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Enhancing Food Sufficiency through Agricultural Mechanization in Nigeria

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Abstract

Nigeria has set an ambitious target to become one of the top 20 economies in the world by the year 2020. The major drive is to set a solid foundation for sustained rapid socio-economic development which will depend upon synergies among the key sectors of the economy. The fundamental value of Agriculture in the development and growth of the Nigerian is indicated in its contribution as a source of food and raw materials for agro-industrial processing and the linkage effects with employment, national income, market opportunities for industrial output and reduction in poverty and health improvement. Of the numerous benefits from Agricultural, Nigeria has grown to rely heavily on earnings from oil exports without making the investments needed to diversify the economy through sustained agricultural growth and development of other non-oil sectors. In order to improve agricultural productivity, co-operate organization and Government interest in agriculture especially agricultural mechanization must be aroused; this can be achieved through policy development and frame work, funding and establishment of Research Centers; the provision of credit and infrastructural facilities to manufacturers and farmers alike. The future prospects for Agricultural Mechanization in Nigeria strongly rest on the development of machines and equipment locally, along with the adaption of new designs and innovation in Agricultural mechanization technology from imported equipment's and machines and finally the building and development of expertise for maintenance and sale of powered machines. This paper looks at the prospects of agricultural mechanization as a good strategy to ensuring food security and sufficiency in Nigeria.

Key words: *Agricultural Mechanization, Food Sufficiency, Food Insufficiency, Food Security, Technology*

Introduction

Agriculture in Nigeria is the most important sector of the economy from the standpoint of rural employment, sufficiency in food and fiber, and export earning prior to the discovery of oil. The above assertion is based on the fact that at independence in 1960, little was known of petroleum as a source of revenue for the Nigerian economy. According to a CBN report, (1991), agriculture has always played a key role in the nation's economy, currently contributing about 42% of Gross Domestic Product as against 13% for Oil & Gas; however, there was sustained emphasis on agriculture to the extent that Nigeria was a major exporter of such agricultural products as palm produce, cocoa, groundnut, cotton and rubber.

In addition to these cash crops, the national agricultural system was able to produce enough of the food crops mentioned above (yams, cassava, maize, millet, sorghum and soya beans) that there was no need for food importation. Then, agriculture accounted for over 60% of the nation's Gross Domestic Product (GDP). Nevertheless, with the advent of petroleum in the 1970's, petroleum became the country's major foreign exchange earner and agriculture became grossly neglected. As a result, the contribution of agriculture to the GDP fell to 20%, thus forcing the country to embark on massive importation of major food items in the early 1980's (FMA,1988) with United States of America (USA), Portugal, Malaysia, Thailand, to mention a few, Nigeria's valued trading nations.

By year 2020, Nigeria aims at having a modern technologically enabled agricultural sector that fully exploits the vast agricultural resources of the country, ensures national food security and contributes significantly to foreign exchange earnings and employing two thirds of the entire labor force. However, growth in the sector has not kept pace with the needs and expectations of the nation. Low mechanization, subsistence small scale holdings, outdated land tenure system, low adoption of research findings and technologies, high cost of farm inputs, poor access to credit, overemphasis on inefficient fertilizer procurement and distribution, inadequate irrigation and storage and poor access to markets have all combined to keep agricultural productivity low with high wastages and below optimum contributions to export earnings.

Agricultural mechanization

Agricultural mechanization is the application of agricultural engineering principles and technologies to agriculture practices, using mechanical systems, in food, fibre, fuel and fur processing, and also, in the production, processing, handling and storage of agricultural product.

Taking a look at agricultural mechanization in Nigeria as a strategy for food sufficiency, it has been observed that, there is still need for appropriate selection of agricultural mechanization techniques which needs to be expanded from the three identified levels of agricultural mechanization technologies. These are, Animal Draught Technology (ADT), Hand Tool Technology (HTT), and Engine Powered Technology (EPT) as reported by:Odigboh (1991), Ani and Onwalu (2002).Table 1 shows the overall use of power in Latin America, Africa and Nigeria.

Table 1: Sources of power for overall agricultural production in Nigeria, Africa and Latin America

Source of Power	Latin America (%)	Africa (%)	Nigeria (%)
Human Power	59	89	90
Animal Power	19	10	8
Engine Power	22	1	2

***Source**: Odigboh (1991)*

It is now obvious that for the impact of mechanization to be adequately felt in the drive for food sufficiency the selection of mechanization technologies should include Wind Powered Technologies (WPT), Hydro Powered Technologies (HPT), Solar Powered Technology (SPT) and Electrical Powered Technologies (EPT).

These technologies are energy and labour saving, and when properly harnessed will increase yield/productivity, ensure timeliness of agricultural operations, reduce labour, save man hour, reduce processing time during post-harvest operations these will eventually translate into food sufficiency provided other factors such as storage, processing, post-harvest losses etc. are well taken care of.

Some of the benefits derived from mechanization are:

i. Boost in food production which will lead to exportation of the excess.
ii. Increase level of information dissemination.
iii. Increased yield.
iv. Encourageyouth participation in the field of agricultural extension and rural development.
v. Improved marketing processes such as packaging, grading and standardizing commodities and reduction losses in marketing channels, ware housing and storage.
vi. Multiple cropping, which was not possible under traditional farming.
vii. Reduce drudgery associated with agricultural operations.
viii. Mechanization will also increase the area of land under cultivation

What is food sufficiency and food security?

According to Food and Agriculture Organization, food sufficiencyis attained when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1996), while Food security is described by the World Bank as "access by all people at all times to the food needed for an active healthy life". The main goal of food security therefore, is for individuals to be able to obtain adequate food needed at all times, and to be able to utilize the food to meet the body's needs. Food security is multifaceted. The World Bank (2001) identified three pillars underpinning food security. These are food availability, food accessibility, and food utilization. This means that a nation whose food production level is unable to satisfy these three criteria is said to be food insecure. Supporting this assertion, Nana- Sinkam(1995) stated that a country and its people are food secured when their food system operates in such a way as to remove the fear that there will not be enough to eat.

According to other pundits, nutritional well-being, expressed as the nutritional status of an individual, is determined by five interrelated factors.

- The amounts and kinds of food available (farm products or markets).
- The ability of the individual to obtain available food (income, purchasing power).
- The desire to obtain the available food (priorities).

- The use of the obtained food (preparation, distribution) and
- The health status of the individual

FAO (2004) opines that food security, which guarantees all human beings, physical and economic, access to the basic foods they need to lead active and healthy lives, bears multispectral implications that go beyond the need for food production, supply and procurement. It is a dynamic process that is closely linked to the thematic topics of poverty, human capacity, creation of employment and generation of income in an ever changing spiral that can move upwards and downwards. This process can occur at different levels viz: internationally, nationally, household and individual levels.

Consequences of food insufficiency

Food insufficiency and hunger are forerunners to nutritional, health, human and economic development problems. They connote deprivation of basic necessities of life. As such, food sufficiency is considered as a universal indicator of households and individuals personal well–being. (Gebremedhin, 2000). The consequences of food insecurity is quite pronounced with the women folks, based on the fact that their activity in agriculture and the yield from this activity cannot translate to food sufficiency due to low productivity, this invariably cannot provide a means of lively hood for her and her children thus leading to the incidence of poverty (Laraba and Jackson 2011)

Food insufficiency will lead to a malnourished nation; this disturbing, yet preventable state of affairs causes untold suffering and presents a major obstacle to the development process. (Smith *et. al,* 2003). Most of the world's hungry people live in rural areas and depend on the consumption and sale of natural products for both their income and food. It tends to be concentrated among the landless or among farmers whose plots are too small to provide for their needs.

For young children, lack of food can be perilous since it retards their physical and mental development and threatens their very survival. Over150 million children under five years of age in the developing world are underweight. In sub - Saharan Africa, the number of underweight children increased from 29million to 37 million between 1990 and 2003 (United Nations, 2005).Furthermore, poverty, hunger and malnutrition have been identified as some of the principal causes of increasing and accelerated migration from rural to urban areas in developing countries (Larabaand Jackson, 2011).

Unless these problems are addressed in an appropriate and timely manner, the political, economic and social stability of many countries and regions may well be seriously affected, perhaps even compromising world peace (FAO, 1996). This is because hunger and poverty can provide a fertile ground for conflict, especially when combined with factors such as unequal difficulty in coping with disasters (United Nations, 2005). Hunger and malnutrition are the major causes of deprivation and suffering targeted by some of the

Millennium Development Goals (MDGs). This is illustrated by Diouf (2005) in his analysis as follows:

i. Hungry children start school late,
ii. Poor nutrition for women is one of the most damaging outcomes of gender inequality.
iii. Hunger and malnutrition increase both the incidence and the fatality rate of conditions that cause a majority of maternal deaths during pregnancy and childbirth.
iv. Hunger and poverty compromise people's immune systems, force them to adopt risky survival strategies, and greatly increase the risk of infection and death from HIV/AIDS, malaria and other infectious diseases.

Origin of food crisis in nigeria

A man with the hoe' to a greater extent still remains the description of the Nigerian farmer today in spite of decades of significant investments made in the sector by the government and international agencies. To say that Nigeria's economy is agrarian does not mean that Nigeria is agriculturally advanced, peasant farming characterizes agricultural practice in Nigeria in which family needs determine the scale of production and wherein small plots of land are cultivated by individual owners or sub-owners following age-old methods without much control on the yields. The essential factors of production – land, labour, and capital are provided within the family. The technology of production is not modern and involves a lot of drudgery.

This type of peasant agriculture involves about 95% of Nigerian farmers, while farmers employed on corporate and government supported large-scale farms account for only about 5 percent (CBN 1991). It is this 5% that has continued to receive priority attention in governments 'efforts to promote agriculture in Nigeria which has being dominated by small-scale farming on small farms, family-owned, rented, or leased.

As rightly observed by Abbas (1993), the Nigerian economy is distorted and integrated into the world capitalist system. The above explains why policies and programmes of governments for agriculture have always been in favour of capitalist system of production in

the form of capital-intensive mechanized farming, cash crop production, large-scale farming among others at the expense of food crops production. As a result of this, food insufficiency emerged and the agro-industries in both the rural and urban centres were unable to sustain production. This has reduced in no small measure the output of food per capita, thus making Nigeria the least in the sub-Saharan Africa. There is therefore the threat of hunger and poverty as 70% of the population lives on less than N100 (US$0.7) per day and youth unemployment is very high (Oni, 2008). It should be noted that the peasant system of production in Nigeria is based entirely on simple tools and family labour

Way forward

Nigeria, through the federal and state governments had in the past embarked on various programmes aimed at developing the rural communities and ensuring food sufficiency. Some of these interventions included the farm settlement schemes in the 1950s and 1960s, the National Food Production Programme (NAFPP) in 1973, the Operation Feed the Nation in 1977 and the Directorate of Food, Roads and Rural Infrastructures (DFRRI), Better Life for Rural Women and the Agricultural Transformation Agenda (ATA). These programmes were either not well implemented or marred by gross mismanagement. This was because the projects were driven by the Government without Private sector participation. These programmes however, helped to produce the necessary raw materials that fuelled the agro-industries. In order to mitigate rising food insufficiency and stabilize markets, the Federal Government has initiated the Agricultural Transformation Agenda and the Value Chain initiative

The task of assuring food sufficiency is large and complex. Action needs to be taken simultaneously at the household, national and global levels. Fostering the growth of national food supplies is necessary for eliminating hunger and reducing poverty but it is not enough. Today, even in the midst of sufficient national food supplies, people are hungry because they cannot afford to buy the food they need for a healthy life.

These challenges need tobe addressed in order to sustain and even surpass the current agricultural growth rate.In spite of consistent growth in the agricultural sector in recent years, it is not yet performing to its optimum in terms of productivity, job creation, youth empowerment, wealth creation, foreign exchange generation and food security. The agricultural sector has been constrained by various challenges that have impeded the development of the sector.

The overall consequences relate to food insecurity, intensification of poverty and inadequate wealth creation. In order to properly tackle these challenges and positionNigeria in the path of attaining the ambitious target of becoming one of the leading 20economies by year 2020, the following key issues must be addressed:

a. Appropriate Selection and Application of Technologies

There is the need for the identification, selection and application of appropriate technologies for the downstream agricultural activities.The appropriate technologies and institutions for the achievement of this objective must promote desired linkage effects. Deployed technologies must support farm and community level processing to reduce high post-harvest losses and must also be sensitive to the diversity in soil structure and chemistry across the country.

b. Adequate Extension Services and Programmes

According to the World Bank report (2004), the Agricultural extension service in Nigeria suffers from lack of organisation and replication of efforts, financial unsustainability and poor accountability. There is therefore the need to improve the harmonization and reduplication of effort in the government established Agricultural Development Programs (ADPs), this is in addition to improving the financial sustainability of extension services, increasing the accountability of extension agents to farmers, processors and agribusiness firms. The national extension strategy also needs to be diversified from its focus on crops to provide services that meet a broader range of needs of farmers, processors, livestock, poultry, aquaculture and agribusiness firms

c. Irrigation

Estimates of Nigeria's irrigation potential ranges from 1.6 million ha (FAO 1988) to 2.5 million ha (FAO 2006). Currently, only 0.7 percent of the nation's cultivated land is under irrigation, or roughly 220,000 ha. Even though the cost of irrigation management is high, there is the need to:

(i) Construct irrigation infrastructuresuch as dams, water channels, canals, artificial ponds and lakes etc.
(ii) Develop an effective and efficient water management practices for the available water resources; and
(iii) Promote dry season farming of seasonal crops.
(iv) Ensure adequate use and safety of underground water.

This can be achieved if all water sources are put into productive use and it will ensure the availability of crops at all seasons.

a. Agricultural Linkage

The relationship between the agricultural and industrial sector in Nigeria is still very weak. More so, agriculture which still employs over 70% of the labour force in Nigeria, mainlyat the primary production level because of low mechanization and small holding needs to be positioned such that cultivation, harvesting and post-harvest operationscan be carried out with minimal labour.

Topromote national development, agriculture must release labour to other sectors of theeconomythrough agricultural mechanization and linkages, this will improve and the foodprocessing capacities of the Nigerian farmer, food processor, agribusiness investor etc. it will also expands the scope of agricultural practices whilst simultaneously reducing the labour requirement. With this agriculture will need less people to till the soil, harvest the crops, handle raw yield, and carry out post-harvest operations and marketing. The concomitant effect will be reduced humanlabour and increased industrialization. However, such "released" labour need to betrained with new skills to fit into the merging industrial economy.

b. Agricultural Policies

Agricultural policies in Nigeria have not only been inconsistent but they have often beenpoorly coordinated as well. Against a background of short political cycles, agriculturalpolicies tended to change frequently with changes in political leadership, and often thepolitical will to implement the policies had also varied as well. The history of Nigerianagriculture is littered with abandoned policies, programs, and initiatives. The fragmentedapproach to policy-making has constrained agricultural growth because it has preventeda sustained commitment to a coherent, integrated strategy for agricultural development.

c. Sponsorship

Nigerian financial policies have been designed to ensure the stability of the financialsystem and, thereby, guarantee the flow of credit to all the economic sectors including agriculture. Although several reforms have been designed to redress the abuses inherent in credit rationing, the issue of inadequate access to credit by farmers haspersisted. The high interest rate constrains demand for credit by farmers whose returnshave remained low. Hence, there is need to provide a structureto ensure that the rural resource-limited farmers have unfettered access to credit.

d. Land Reform

Incentives to invest in agriculture are also undermined by policies regarding land ownership and land tenure. The Land Use Act (LUA), introduced in 1978, invested proprietary rights to land in the state. User rights are granted to individuals through administrative systems rather than a market allocation system. While uniformity andequity in land allocation are major areas of emphasis in the LUA, various tenure systemsare in practice around the country that fall outside the provisions of the LUA. Whilecosmopolitan and enlightened land owners can obtain deeds and use their land ascollateral, it has not been easy for rural based small holder farmers. Hence their accessto credit continued to be limited to the level not requiring collateral.

e. Improved Seeds & Chemical Inputs

One reason why agricultural productivity has remains low in Nigeria is that adoption ofimproved varieties and improved breeds is extremely low. If the use of improved seed, chemicals and technologies is increased then there will be marked transformation in the sector.

f. Infrastructural Deficiencies

Private investment in agriculture is discouraged by infrastructural deficiencies: a nationalroad network that is limited in its coverage and poorly maintained ports and customsfacilities that are undersized and overtaxed, an electricity grid that suffers from frequentdisruptions, water supply systems of spotty coverage and uncertain reliability, andcommunication systems that fail to reach many. (Manyong et al. 2004).These deficiencies contribute to high production costs of agricultural outputs and furtherundermine the profitability of agriculture as well as discourage export initiatives.

g. Research and Training

The government has long recognized that technology development is vital to thedevelopment of the agriculture sector, yet the national research system has enjoyed onlylimited success in generating new technologies at least new technologies that canbe adopted by farmers.

Nigeria currently has about 50 research institutes with Twenty Two of these, including a National Centre for Agricultural Mechanization (NCAM) having mandates related to agricultural research and agro-product utilization. NCAM was formally established by Decree (now Act of the National Assembly) No.35 of 1990 with the mandate to fast-track the positive transformation in

the agricultural sector of the Nigerian economy in order to increase the quantity and quality of agricultural products through the introduction and development of need-based, home-grown agricultural mechanization technologies.

This mandate was to be achieved through the following specific functions:

i. to encourage and engage in adaptive and innovative research towards the development of indigenous machines for farming and processing techniques;
ii. to design and develop simple and low-cost equipment which can be manufactured with local materials, skills and facilities;
iii. to standardize and certify, in collaboration with the Standards Organizations of Nigeria (SON), agricultural machines, equipment and engineering practices in use in Nigeria;
iv. to bring into focus mechanical technologies and equipment developed by various institutions, agencies or bodies and evaluate their suitability for adoption;
v. to assist in the commercialization of proven machines, equipment, tools and techniques;
vi. to disseminate information on methods and programmes for achieving speedy agricultural mechanization;
vii. to provide training facilities by organizing courses and seminars specially designed to ensure sufficient trained manpower for appropriate mechanization; and
viii. to promote cooperation in agricultural mechanization with similar institutions in and outside Nigeria and with international bodies connected with agricultural mechanization.

The disappointing impact of the research in NCAM and other research centres can be attributed to three main factors:
(i) These research organizations are poorly funded and financially unsustainable;
(ii) Coordination within the Nigerian agricultural research community, Universities, Colleges of Agriculture, NGOs, stake holders etc. is weak, resulting in unnecessary duplication of effort; and
(iii) Research tends to be supply-driven, with little accountability to end-users.

Table 2: Agro-Based Research Institutes in Nigeria

S/No	Research Institute	Mandate	Ecological Zone Covered
1.	National Centre for Agricultural Mechanization (NCAM), Idofian, Ilorin, Kwara State	Research into agricultural mechanization through the development of sustainable indigenous mechanization technologies.	All ecological zones in Nigeria.
2.	Cocoa Research institute of Nigeria (CRIN), Ibadan	Research into the genetic improvement and production of cocoa, cashew, kola, tea and coffee.	Ecological zones covered by the specified crops.
3.	Forestry Research Institute of Nigeria (FRIN), Ibadan	Research into forestry, agro-forestry, wildlife, and environmental production and conservation Total farming systems for the ecological zones encompassing Kano, Sokoto, Katsina, Kaduna and Kebbi andZamfafa States.	Ecological zones encompassing Kano, Sokoto, Katsina, Kaduna, Kebbi and Zamfara states.
4.	Institute for Agricultural Research (IAR), Zaria.	Research into genetic improvement of sorghum, groundnut, cowpea, cotton, sunflower, maize. Total farming systems for the ecological zones covered by Kano, Sokoto, Katsina, Kaduna Kebbi and Zamfara States.	Northern and Western zones of Nigeria
5.	Institute of Agricultural Research and Training (IAR&T), Ibadan	Research into kenaf, jute and soil and water management. Total farming systems for the ecological zones encompassing Lagos, Ogun, Oyo, Osun, Ondo, Ekiti, Edo and Delta States.	Lagos, Ogun, Oyo, Osun, Ondo, Ekiti, Edo and Delta States.
6.	Lake Chad Research Institute (LCRI), Maiduguri	Research into genetic improvement of millet, wheat and barley. Total farming systems for the ecological zones	Ecologies encompassing Borno, Yobe, Gombe, Jigawa, Bauchi and Adamawa states

		covered by Borno, Jigawa, Yobe, Gombe, Bauchi and Adamawa States.	
7.	National Agricultural Extension and Research Liaison Services (NAERLS), Zaria.	Co-ordination of all agricultural extension and specialized support activities in crops, livestock, fisheries, forestry, irrigation and food technology	All ecological zones of Nigeria.
8.	National Animal Production Research Institute (NAPRI), Zaria.	Research into animal production and animal products.	Ecological zones covered by the specified animals
9.	National Cereals Research Institute (NCRI), Badeggi	Research into the genetic improvement and total farming systems of rice, soya bean, benniseed and sugarcane; and extension services in the middle belt.	The middle belt zones
10.	National Institute for Freshwater Fisheries Research (NIFFR), New Bussa.	Research into genetic improvement of fresh water fish species, other aquatic resources and their production in Nigeria; and Research into long term effects of man-made lakes on ecology and environment.	Ecological zones covered by the fisheries and aquatic resources.
11.	National Institute for Horticultural Research (NIHORT), Ibadan	Research into genetic improvement and production of fruits and vegetables as well as ornamental plants	Ecological zones covered by the specified plants
12.	National Root Crops Research Institute (NRCRI), Umudike.	Research into the genetic improvement of cassava, yam, coco-yam, Irish potato and ginger. Total farming systems, research and extension services in South-East zones.	Anambra, Enugu, Cross River, Ebonyi, Imo, Abia, Rivers State, AkwaIbom, Bayelsa and Plateau States.
13.	National Veterinary Research Institute (NVRI), Vom, Jos	Research into all aspects of livestock and animal diseases; their treatment and control Development and production of animal vaccines and sera, etc.	Ecological zones covered by the animals.
14.	Nigerian Institute for Oceanography and Marine Research (NIOMR), Lagos	Research into the resource and physical characteristics of Nigerian territorial waters and the high sea beyond; and Research into genetic improvement of marine and brackish water fish species oceanography and aquatic resources, their production and processing.	Ecological zones covered by the ocean and territorial waters.
15.	Nigerian Institute for Oil Palm Research (NIFOR), Benin City	Research into the genetic improvement, production and processing of oil palm, raphia, date, coconut and ornamental palms.	Ecological zones covered by the specified plants.
16.	Rubber Research Institute of Nigeria (RRIN), Benin City	Research into the genetic improvement, production and processing of natural rubber and other latex producing plants, such as gum arabic.	Ecological zones covered by the specified plants.
17.	Federal Institute for Industrial Research (FIIRO), Lagos	Research into agro-industrial and food processing technology and upgrading of indigenous production and processes; and Food science and technology, design and fabrication of machines.	Ecological zones covered by the plants.
18.	Nigerian Institute for Trypanosomiasis Research (NITR), Kaduna.	Research into tsetse and simulium flies and diagnostic methods on the control of trypanosomiasis and onchocercieisis.	Ecological zones covered by the animal.
19.	Nigerian Stored Product Research Institute (NSPRI), Ilorin	Research into the improvement of storage and preservation systems on major food and industrial crops; and	Ecological zones covered by the plants.

		Studies on stored product pests, pesticides formulation and residue analysis.	
20.	National Research Institute for Chemical Technology (NARICT), Zaria.	Research into hides, skins, leather, industrial chemicals, polymers and plastics.	Ecological zones covered by the specified plants and animal.
21.	National Institute for Pharmaceutical Research and Development (NIPRD), Abuja.	Research into medicinal plants/herbs and drugs development and formulary	Ecological zones covered by the specified plants.
22.	National Centre for Genetic Resources and Biotechnology (NAGRAB), Ibadan.	Husbanding of plant and animal genetic resource. Development resources in genetics.	Ecological zones covered by the specified plants and animal.

On the above premise with proper training and dissemination of research findings coupled with effective and efficient collaboration between the research, training, universities and all stake holders, there would be a remarkable transformation in the agricultural sector which will eventually promote food sufficiency and security in the nation.

h. Conflict Resolution Strategies

Incessant conflicts exist between crop and livestock farmers, pastoralists (mainly Fulaninomads) and arable crop farmers, fadama users and non-fadama users, female farmers (especially female-household heads/widows) and their male relatives and neighbours. There should be effective development of the grazing reserves and stockroutes to ensure availability of forage and opportunities to transform pastoralist's tolivestock ranchers. This should greatly reduce the pastoralist – crop farmer conflicts.

i. Value Re-orientation

There is need to re-orient the values of the populace, especially youths, on work ethicsand value for money. The old idea of farming and agriculture being associated with old andpoor, uneducated and unkempt members of the society needs to be reversed. Thebenefits of agriculture as a vibrant and enterprising sector with demonstrable indicatorsshould be portrayed.

Conclusion

The Nigerian economy has what it takes to be food-sufficient and secure given the enormous natural endowment in land, labour,capital, vegetation etc. What is required is a re-orientation of the agricultural sector by properly repositioning the peasant farmers who are the providers of food in Nigeria. Nigeria could be food-secure if it adopts and faithfully implement the strategies suggested above. This is because these strategies do not only encourage these farmers but also promote their activities.

However, appropriate agricultural mechanization technology for Nigeria must evolve from a gradual development of indigenous technology for Nigerian agriculture. The mechanization approach must be an integrated one to include most, if not all, the agricultural production processes and operations and must also be part of and include the essential elements of the overall agricultural and rural development strategies in order to get to the roots of rural poverty.

A number of high impact opportunities identified across the agricultural value chain includes; Research & Development initiatives, accelerated mechanization and irrigation programs, improved farming techniques and extension programs to increase productivity, self-sustenance through import substitution initiatives; reduction of postharvest losses through expansion of storage facilities and creation of strategic storage infrastructure towards food security; increased export earnings through food processing and acceleration of agro-industrial linkages to diversify the economy and boost development of other sectors; creation of strategic marketing boards and launch of sustained capacity development programs will enhance food sufficiency in Nigeria.

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