

EFFICIENCY DIFFERENTIALS OF FOREIGN AND LOCAL FARMERS IN KWARA STATE, NIGERIA

Olubunmi Abayomi Omotesho, Adewale Henry Adenuga, Muhammad-Lawal Abdulazeez and Bello Sadiq. Abiodun

Department of Agricultural Economics and Farm management, University of Ilorin, Ilorin, Nigeria

ABSTRACT

The Nigerian agricultural sector is dominated by small scale farmers who by virtue of their low income have dwindling capacity to access and procure capital, labour and modern inputs. In theory, it is believed that foreign direct investment in agriculture is essential to ameliorate this problem of inadequate capital faced by the farmers and consequently raise agricultural productivity. However, debate relating to the veracity of this statement and the sustainability of the concept still rages on. This study therefore attempted to examine issues of productive efficiencies between foreign and domestic farmers in Kwara State, Nigeria. The study was conducted in Shonga, Edu Local Government Area of Kwara State. A two stage random sampling technique was used to obtain data from 50 domestic farmers and the enumeration of all the foreign commercial farmers from Zimbabwe in the study area. Major tools of analysis used for the study include: Descriptive Statistics and Data Envelopment analysis. Results of the study revealed a higher mean Technical Allocative and Economic Efficiencies for the New Nigerian farmers (Foreign Commercial Farmers) compared to that of the domestic farmers with a significant difference in the means of the overall Economic Efficiency between the two groups. It was therefore established in the study that foreign commercial farmers are more efficient than the domestic farmers. In line with the result of the study, it is recommended that the government should design policy strategies that would encourage private sector participation and technology transfer as well as ensure the use of modern farming techniques to increase efficiency of agricultural production in the country.

Keywords: Data Envelopment Analysis, Economic efficiency, Foreign Commercial Farmers, Shonga, Technology Transfer

INTRODUCTION

By the year 2025, four fifths of the expected global population of 8.5 billion will be living in developing countries. The capacity of global resources and technologies to satisfy the demands of this growing population for food and other agricultural commodities is of serious concern. The challenge therefore is how to meet these needs mainly by sustainably increasing production and avoiding damaging environmentally sensitive areas. Improving the efficiency of the agriculture sector is an essential step toward sustainable development and poverty reduction, especially in Sub-Saharan Africa. Improved Agricultural Efficiency therefore is an important part of the solution since meeting

this challenge requires production on land already in use (Omiti, Chacha and Andama, 2002; International Finance Corporation, (IFC), 2010). In a bid to increase the level of food security in the country and reduce the incidence of poverty, the Nigeria government like most other developing countries has over the years embarked on numerous agricultural development strategies some of which include: Operation Feed the Nation (OFN) launched in 1976, River Basin and Rural Development Authorities, established in 1976; Farm Settlement Scheme and National Accelerated Food Production Programme (NAFPP), launched in 1972; the Green Revolution inaugurated in 1980 and more recently The National Economic Empowerment and Development Strategies (NEEDS) in 2004, The adoption of the Millennium Development Goals (MDGs), The National Poverty Eradication Programme (NAPEP); National Policy on Integrated Rural Development (NPIRD), National Special programme for Food Security (NSPFS); National Fadama Development Project and various presidential initiatives such as presidential initiatives on Cassava and Rice (International Conference on Agrarian Reform and Rural Development (ICARD), 2006). In spite of all these laudable attempts and strategies at revamping the agricultural sector, the sector still remains relatively under-developed with an ever-worsening food security situation. According to a report by the World Bank, Nigeria is described as being among the poorest nations in the world with the majority of its people (over 60%) entangled in poverty living on less than a dollar per day (Nyako, 2006, Belay, 1997). It is clear therefore that Major adjustments are needed in agricultural, environmental and macroeconomic policy, at both local and national level to create the conditions for sustainable agriculture and rural development. Issues of sustainable development should contextually take into consideration cooperation, stakeholder participation, commitment, long, medium and short term effects of current actions, common concerns, inter and intra generational equity, justice, and moderate production and consumption habits (Tisdell 1994). Agriculture in Nigeria has been restricted to subsistence level where over seventy percent of the farming populations are still engaged in small scale farming making it difficult to cope with the increasing level of demand for food (ICARD, 2006). This situation is against the backdrop of developed economies like America where only 5% of its population are engaged in Agricultural production, yet it feeds itself with enough surpluses for exports (FAO, 2001). It is clear that for a country like Nigeria to achieve sustainable development in the shortest time possible whether in terms of increased agricultural production, poverty reduction, improving standards of living or creating the right environment and structure of investments, there is a need to start breaking new grounds, exploring new opportunities and creating innovative and dynamic strategies aimed at increasing the efficiency of agricultural production (Ogunkola and Jerome 2005; Iweala 2006). It is believed that novel approaches aimed at solving impediments of agricultural development, perhaps, embracing Foreign Direct Investment (FDI) might create leverage for bolstering domestic capital, productivity, employment etc, which are probably crucial to jump-starting economic growth and development (Akinlo 2004; Ayanwale and Bamire, 2004; World Investment Report, 2006).

The beginning of the Obasanjo administration in 1999, marked the emergence of extensive networks of regional investment agreements that seek to promote and protect foreign investors investing in Nigeria (Aremu, 2005). One of such noticeable attempts at improving the economy has been the encouragement given to Foreign Direct Investment (FDI) in the area of agriculture. It is believed that FDI is one of the most potent tools for solving economic problems in most developing economies of the world (Bengoa and Sanchez-Robles 2003; Akinlo 2004;

Ayanwale and Bamire 2004; World Investment Report 2006). In 2004, a memorandum of understanding was signed between the Kwara State Government and White commercial farmers from Zimbabwe who had most part of their lands expropriated from them by the government of Zimbabwe for land reform reasons as foreign investors and domestic participants in Nigeria. Each of the thirteen foreign farmers was allocated 1,000 hectares of land on a 25-year lease (Sunday Times, 2005). The farmers were invited and encouraged by the State Government to acquire any part of the 17 communities in Shonga district about 110 kilometres north of Ilorin, the Kwara State capital for cultivation (Bukola, 2008).

According to economic theory, cross-border investments which involve cultivating large farm sizes allow resources to be used more efficiently and productively (Adewumi, Omotesho and Ayodele, 2012). These farms however, are high energy-using, high chemical-using, requiring intensive management, placing a high premium on uniformity rather than diversity of both products and environments, and appearing to depend on the results of continuing research for the maintenance of their productivity (Tisdell, 1994). The sustainability of the system in relation to food security calls for serious concern. Debates relating to the efficiency of these farms especially with respect to sustainable agricultural production compared to the small domestic farms therefore still rages on. Previous studies on the relationship between farm size and efficiency have produced conflicting results (Bravo-Ureta 1986; Moussa and Jones 1991). Nehring et al. (1989), Bravo and Rieger (1990) and Kumbhakar (1993) found that small farms are not the most efficient while Byrnes et al. (1987) and Lund and Hill (1979) suggest that medium size farms are the most efficient. Jones (1991) among others was unable to establish any significant relationship between farm size and efficiency. Measuring the efficiency differentials between the small domestic farms and the mechanized foreign farms can be identified as one of the ways to justify the contribution of the small domestic farms to sustainability objectives which include: maintenance of intergenerational economic welfare, sustainability of production and economic systems in terms of their resilience and other properties, and maintenance of biodiversity (Tisdell, 1994; D'Souza and Ikerd, 1996). This study therefore attempted to determine the efficiency differentials if any between the foreign and local farmers in Kwara State, Nigeria. In the context of a deliberate attempt at achieving efficient and sustainable agricultural production an in-depth agricultural efficiency studies is essential as such would proffer ways of improving efficiency of resource base, farm profit and technological development of farming units when investment is present and ensure sustainable use of resources (Ogundari and Ojo, 2006).

METHODOLOGY

Study Area

The study was conducted in Kwara State, Nigeria. The state consists of sixteen (16) Local Government Areas including Edu Local Government Area where the study was specifically carried out being the area where the foreign commercial farmers are situated. The state is located in the Mid-north – western part of the country within latitude $7^{\circ}45'N-9^{\circ}30'N$ and longitude $2^{\circ}30'E-6^{\circ}25'E$. The state shares boundaries with Oyo, Osun and Ondo to the south, Kebbi and Niger to the North, Kogi to the East and Republic of Benin to the West. The population of the state is put at 2,371,089 and covers an estimated land area of 32,500km² out of which 75.3% is cultivable and found suitable for almost all forms of food crops (Federal Office of Statistic, 2006, Bukola, 2008). The state has two main climatic

seasons, the dry and wet season. Annual rainfall ranges between 1000 to 1500mm while the average temperature lies between 30°C and 35°C. It also has an estimated figure of 203,833 farm families with the majority living in rural areas. The State is divided into four zones by the Kwara State Agricultural Development Project (KWADP) in consonance with ecological characteristics, cultural practices and project's administrative convenience. These are: Baruteen and Kaima Local Government Areas (Zone A); Edu and Patigi Local Government Areas (Zone B); Asa, Ilorin East, Ilorin South, Ilorin West and Moro Local Government Areas (Zone C); and Ekiti, Ifelodun, Irepodun, Offa, Oyun, Isin and Oke-Ero Local Government Areas (Zone D). The map of the study area is given in figure 1

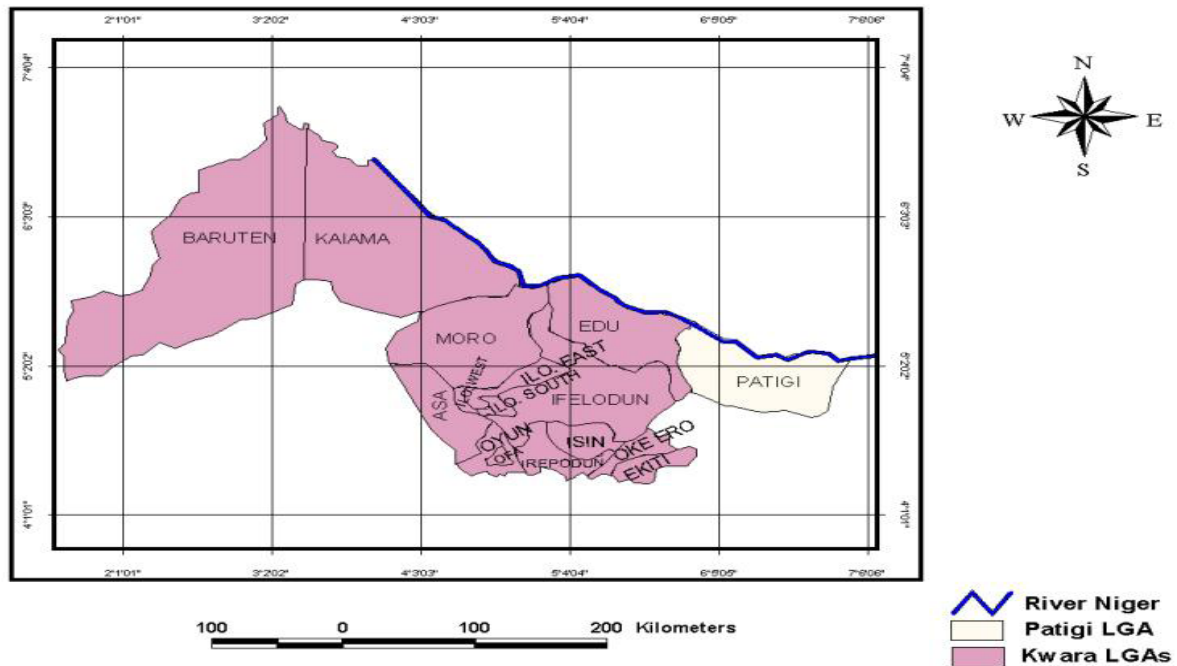


Figure 1: Map of Kwara State

Source: Kwara State Ministry of Lands and Housing, 1999.

Sampling Technique

The sampling procedure employed for the study involves the enumeration of the foreign commercial farmers from Zimbabwe and a two stage random selection of fifty domestic farmers. Ten (10) foreign commercial farmers were enumerated from a sample frame of thirteen foreign commercial farmers present in the study area (KWARA MANR). For domestic farmers, a two stage random sampling technique was adopted. The first stage involved the random selection of five (5) communities from the twenty-six (26) communities affected by Government's land acquisition exercise while the second stage involved the random selection of ten (10) domestic farmers from each of the five communities. The sample size was fifty foreign commercial farmers (which were re-sampled i.e.

bootstrapped from 10 existing foreign commercial farmers) and fifty domestic farmers making a total sample size of one hundred farmers

Analytical Techniques

Data collected was analysed and compared using descriptive statistics and Data Envelopment Analysis.

Bootstrapping

The bootstrap method of re-sampling proposed by Efron (1979) was adopted. This method does random sampling of the sample observation at cycle of computation. It is generally used to reduce bias and provide more reliable standard errors. It attempts to address problems of samples, which have a high degree of multicollinearity as well as skewness in the wrong direction (i.e. direction indicating absence of inefficiency). The bootstrap methods used in this study were similar to the one described by Maddala, (2002), and it goes as thus let (Y_1, Y_2, \dots, Y_n) be the given sample. A sample size n from this sample was then drawn with replacement. The new sample was called $B_j (Y_1, Y_2, \dots, Y_{10})$ bootstrap sample where each Y_1 is a random pick from (Y_1, Y_2, \dots, Y_n) . This was done for $J=1,2, \dots, 5$ and was completed from each of the bootstrap samples. Although it should be noted that the major problem with this type of sampling, is that it produces bad results if the estimate of the variance is poor.

Data Envelopment Analysis (DEA)

DEA is a linear programming methodology to measure the efficiency of multiple decision-making units (DMUs) when the production process presents a structure of multiple inputs and outputs. DEA has been used for both production and cost data. Utilizing the selected variables, such as unit cost and output, DEA software searches for the points with the lowest unit cost for any given output, connecting those points to form the efficiency frontier. Any firm not on the frontier is considered inefficient. A numerical coefficient is given to each firm, defining its relative efficiency. The main advantage of this method is its ability to accommodate a multiplicity of inputs and outputs. It is also useful because it takes into consideration returns to scale in calculating efficiency, allowing for the concept of increasing or decreasing efficiency based on size and output levels and there is no need to explicitly specify a mathematical form for the production function, proven to be useful in uncovering relationships that remain hidden for other methodologies (Charnes, Cooper, Lewin and Seiford 1994; Fare, Grosskopf and Lovell 1994). In using the DEA method, to solve for the technical, allocative and economic efficiencies, the price information was supplied with the view of solving with a cost minimization. The equation specified closely follows that of Coelli (1996)

Min θ

θ, λ

St $\theta x_0 - X\lambda \geq 0$ ----- (1)

$Y\lambda \geq y_0$ ----- (2)

$N1'\lambda = 1 \geq 0$ ----- (3)

$$\lambda \geq 0$$

Where:

Where θ is a scalar, $N1$ is a $N \times 1$ vector of ones, λ is an $N \times 1$ vector of constants which shows the intensity with which each farm is used in order to construct the frontier of the production possibilities set. Equation 3 in the model ($N1\lambda = 1$) is the convexity constraint which makes the model to have a variable returns to scale (VRS) specification. Without $i\lambda$, the model would have a constant return to scale specification (CRS). Thus, the linear programming problem needs to be solved N times and a value of θ is provided for each farm (DMU) in the sample.

RESULTS AND DISCUSSIONS

Socio-Economic Characteristics of the Respondents

Comparative analysis of farming experience of both farm groups indicates that foreign commercial farmers were more experienced on the average than the domestic farmers. The average farming experience for the domestic farmers was 21 years while that of the foreign commercial farmers was 30 years. All the domestic farmers were males implying the dominance of males in agricultural production in the study area. On the other hand, the foreign commercial farmers from were predominantly males as well. This can probably be attributed to the risk preference of men folk towards sojourning into new land for their livelihood and sustenance of their families. The distribution of domestic farmers indicates that a sizable number of them (about 30%) can neither read nor write unlike the highly educated foreign commercial farmers. Differentials in the farm size of both farm groups reflects that the minimum farm size utilized by foreign commercial farmers was approximately 34 times bigger than the maximum farm size utilized by domestic farmers. The average farm size cultivated by the domestic farmers was 1.6 hectares while for the foreign farmers it was 272 hectares. Land was neither rented nor purchased by the domestic farmers but rather was made available on request from the family head. Foreign commercial farmers on the other hand, had their lands made available to them by the government.

Differentials in Efficiency Indices for Both Groups Using DEA Method of Estimation

A summary of the distribution of productive efficiencies of both farm groups is given in table 1

Table 1: Distribution of Productive Efficiencies of Both Farm Groups.

Efficiency Range	Domestic Farmers						Foreign Commercial Farmers					
	TE		AE		EE		TE		AE		EE	
	Freq	(%)	Freq.	(%).	Freq.	(%).	Freq	(%)	Freq	(%)	Freq	(%)
<50	0	0	2	4	2	4	0	0	0	0	0	0
51-60	0	0	1	2	1	2	0	0	0	0	0	0
61-70	0	0	2	4	4	8	0	0	8	16	8	16
71-80	1	2	5	10	7	14	0	0	0	0	0	0
81-90	4	8	8	16	6	12	0	0	0	0	5	10
91-100	45	90	32	64	30	60	50	100	42	84	37	74
Total	50	100	50	100	50	100	50	100	50	100	50	100
MIN	0.779		0.165		0.165		0.908		0.701		0.701	
MAX	1.000		1.000		1.000		1.000		1.000		1.000	
MEAN	0.979		0.896		0.878		0.991		0.944		0.936	
STDEV	0.054		0.164		0.175		0.028		0.109		0.113	

TE: Technical Efficiency; AE: Allocative Efficiency; EE: Economic Efficiency

Mean technical, Allocative and overall economic efficiencies of domestic farmers were 98, 90 and 88% respectively while foreign commercial farmers had mean technical, Allocative and economic efficiencies of 99, 94 and 94% respectively. Productivity efficiency indices portrayed a high skewness in the range of 91-100% for both farm groups signifying that most of the respondents generally produce on the most efficient frontiers of production. The higher productive efficiency frontiers achieved by foreign commercial farmers could be attributed to the more sophisticated techniques of production adopted by this group of farmers. On conducting a student t-test on the means of the DEA methods of estimation for both farm groups, there was no significant difference in the means of technical and allocative efficiency scores of domestic and foreign commercial farmers. While the means of overall economic efficiencies of both farms groups suggests that there was a significant difference in productive efficiency of both farm groups.

CONCLUSION AND RECOMMENDATIONS

From the results of the analyses, it can be concluded that on the overall, the foreign commercial farmers were more efficient than the domestic farmers in the study area. However, considering the little difference in economic efficiency and with no significant difference in allocative and technical efficiency, a transformation from emphasis on large-scale and intensive systems of agriculture towards small-scale sustainable agriculture is recommended to improve the country's food security situation since it is in this area that most gains in terms of both productivity increases and rural poverty reduction can be achieved. This is in view of the fact that food production in the country is mainly in the hands of the small scale farmers. For agricultural and economic growth to occur, technological driven-approaches needs to be considered in order to achieve an optimum combination of farm inputs, which is one strong point the foreign farmers have on their side. In as much as government is prepared to co-finance agricultural investment by foreign investors, such leverages should be extended to domestic farmers particularly in the form of input supports at subsidized rate. Government should design policy strategies that would encourage private sector participation and technology transfer as well as ensure the use of modern farming techniques by the smallholder farmers to increase efficiency of agricultural production in the country. Adaptation of sustainable agricultural technologies to local conditions and the needs of the smallholder farmers in a way that is affordable to them are very crucial. The government should develop Capacity building programmes for the smallholder farmers to enable them innovate through learning and experimentation and to secure better access to input and product markets while also employing sustainable practices that require less water wastage and less use of chemicals and pesticides that cause land degradation.

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ABOUT THE AUTHORS:

Abayomi Olubumin Omotesho is a Professor of Agricultural Economics, Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Nigeria.

Muhammad-Lawal Abdulazeez is a Senior Lecturer, Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Nigeria.

Adewale Henry Adenuga is an Assistant Lecturer, Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Nigeria.

Bello Sadiq. Abiodun is affiliated with the Department of Agricultural Economics and Farm Management, University of Ilorin, Ilorin, Nigeria.