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## Review article

# Modern technologies and Nigerian's small scale farmers: constraints and prospects of its adoption

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## ABSTRACT

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In spite of abundant modern technologies and guide lines available for use in increasing Agricultural productivity, most of the Nigeria small scale farmers who constitute the majority in agricultural sector cannot adopt these new innovations. The result is failure to produce enough food for the nation and poor standard of living of the farmers who could not also contribute anything to the economy and development of the country. This paper looks into the problems militating against the adoption of these modern technologies. It further discusses strategies for their acceptance by the small scale farmers.

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## 1. Introduction

Agriculture which employs between 51-91% of the active population of Nigeria was the backbone of the country's economy, until the discovery of petroleum three decades ago (Anyu, 1982). But the small scale farmers who contribute majority in the agricultural sector are noted for their traditional farming system of slash and burn clearance system, use of manual labour and simple tools, and increasing out modedness under the pressure of modernization.

Nwuba (1987) noted that the Nigeria population is increasing and more mouths are to be feed. But ironically more and more people are moving away from the village soil resulting in farming being left to the elderly and weak people who can obviously produce very little. The only way to increase the farm power and restore prestige to

farm work as well as to increase agricultural products is to mechanize agricultural practices. Before the discovery of oil, agriculture had powered the economy of the country by contributing more than 60 percent of the Gross Domestic Product (G.D.P), and was the nation's leading foreign exchange earner, but presently it is believed that agriculture's contribution to GDP has dropped to about 40 percent (Nwakpu, 2003).

Nigeria's great agricultural potentials still remain untapped and in apparent efforts to place the sector on sound bearing, various attempts have been made to address the challenges facing the sector by the Federal Government. Among the approaches used so far include introduction of the National Accelerated Food Production Program (1972), Operation Feed the Nation (1980) and the National Agricultural Land Development Authority (1991). These programmes were aimed at developing agricultural sector for increased food production. But the challenges have persisted because the country is still living in an age of outmoded values and primitive practices where in general the skills handed down to our farmers from generation to generation still represent the sum total of the knowledge and experience which bring to bear on our primary industry of agriculture (Igboeli, 1994). Therefore, for increased agricultural productivity, there is urgent need by our small scale farmers to change from their primitive agricultural practices to settled agriculture which requires a change in technology and attitude.

## **2. Constraints**

Among the constraints Mitigating against the Adoption of Modern Technologies in Agricultural Practices by Small Scale Farmers in Nigeria include:

### **2.1. Climatic factors**

Rainfall, temperature, atmospheric humidity, light duration and intensity are relevant climatic factors affecting agricultural development. The location of Nigeria in the tropics where rainfall is heavy encourages rapid restoration of undergrowth after land clearing. Nwuba (1978) noted that this prolific root system just below the surface of the ground causes severe losses from breakages of agricultural implements, this makes mechanization of agricultural practices difficult and also the cost of repairing and replacement of these machine parts is high and adds to production cost.

### **2.2. High cost of agricultural machines**

Small scale farmers cannot afford the high cost of agricultural machines and aggregates. Thus, in the absence of agricultural machines, mechanization of agricultural operations for increased productivity cannot be easily possible. (Nwuba, 1987)

### **2.3. Institutional frame work**

There is notably absence of institutional frame work that is friendly with small scale farmers in Nigeria, and whatever institutional frame work that may exist, it is generally not interested or apathetic towards them (Any, 1928). Government also has not shown any serious understanding or recognition of the problems of the small farmers as an impediment to their increased food production, and consequently little attempt has been made to create institutions to meet their production requirements.

### **2.4. Education, research and extension services**

A country's development rate is increased by the quantum of its research (Sunday Sun, 2010). In Nigeria research development is in its lowest ebb and whatever research result that may existed are not readily available to the small scale farmers to enhance their agricultural practices.

### **2.5. Absence of agricultural infrastructure**

Infrastructural facilities such as irrigation, public water, communication, schools and hospital are conditions precedent to increased agricultural productivity (Naseen, 1977). Unfortunately in Nigeria, small and landless farmers suffer the most due to lack of these infrastructural facilities, which are essential to enable the majority of farmers to participate in these modern technological innovations (Nwuba, 1984)

### **2.6. Lack of credit facilities**

Hodder (1973) posited that credit is a key factor in a country's agricultural development. In Nigeria, the credit institutions discriminate against the vast majority of the small scale farmers for lack of collateral. Thus, this is one of the major reasons for non-adoption of modern technologies by small scale farmers who lack funds for their acquisition. According to research by the authors, at Omasi a prominent rice producing area in Anambra State, as much as 90 percent of credit needs of small farmers are still being met through non-institutional services such as friends, relatives, shopkeepers, traders and other local money lenders which in a way reflect the remoteness of the institutional credit system in Nigeria.

### **2.7. Narrowness of markets**

Improved seeds, fertilizers, and better irrigation facilities, a cultivator is unlikely to use these to increase his total production unless the market for this increased production is there, is seen to be there and is accessible (Hodder, 1973; Okigbo, 1983). Thus, the narrowness of Nigerian market constitutes a formidable obstacle to small scale farmer's adoption of modern agricultural technologies that would increase their agricultural productivity.

### **2.8. Absence of transportation facilities**

Clerk and Haswell (1964) observed that improvement of transport facilities perhaps is the most valuable single contribution towards economic, social, political, and agricultural development. Anya (1982) also noted that it is true to say that there is no point in a farmer having to adopt a technology which enables him to increase his food production very substantially and immediately, if at the same time his form of transport is so costly or demand for extra produce is so uncertain or market so distant as to make such an increase worthless.

Thus, in Nigeria transportation which is seen as "sine qua non" in developing agriculture is absent. Thus, fertilizers, improved strains of seeds, cultivators and other heavy agricultural machines needed for intensification of agriculture can't be carried to the fields far away from the main roads.

### **2.9. Available Technologies**

Any technology appropriate for small scale farmer should be simple in operation, easy to understand. Thus, if the operation of any technology is complex, its adoption will be difficult (Okigbo, 1986; Naiz, 1997; Spiridanov, 1979; Odigbo, 2008) observed that for agricultural mechanization to succeed, all the needed agricultural machines and equipments should as far as possible be manufactured locally to ensure their acceptability, durability, affordability, reliability, availability, maintainability, and manageability. In Nigeria, most of the available agro machines are imported, and farmer's rejection of them are due to their high price, non-availability of spare parts, and operational complexity. Thus, Bunting (1987), posited that it is un-economically and wasteful in the final analysis for a farmer to purchase an agricultural machine whose spare parts are readily not available.

### **2.10. Corruption**

Government efforts to aid the small scale farmers to acquire modern agricultural inputs at subsidized price, and other agricultural machines and aggregates are often sabotaged by corrupted government officials who introduce unnecessary bottlenecks on the way to delivering such incentives to farmers. Eventually, such do reach the farmers it will be after the cropping season is over. This is one of the most important constraints against increased food production in the country.

### **2.11. Government Policies**

Hodder (1965) observed that in final analysis it is commonly government action that determines the direction and scope of economic policy. Nigerian government has not been disposed to providing enabling environment for the small scale farmers to adopt modern technologies that will boost their agricultural production.

## **3. Methods for Adoption of Modern Technologies by Nigerian Small Scale Farmers**

### **3.1. Involvement of farmers in policy formation**

The basic components of production technology being propagated need to be redesigned with emphasis on farm problems as agriculture is location and time specific (Okigbo, 1983). Experiences have shown that policies do

not grow food. Therefore, to ignore farmers in policy formation and implementation means failure in agricultural sector. Farmers' contributions are needed in designing appropriate technologies to solve their problems.

### **3.2. Statistics and data bank**

The importance of statistics, data, surveys, labour force participation and productions, assets, status and income levels and inequality related to farmers' contribution in food production cannot be over emphasized. These informations are lacking or are insufficient; when available they will help to prepare projects and programmers' that can bring about significant improvements for farmers, and farmers also should be taught how to access these statistical data.

### **3.3. Capacity building for small scale farmers**

There is need for capacity building for small-scale farmers through workshops, town hall agricultural meetings and seminars, to be organized by extension workers through which new innovations in agricultural practices and machines would be introduced to them. The farmers will also see it as opportunity to relate their field experiences and receive solutions to their problems.

### **3.4. Group formation among farmers**

Farmers should be made to form farming groups with leaders. Through this, it becomes easier to reach them. Inputs can be delivered to them through these group leaders, in place of using corrupt government officials and politicians who use such items for their political ends, the products if eventually it gets to farmers, would be at exorbitant prices or after the cropping season is over.

### **3.5. Quality of extension and technical staff**

The quality of Extension and Technical Staff should be regularly improved through workshops and seminars, in-service training, staff evaluation sessions, exchange of technical missions, foreign training, news-letter, slide sets, video films. These will enable the Extension Workers to keep abreast with emerging technological development, identify field problems and proffer alternative solution to farmers.

### **3.6. Low interest rate agricultural loan**

Agricultural loan scheme should be established with low interest rate. This will enable the small scale farmers have access to finance for purchase of inputs, and agricultural machines which will enable them increase their hectare and agricultural products.

### **3.7. Bulk purchase of surplus agricultural products by government**

Government should buy off surplus agricultural produce, perishable fruits and vegetables for preservation, which would otherwise get damaged and later, sell them at distant markets where they are needed. This will encourage farmers to increase their production

### **3.8. Tractor and equipment hire services**

Tractor and agricultural equipment hire services should be established by government to enable small farmers have access to such services at low cost. Nwuba (1987) stated that mechanization of agricultural practices is only possible through the use of machineries.

### **3.9. Political will**

Government should recognize the importance of agriculture in the nation's economy and therefore enact enabling laws to help small scale farmers play prominent role that will strengthen the agricultural sector. Without political will, no policy will stand the test of time.

### **3.10. Establishment of industries**

Gourou (1975) noted that once there is mutual support between industry and agriculture, whereby the surplus agricultural produce is used by industries, agriculture under the stimulus of greater demand, becomes more efficient, and industry in turn raises the market for agricultural produce.

### **3.11. Local manufacture of agricultural machines**

Government should encourage local manufacturing of agricultural machines and implements that will be cost effective to small scale farmers. A locally manufactured machine will easily appeal to farmers because of available spare parts and low price.

## **4. Conclusion**

Adoption of modern technologies available for agricultural production is the first step towards increasing agricultural production. But the role of government in this regard cannot be over emphasized. It is an undisputed fact that for whatever the environment, historical or spatial bases for development and theoretical conclusions reached, in the final analysis it is commonly governmental action that determines the direction and scope of economic policy, and must play critical role in making small scale farmers adopt modern technologies for increased agricultural production in Nigeria.

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