transparent in all dealings and genuinely God fearing. He or She would not manipulate the followership or be manipulated by them. We need this sort of leaders to build strong institutions that would help develop and sustain a democratic system and culture for enduring peace, equity and stability.

10.0 Acknowledgments

Mr. Vice-Chancellor Sir, I have been very specially favoured by God Almighty, the creator of the Universe in so many ways. In spite of my humble background as a child of a peasant farmer, God has been faithful to me and my family all the way. Reflecting deeply on all the events that brought me to where I am today, I have come to realize that there is always the inner push in all of us that drives us towards our divine destiny. That inner push is nothing but God almighty. Neither the circumstances of my birth, nor the environment that nourished me, provided the necessary substance or raw material that could lead to the production of the finished product that has held all of you here “captive” since over an hour now. So, all glory, honour and adoration belong to God almighty.

I am a late comer into academics. I started my academic career at the National Agricultural Extension and Research Liaison Services (NAERLS) Ahmadu Bello University Zaria as Assistant Extension Specialist in 1990. Then I was working on my PhD in the Department of Agricultural Economics and Rural Sociology, Institute for Agricultural Research (IAR), Ahmadu Bello University, Zaria. I have had the good fortune of meeting highly knowledgeable Professors who gave me a head start in academics. They include Professors Tunji Arokoyo, T. K Atala, L. A. Ega, A. O. Ogunbile, J. O. Olukosi, Jacob P. Voh, my good friend Professor Dayo Phillip and late Dr. S. A. Ogunwale who were all instrumental to the successful take off of my academic career in Ahmadu Bello University Zaria. I am grateful to them all.

I came from Ahmadu Bello University to join UNAAB in 1997. I came in company of some friends and colleagues who have played very active roles in supporting me and my family in so many ways and to them I owe a debt of gratitude. They include Dr. and Mrs. Elemo, Professor O.A.. Osinowo, Professor and Dr. Mrs. Bodunde, Professor S.T.O. Lagoke and Dr. and Mrs. Johnson Adewumi

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I have had research collaboration with scientists in virtually every College in the University. From the College of Natural sciences Dr. Friday Uwem Ekpo; College of Environmental Management, my beloved brother and young friend, John Oyedepo; College of Engineering, Dr. Johnson Adewumi, Dr. Olayanju ; College of Animal Science and Management, Professors A.B.J. Aina, and I. F. Adu; College of Veterinary Medicine, Professor M. A. Dipeolu; College of Plant Science , Professor Olowe and Dr. Johnson Adesodun; and College of Agricultural Management and Rural Development, Dr Mure Agbolahor Although some of the studies carried out jointly with some of these scientists could not be reported here because of the focus of this inaugural lecture and space constraints, I am grateful to all of them.

I have enjoined the support of numerous donor organizations during my career and I am grateful to them all. They include: The Wellcome Trust, UK, UK's International Institute of Environment and Development (IIED), UK's Department for International Development (DFID), Promoting Pro-Poor Opportunities in Service and Commodity Markets (PropCom) and the International Food Policy Research Institute (IFPRI).

I have been privileged to work with two Vice-Chancellors in UNAAB in the past i.e. Professor Julius Okogie and Professor I. F. Adu. I am particularly grateful to Professor Okogie for giving my wife a job in UNAAB. I am grateful to Professor Adu for initiating the first study that later got me external research grants that enabled me to carry out numerous studies among settled Fulani pastoralists in southwest Nigeria.

There is something about the leadership style of our present Vice-Chancellor, Professor Oluwafemi Olaiya Balogun that has been grossly misunderstood by some people in UNAAB. Leaders who want to do the right thing all the time are not always popular in Nigeria because they always get into conflict with those who want to circumvent established standards and regulations. Some of us have come to accept the fact that while there are no perfect leaders, one

should recognize and support leaders who strive to provide leadership that ensures the greatest good for the greatest number of people. I personally believe that Professor Balogun is a rare gem. He has transformed the physical landscape of UNAAB by planting more buildings than he met on ground in less than three years of his tenure. I thank him particularly for giving me the opportunity to be part of the good work he is doing by appointing me as a Director of a unit in the University.

I am eternally grateful to my parents, late Mr. Peter “Bicycle” Omotayo and Mrs. Elizabeth Ado Omotayo for supporting my education all through, even after I got married. I am grateful to Bishop and Mrs. Akomolafe for their support and direction early in life which enabled me to enter secondary school at the age of twelve years even when my father almost truncated it out of ignorance.

My Darling wife, friend and “Pastor in my home”, Mrs. Folakemi Mary Omotayo I can never thank her enough for loving me wholeheartedly and for supporting my ambition all the way even at the expense of her own personal development. I am also grateful to my in-laws, Mr. Ayedun Oso, Dr. Adeyemi Adejuwon and Mr. Julius Oso who supported and encouraged my wife during our trying times. My three lovely children, Tola, Tope and Omowaleola, I thank you for being good children and making it easy for me to leave home confidently anytime in pursuit of my ambition and coming back to find out that all is always well.

Mr. Vice-Chancellor sir, this is the journey so far. I believe there are new grounds to break, more mountains to conquer and many more dreams to realize particularly the dream of crowning the Nigerian farmer as of ages past. Together we, academics and experts in the field of agriculture in Nigeria, can realize that dream if we understand that after all, we are academics, researchers or experts in the areas of Agriculture because there is farming as an occupation and there is the Nigerian farmer. Together we must all strive to make farming an enviable occupation and enthrone the farmer as King again. It is when that crown ceases to elude the Nigerian farmer that Professors and experts in the field of agriculture in Nigeria can, as individuals and as a group, boldly and conscientiously affirm like Apostle Paul in 2 Timothy, 4: 7 that “I have fought the good fight, I have finished the race and I have kept the faith. There is laid up for me the crown of righteousness..... ”

I thank you all for listening.

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