



## Promoting food production through input services and rural infrastructures

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### ABSTRACT

Over the decade, the problems of national food nutrition and fibre crises have been on the increase and the ghost chasing the economy is no longer a figment of the imagination. The time has come for a definitive attack. This paper examined the economics of promoting increased food production through efficient inputs services and farm-rural infrastructures. The basic agricultural inputs for modernized commercial production are land, Labour, modern farm capital, water, climate, power and entrepreneurship, while basic infrastructures that promote agricultural production include rural, physical, social, institutional and farm facilities. These inputs and infrastructures interact, thus have competitive, complimentary supportive, joint effect and consequently; the economics of inputs-infrastructure promotion raises quantitative, management, organizational, institutional and costs return implications that merit substantial research efforts in the context of the atomistic population of small holder farmers in Nigeria. Although government may facilitates, stimulates and promotes growth of Agriculture food production programme, success must ultimately depend on the multitude of farm household. To secure food security for the teeming population, various motivated programmes (farm settlement) and the co-operationalized systems must be updated. Hence Inputs-land, Labour, capital, power and entrepreneurship must be earnest in a way to favour production and basic rural-farm infrastructures.

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### Introduction

The economy of pre-colonial Nigeria as well as that of the colonial regime was mainly sustained by agriculture. The performance in the agricultural sector was quite credible up to the first republic era. This trend was maintained up to the 1980s when food scarcity and food insecurity gradually begin to manifest in Nigeria.

The near-total collapse of agriculture due to discovery of oil in export quantity, inconsistent government policy, high corruption rate and lack of infrastructure seem to account for the fatal crisis that rocked the boat of food security in Nigeria. (Okuneye, 1998).

Successive government after independent in Nigeria had attempted to confront the food crisis with huge investments in agriculture. This sector received adequate government attention up to the mid-1980s, most especially with the Agricultural Development Project (ADPs) established in the 1960s, the Operation Feed the Nation of the 1970s, the River Basin Development Authority (RBDA) and the National Agricultural Land Development Authority (NALDA) as well as the Directorate of Food, Roads and Rural Infrastructure (DFRRI) from 1985-1993 (Rahaman, 2009). Most of these Agricultural projects actually encouraged small-holder farmers to bring more land under cultivation and thereby increase Agricultural output which, all things being equal, should have reduced household expenditure on food. But due to policy shifts, corruption and poor rural infrastructures, most of these programmes, which aimed at transforming Agriculture in Nigeria, did not attain the desired results.

### Basic Agricultural Inputs

According to Oloyede (1998) Agricultural inputs, which are called productive resources in classical production economics theory, are classified into two groups. The first group is cost carrying productive resources which include land, Labour,

capital and entrepreneurship or modern management. The second group is the so called non-cost carrying free gifts of nature, which include water, climate and power.

In today's modernized peasant and commercialized agricultural settings, all inputs have costs attached to them in view of their constraints on production in terms of availability, usability, transferability, and hazards or deleterious effects on the agrarian landscape. Thus, the major basic inputs of modern agriculture, which require active promotion in the process of expanding food production to meet national need are land, Labour, capital, (physical, mechanical, biological, chemical, financial), entrepreneurship terms in this section, as they are related to food production expansion in Nigeria.

The land resource is the most basic agricultural input in Nigeria, the available arable land has been estimated at about 75.30 percent of total land area (of 94.185 million hectares) the forest reserves can be made available for crop production through rotational agro-silviculture and forest farming. From the remaining 23.264 million hectares of combination of built-up areas, permanent pastures and cultivable wastes, an additional area of 4.427 million hectares (or 4.7 percent) can be made available for cropping through reclamation, range management, watershed protection and "urban" agriculture or market gardening. In total, an area of 84.767 million hectares (or 90.00 percent) may be regarded as cultivable land in Nigeria under effective and self-perpetuating land management system. Land management includes rotational land-use, optimal tillage-grazing land-use, pest-weed management land use, and multiple-harvest land use, and forest management land-use (Olajide, 1999).

It is rather astonishing that a nation such as Nigeria that is endowed with enormous agricultural potentials still finds it difficult to adequately provide the food needs of its populace.

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**Table 1. Nigeria; The Estimated Labour Market (Million)**

Year	Professional Technical And Administrative	Farmer Population	Residual Rural Labour Force	Estimated Total Labour Force (A)	Percentage Of Total Population
1960	0.446	9.600	22.108	32.154	62.32
1970	0.817	12.114	26.327	39.258	60.88
1980	2.129	14.056	34.232	50.417	59.50
1985	4.282	14.773	39.049	58.184	60.44
1990	8.613	15.146	41.640	65.399	59.84
1995	17.324	15.528	43.027	75.889	61.16

Sources: World Bank, 1999

**Table 2. The Table below shows Estimated Average Yield per hectare of major Crops & percentage of consumers in Nigeria [kg/ha].**

Crop	1975 Total 70m Pop.	1985 Total 90m Pop.	1995 Total 105m Pop.	2000 Total 120m Pop.	2005 Total 150m Pop.	Average Growth Rate	% of Pop. with access to safe food
Cassava	9559	9361	10,767	12,820	26,450	8.1	65%
Yam	8960	10,855	9976	10,730	13,100	6.7	54%
Maize	900	1322	1588	1860	2550	31.5	42%
Sorghum	687	975	1001	1242	1825	22.3	34%
Groundnuts	676	768	850	910	30	12.1	23%
Cowpea	215	385	391	405	464	38.2	20%
Rice	1387	1,870	1283	1560	2250	4.6	11%
Millet	633	861	1000	1154	1959	26.1	24%
Cotton	671	974	657	525	486	6.2	05%
Soya beans	319	867	1503	1686	1823	112.6	22%
Wheat	650	790	882	972	1190	25.3	40%

Sources: National bureau of statistics, 2007

### Basic Rural Farm Infrastructures

Infrastructures are social overheads that facilitate the effective conduct performance of farm and non-farm enterprises. Rural infrastructures found in transportation systems and rural telephones/postal services. The Second rural social infrastructures comprising rural health also include clinic/dispensary, adult education training facilities, and utilities such as rural electrification, power and water supplies. Third are rural institutional infrastructures comprising production organizations/institutions, financial institutions, research institutions, extension services, soil conservation services, pest management/control services etc. fourth are rural farm infrastructures comprising storage, irrigation, land preparation, farm input supply and inter-farms marketing/purchasing facilities. Infrastructures are invaluable to the enhancement of optimum production and better quality of rural farm life and living. Five major sources will need to be mobilized for adequate and or effective provision of infrastructures in the process of enhancing increased food production. These are governmental efforts. Much as the importance of infrastructures has been recognized and proclaimed, very little has been done in mapping, inventory and indexing the various types to assess the demand and supply aspects as well as their interaction pattern with the basic farm input (Olajide, 1999).

Broadly speaking, agriculture is still of peasant characteristics in Nigeria. The average size of farm land holding is below 3 hectares (FOS, 2005). The technology employed is still low as only 34% of the farmers uses chemical fertilizers, 11% use improve seedling, 9% use pesticides and 3% use vaccines and drugs to prevent various forms of post-harvest damages (Ojo, 1993). Hence, the use of poor technology is quite

instrumental to the low level of agricultural productivity, and this has implications for food security.

The shaky premise on which Nigeria food security situation has been rested is no doubt a product of the myriads of problems that confront the Nigerian agriculture. Such problems impede its productivity and contribution to national aggregate output. These include:

- i. Lack of infrastructural facilities such as poor feeder roads and inadequate road network, lack of appropriate storage facilities, poor irrigation system.
- ii. Inadequate manpower skill development especially lack of skilled extension workers, poor or lack of relevant research into agriculture and food security, shortage of technical man power for agriculture mechanization; rural-urban migration of Labour skill especially youths with negative effect on Labour availability and productivity. This situation has raised food production costs and in turn, food prices.
- iii. Socio-cultural factors such as local land tenure system which limits access to land by would-be farmers; and religious sanctions which do restricts the production of certain crops or rearing of certain animals.
- iv. Economic factors e.g. high cost and lack of access to basic farm inputs (fertilizers, herbicides, pesticides etc.) which affect production levels; and low participation in agriculture by the organized private sector
- v. High inflation rate: availability of food to sustain developmental efforts of the populace should be viewed not only from the production aspect but also from the market price perspective. The inflationary trend in Nigeria is extremely high, and has been quite excruciating considering the fact that basic food need is topmost in the hierarchy of needs. Adequate

attention by government and others had not always been paid to agriculture and food security to ensure that more food is produced and made available to non-producers at reasonable prices.

#### **Infrastructure in rural and agricultural development**

General conclusions that have emerged from these studies are that good infrastructure services are necessary for agriculture and rural development, and differences in regional economic development have been linked to differences in infrastructural investment.

Fan and Zhang (2004) found that education and infrastructure played a significant role in explaining the differences in non-farm productivity more than it does in agricultural productivity. The relationship between infrastructure development and agricultural development is bi-directional. Infrastructure development can stimulate agriculture and rural development, whilst on the other hand agricultural development can also stimulate improved infrastructural development. Improved infrastructure also has the potential to reduce inequality in income distribution through its effect on spatial location of economic activity. Under normal circumstances, all infrastructures are located in the settlement system of a region, and the accessibility of these services will determine the economic activity in that region. Access to road transportation determines households' demand for production and consumption goods and services. If agricultural inputs and output markets are more accessible, rural households will tend to use these services more, leading to improved productivity (Kamara, 2004). Deficiencies in rural infrastructure services result in poorly functioning domestic markets with little spatial and temporal integration, low price transmission, and weak international competitiveness (Pinstrup-Anderson & Shimokawa, 2006). Economic activities in most rural areas tend to be concentrated around areas where there are banks, postal services, retail outlets and suppliers of inputs. Poor road conditions, high transport costs and distant markets have been identified as factors that hamper improved market access for emerging farmers in South Africa (Makhura and Mokoena, 2003; Nieuwoudt and Groenewald, 2003), and also contribute towards the problem of missing markets. Factors that determine access to input and output markets include distance to the markets, the state of the roads, the cost of transportation and the frequency of visits to these markets. Rural services centres and nearby towns and cities are often an important source of inputs for farmers, and also provide a market for farm produce analysis of the relationship between center and periphery, particularly the relationship between infrastructure and people, is viewed as a center piece in regional development planning in the developing world.

Infrastructure directly affects human welfare and equity across community and income groups. Urban and rural households in South Africa experience widely different access to basic infrastructure services. The lowest household income groups have no or extremely limited access to infrastructure (Bogetic and Fedderke, 2005). Physical infrastructure, such as irrigation and transport and road systems, together with institutions such as banks and markets, make possible a range of production options that are translated to higher agriculture productivity through technology adoption (Pinstrup-Anderson & Shimokawa, 2006). This means that investment in infrastructure has the potential to reduce poverty and income inequality between different geographical locations. It is worth saying that it will also promote food security.

#### **Demands and Supply Pattern of Basic Inputs**

The resultant effects of neglect of the agricultural sector are the sharp and persistent high prices of food, malnutrition, household food insecurity and restricted access to nutritious and sufficient food, culminating in high poverty trend among the Nigerian populace. This dismal situation is made complicated by poor and expensive transportation, Labour supply, storage and processing facilities as well as undue limitation of farmer's access to most of the essential farm inputs apart from rise in population of consumer.

#### **Sources: World Bank, 1999**

The estimated total force does not take account the residual the residual unskilled urban force. If this were to be included, the average Labour force of Nigeria will vary from a low of 60.00 percent to a high of 65.00 percent.

Thus, given the trend of low aggregate farm output the demand for food will continue increasingly to out strip the supply. Food production under the current wage rates and intractable inflation will continue to be a high-cost enterprise. In other words, the prospect of cheap food under low productivity of agriculture and factor proportions as well as an over priced currency must be considered illusory.

The above table shows that except from cassava and yam, there has been low production rate for most of the food crops which prevent many Nigerians from having good access to safe food. This is usually compounded by transportation problems and poor storage facilities, which accounts for the high cost of such food items.

In most developing countries such as Nigeria, empirical input demand and supply function for predictive and planning purpose can hardly be fitted with any meaningful or practical utility. In an effort to promote food production through input programming and servicing engineering or process" input demand functions do constitute a meaningful and usable alternative. For example, the following rules of thumb derivable for process" input demand functions do constitute a meaningful and usable alternative. For example, Munn, (1996) opine that the following rules of thumb derivable for process functions and experimental studies provide a solid basis for an estimation of input:

1. Yield per hectare in various ecological zones and for various crops yield is a solid basis for an evaluation of land requirements for a given level of food output at a given level of attainable or possible of feasible yield potential.
2. Labour requirement per hectare for different types of crops in term of man days provides a solid basis for a meaningful programming and servicing of Labour input demand and supply. It also constitutes a meaningful approach to an assessment of the optimal level of mechanization of crop types and farm sizes.
3. Modern farm capital demand can also be assessed from land and Labour requirements. Besides, physical and mechanical capital can be assessed by technical requirements per hectare at constant or current prices.
4. Water input demand can be assessed by the water requirements of various crops and various ecological zones. The coefficient derived from research enable planners to determine the size of dams and water storage facilities for total supplemental irrigation farming.

The demand and supply of rural infrastructures to promote increased food production can also be derived from the required levels of food output/target, the size distribution population of farm-firms, spacio-temporal locations and the level of production technology. In Nigeria, the distributions of nearly 14 million farmers make the estimation of rural-farm infrastructures a very difficult thing to overcome by a village,

cooperative, community, and inter-village approach. It must be stressed that one of the greatest bottle necks to the effective promotion of increased food production is the dearth of farm-input and infrastructures. An inventorial assessment of infrastructures facilities in Nigeria shows that the supply is grossly inadequate when measured by the supply of the basis inputs. The establishment of agro-service centres all over Nigeria and the resultant quivering of producers for basic inputs illustrate a situational inadequacy which must be corrected or redressed through appropriate agricultural policies.

#### **Economics Of inputs infrastructure utilization**

According to Ajayi et al. (2011), the economics of inputs and infrastructures utilization has much to do with the issue of optimum allocation. The promotion of increased food production is nothing but an exercise in allocative efficiency involved in the attainment of socio-economic optimality which has been referred to in the economic literature as *pare to optimum*. This optimum envisages an optimal allocation conducive to efficient distribution of income wealth, elimination of rural deprivation and the creation of an effective consumer's surplus which is an exercise in the provision of adequate employment opportunities and the elimination of unemployment. This exercise that is resources allocation has qualitative, organizational, institutional and management aspects. Too often the issue of promoting increased food production to meet national needs has tendered to lose sight of these economic aspects. The quality of infrastructures and inputs involved in increasing production must be properly assessed and developed in line and attune with production targets. The costs-returns aspects will need to take into consideration the divergences between social value and social costs of lumpiness, compensatory and developmental as well as the educational aspects of establishment, mobilization and expansion. There is the issue of what form organization will be instrumental and distribution of inputs and infrastructures at the minimum costs and with optimum effectiveness. There is also the issue of the institutional frame work within which Governmental promotion of inputs and infrastructures can be effected without wasteful and unnecessary bureaucratization. Management of the supply and distribution of inputs and infrastructures constitutes another important aspect of economic areas of major research interest which constitute a mine of information for developmental processes (George and Shorey, 1999).

The research implication of the economics of inputs and infrastructures utilization cannot be over emphasized.

To make this right in relation to food security become operational in Nigeria, the following conditions must be met:

- (i) Adequate food supply to satisfy the needs of people across all regions and/or sections of the country, and in all seasons. This requires not only an adequate food output and/or food importation, but also effective food storage, processing, preservation, transportation, and distribution systems.
- (ii) Adequate and efficient purchasing power by individuals and households, that would enable them acquire food necessary to meet their consumption needs, both quantitatively and qualitatively. This element has income, employment, education and social security dimensions.
- (iii) Equitable distribution of foods to all members of the household without discrimination on ground of age, gender and other cultural or religious consideration.

#### **The Way Forward: Option/ to improve Agriculture and Food Security**

- i. Adoption of Labour intensive agricultural growth for poverty reduction and high agricultural production outputs especially for Labour force in rural areas.

- ii. The rural poor and women's access to land and other assets must be increased to enable them cultivate more land, rear animals and raise other livestock.

- iii. Provision of appropriate and cost effective on-farm storage facilities from specific agricultural products and enterprises. Such should be designed and commercialized in villages/rural areas to reduce incidence of food spoilage or post-harvest damages/wastages, processing and storage.

- iv. Agricultural inputs such as improved seedlings cutting and suckers need to be made readily available and commercialized through incentives to the private sector while other farm inputs should be subsidized for the benefits of the masses who have interest in farming and only genuine or certified farmers should have access to fertilizers and other agricultural inputs at subsidized rates (FAO 1992).

- v. Improvement of irrigation network to raise the level of food production. This will enable irrigation practitioners to run two or more cropping seasons every year. This will result in abundant food supply. To achieve this, government should adequately fund the River Basin and Rural Development Authorities (RBRDAs) and properly monitor them to ensure that they discharge their roles.

- vi. An agency to be solely responsible for monitoring food processing, handling, and control should be established, empowered and well-funded. It will also ensure that all processed foods- including animal poultry and sea foods-meet the local quality content needs as well as the required international standard.

- vii. Empowerment/support scheme for graduates of Agriculture: government should provide an enabling environment and necessary financial support for graduates of Agriculture and other youths.

- viii. Government should make greater investment to improve farming technology. Federal government should provide the necessary funding to fully resuscitates the Agricultural Development Projects (ADPs), empower farmers' cooperative groups to secure and employ modern farming techniques that would raise their productive capacities, and equally mandate ministry of Agriculture and natural resources at state and federal level to focus more on food production .

#### **Conclusion**

It is obvious that food security constitute an important element of national security. Hence, a nation must not play with the food needs of its populace. Considering the abundance of Nigeria's agricultural potentials, other natural endowment, and government's huge investment in the agricultural sector, it is only unimaginable that food security is not guaranteed as large numbers of people still face poverty and malnutrition. This situation has been aggravated by rapid population growth.

Budgetary allocation to agriculture must be improved and better managed while excess crude oil proceeds could be improved and better managed. Excess crude oil proceeds could be judiciously utilized for mass food production rather than the current periodic, albeit absurd, sharing of such public funds among the different tiers of government without anything to show in return. There is the urgent need for our leaders to exhibit discipline, and demonstrate it in both public and private lives. The nation would achieve food security if the leaders, and followers alike, show exemplary sense of discipline in everything they do.

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