*International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs)*
*Available online on: http://ijasrt.iau-shoushtar.ac.ir*
*ISSN: 2251-7588 Print*
*ISSN: 2251-7596 Online*
***2015: 5(3):195-201***

*Received: 10 May 2016*
*Reviewed: 15 June 2016*
*Revised: 23 June 2016*
*Accepted: 10 October 2016*

# Effect of Land Fragmentation on Smallholders' Productivity in Imo State, Nigeria

**Iheke, O. R. and Amaechi, E. T**
*Department of Agricultural Economics, Michael Okpara University of Agriculture, Umudike, Nigeria*
*Corresponding Author Email: ralphiheke@gmail.com*

**Abstract**

This study analyzed the determinants of the productivity of smallholder arable crop farmers with a particular focus on land fragmentation using the Simpson Index as measures of land fragmentation in Imo state of Nigeria. Data collected by using structured questionnaire and interview schedules were analyzed using simple descriptive statistics; Simpson index and regression analysis. Results showed that a greater percentage of the respondents were females, while the average age of the respondents was 52 years. About 90% of the respondents had formal education. The average farm size cultivated by the respondents was about 1 ha. Farming was the primary occupation of majority (73.33%) of the respondents. About 63.33% of the respondents were not visited by extension agents during the last cropping season. The Simpson index was 71.91%, indicating high degree of land fragmentation. The significant factors influencing the productivity of the farm were fragmentation, fertilizer, labour, and planting materials. Land reform policies and programmes that would give farmers access to more contiguous land holdings for increased agricultural production was recommended.

**Keywords**: Land, Fragmentation, Smallholder, Productivity

## 1. Introduction

Land is a basic resource for agricultural production. Land fragmentation is a phenomenon which exists when a household operates a number of owned or rented non-contiguous plots at the same time (Wu *et al*, 2005). Land fragmentation has been a prominent feature in many countries since at least the 17$^{th}$ century (Shuhao, 2005). The existence of fragmented landholdings is regarded as an important feature of less developed agricultural systems. It can be a major obstacle to agricultural mechanization, causing inefficiencies in production and involves large cost to alleviate its effects (Niroula and Thapa, 2007). Rahman and Rahman (2008) reported that land fragmentation has a significant detrimental effect on productivity and efficiency.

According to Shuhao (2005) and Jha *et al* (2005), land fragmentation leads to increased travelling time between fields, hence lower labour productivity and higher transport cost for inputs and outputs. They noted that fragmentation also involves negative externalities such as reduced scope for irrigation, soil conservation investments and loss of land for boundaries and access routes. Farmers may also incur higher costs of supervising workers on each separate farm than when supervision occurred on a large farm. Fragmentation also involves greater potential for dispute among neighbours. These conflicts arise when farmers do not agree with the current farm demarcations especially because they believe that their neighbours have cheated them by taking some land from their respective farms.

While numerous land consolidation and land reform policies have been implemented to reduce fragmentation in European countries like the Netherlands and France, in African countries like Kenya, Tanzania, Rwanda and elsewhere (Sabates-Wheeler, 2002), fragmentation still persist in Nigeria probably caused by the traditional land tenure system. The promulgation of the 1978 Land Use Act was in a

bid to solve the problems of fragmentation posed by the land tenure system (broadly described as rigid, creating obstacles in the way of development).

### 1.1 Land Fragmentation and Productivity of Smallholders' Farms: An Empirical Review

There has been debate over time on land size and land productivity relationship. The debate basically focused on the effect of fragmentation on the ability of farmers to minimize risk. Bizimana *et al* (2004), Binswanger *et al* (1993), Jabarin and Epplin (1994), Blarel *et al* (1992), Carlyle (1983), Heston and Kumar (1983), Bentley (1987), reported that land fragmentation has a negative effect on productivity and yield. Jha *et al* (2005) reported a significant positive relationship between average farm size and yield while the number of plots and yield were inversely related.

On the other hand, Boliari (2013a), Huang *et al.* (2007), Lerman (2005), Battese *et al* (1989), and Huang and Bagi (1984) noted that variations across farms were due to differences in productivity, which was largely influenced by farm size and ecological and socio-economic factors such as gender, age, education, extension services, access to credit, among others.

Among the advocates of fragmentation because of its benefit to farmers were Ilbery (1984), Bentley (1987), Tan (2005) and Shuhao (2005). They viewed land fragmentation as a positive choice by farmers in order to reduce risk from natural disasters (such as floods and droughts), promote crop diversification, as well as to ease allocation of labour over cropping seasons. Bentley (1987) noted that land fragmentation may enable risk management through the use of multiple agro-climatic zones and the practice of crop scheduling. Growing crops in different locations may reduce the risk of losing output due to perils such as floods, fires and destruction of crops by herds. Shuhao (2005) opined that land fragmentation may also enable the growing of a variety of crops that mature and ripen at different farm at different times.

This study specifically measured the degree of land fragmentation in the study area and examined the effect of land fragmentation and other factors on the productivity of farms.

## 2. Materials and methods

This study was conducted in Imo State, Nigeria. Imo State lies within latitudes $4^0$ 45' and $7^0$ 15' north of the equator and longitude $6^0$ 50' and $7^0$ 25' east of the Greenwich Meridian. It has a land area of 5100 square kilometers. According to national census of 2006, Imo State has a population of 4.8 million people and the population density varies from 250-1400 people per square kilometer. It is bordered by Abia State on the East, by Anambra State to the North, by the River Niger and Delta State on the West and Rivers State to the South. The main cities in Imo State are Owerri, Orlu, Mbaise, Mbano and Okigwe. Administratively, the State is divided into 27 Local Government Areas and has three (3) Agricultural Zones namely: Owerri, Orlu and Okigwe. The major occupation of the Imo inhabitants especially in the rural areas is farming.

Purposive and simple random sampling techniques were used in selecting the respondents. Six Local Government Areas (LGAs) out of the 27 LGAs in the State were purposively selected based on performance in arable crop production. From the selected LGAs, 2 autonomous communities were randomly selected from each LGA. Finally, 6 smallholder arable crop farmers were randomly selected from each community to give a total of 72 respondents.

Data collection was by structured questionnaire and interview schedules administered to the respondents. Data collected were on the socio-economic characteristics of the respondents such as on age, gender, marital status and household size, level of education attained, occupation, years of experience and farm input and output data as well as on land fragmentation. Sixty seven questionnaires were retrieved and 60 were found to be useful and used for analysis.

Simple descriptive statistics such as mean, frequency tables and percentages; Simpson's index and regression analysis were used for data analysis. With respect to measuring fragmentation, the Simmons Index of Simmons (1964), the Januszewski Index of Januszewski (1968) and the Simpson Index of Blarel *et al* (1992) are among the most commonly used fragmentation indices in the literature. None of these indices is superior to one another; they are essentially similar to each other and incorporate the same three parameters desirable in assessing the degree of fragmentation: 1. the farm size; 2. the number of plots; and 3. the size of plots. The choice of index for this study is the Simpson Index. The Simpson Index is defined as the sum of the squares of the plot sizes, divided by the square of the farm size.

$$\mathrm{SI} = \frac{\sum_{i=1}^{n} a_i^2}{A^2} \qquad (1)$$

Where SI is the fragmentation index, n is the number of parcels belong to a holding, a is the size of a parcel and A is the total holding size. An SI value of 1 means that a holding consists of only one parcel and values closer to zero mean higher fragmentation.

The Simmons index becomes the Simpson index if it is subtracted from 1.

The effect of fragmentation on land productivity was analyzed using the Ordinary Least Square regression model. The model is specified in the implicit form as:

$$Y = f(X_1, X_2, X_3, X_4, X_5) \quad (2)$$

Where Y = land productivity (total value of arable crops divided by total planted area of the crops); $X_1$= land fragmentation index (as defined previously); $X_2$ = fertilizer (kg); $X_3$ = cost of planting materials (naira), $X_4$= labour cost in Naira; and $X_5$=capital in naira made up of capital consumption allowance, interests, rents, etc. Four functional forms namely: linear, exponential; semi long and double log function were tried and the best fit model chosen for further analysis. The choice of the best fit model was based on the magnitude of the coefficient of multiple determinations ($R^2$), f-statistics, the number of significant variables and the conformity of the signs borne by the coefficients of the variables to a priori expectations.

## 3. Results and discussion

### 3.1 Socio-economic characteristics of respondents

The socio-economic characteristics of the respondents are presented in Table 1. The results showed greater percentage of the respondents were females. This is consistent with Idowu and Ajani (2008). They reported that women have been found to participate actively in all subsectors of agriculture, namely crops, livestock, fisheries and agro forestry, and particularly in subsistence food production, where they contribute an estimated 60 to 80 percent of the total labor used. Majority of the farmers were aged between 41-50 years, with the mean age being 52 years. This implies ageing farming population. Farm operations in Nigeria have remained labour intensive and require able-bodied men and women. As noted by Iheke (2010) and Iheke and Nwaru (2014), the risk bearing abilities and innovativeness of a farmer, his mental capacity to cope with the daily challenges and demands of farm production activities and his ability to do manual work decrease with advancing age. Majority of the respondents were married and this implies that farm households are stable with *ceteris paribus,* a pool of family labour for farm work. According to Nwaru (2004), the stability should create conducive environments for good citizenship training, development of personal integrity and entrepreneurship. About 90% of the respondents had one form of formal education or the other from primary to tertiary. This implies that they are literate and should be able to understand and evaluate farm innovations. Education has been hypothesized to positively influence productivity of farms (Amos, 2007; Kibaara 2005). Education has been described as being pivotal to unlocking the entrepreneurial abilities of farmers and enhancing their ability to understand and evaluate new production techniques (Iheke, 2010; Nwaru*et al.,* 2011).

The average farm size cultivated by the respondents was about 1 ha. This shows declining farm size which may be due increased population pressure and rapid urbanization as witnessed in the study area. As reported by Iheke (2010), rural farms are usually small-sized, fragmented and scattered and not contiguous land holdings. According to Nwaru (2004), small-sized, fragmented and scattered holdings poses a great challenge to the much-desired agricultural modernization/mechanization and commercialization in Nigeria and therefore depicts the need for urgent land reform policies and programmes that would give farmers access to more contiguous land holdings for increased agricultural production.

Farming was the primary occupation of majority (73.33%) of the respondents. This is in line with research findings that farming is the major occupation of rural dwellers. The average household size was 6 persons per household. This is consistent with the findings of Iheke and Ukaegbu (2015). According to Iheke (2010), large household size is desirable and of great importance in farm production as rural households rely more on members of their households than hired workers for labour on their farms. Majority (63.33%) of the respondents were not visited by extension agents during the last cropping season, a measure which if reversed would impact positively on farm productivity. Iheke (2006) noted that as change agents, extension workers serve as channels for diffusion of technical innovations. Extension services provide informal training that helps to unlock the natural talents and inherent enterprising qualities of the farmer, enhancing his ability to understand and evaluate new production techniques leading to increased farm productivity and incomes with concomitant increase in the welfare of the farmer (Nwaru, 2004; Nwaru *et al*., 2011). The average distance from the homestead to the farm was 3.2 kilometers. Distance from the households' residences to plots has been reported to negatively affect the productivity of farms (Shuha, 2005; Byringiro and Reardon, 1996).

### 3.2 Degree of land fragmentation

The degree of land fragmentation as estimated using the Simpson Index was 0.72. This indicates high level of fragmentation or parcelation of the farms. This conforms to the report of Iheke (2010), Boliari (2013a; 2013b). According to Shuhao

(2005) and Jha *et al.*(2005), land fragmentation leads to increased travelling time between fields, hence lower labour productivity and higher transport cost for inputs and outputs. It also involves negative externalities such as reduced scope for irrigation, soil conservation investments and loss of land for boundaries and access routes.

**3.3 Factors influencing smallholder farmers' land productivity**

The regression result of the factors influencing productivity is presented in Table 2. The double log functional form was chosen as the lead equation. The coefficient of multiple determination ($R^2$) was 0.7604 which implies that 76.04% of the variations in land productivity were explained by the independent variables includes in the model. The F-ratio was significant at 1% probability indicating the goodness-of-fit of the model. The significant factors influencing land productivity were fragmentation, fertilizer, labour, and planting materials. The coefficient of land fragmentation index was negatively signed and significant at 1% level of probability. This implies that the greater the degree of fragmentation of land, the less the productivity. This conforms to a priori expectation. Jha *et al.* (2005), Bizimana *et al.* (2004), and Barel *et al.* (1992) reported that land fragmentation reduces the productivity of farms. The coefficient of fertilizer was significant at 5 percent significant level and positively related to productivity. This implies that productivity increases with increase in the use of fertilizer. This conforms to *a priori* expectation. Most farm land has been impoverished due to continuous cropping and fertilizer application has become a veritable option for enhancing the fertility of the soil, leading to increase in productivity. This explains the positive relationship between fertilizer use and productivity. The coefficient of labour was positively related to productivity and significant at 1% probability level. This implies that as the farmers employs more labour services, his productivity increases. Agricultural production has remained labour intensive in Nigeria and is an indispensable factor of production. This could explain the positive relationship between labour and productivity. This result agrees with the findings of Iheke and Nwaru (2014). The coefficient of planting materials was positively signed and significant at 1% probability level. This result implies that as the farmers improves on the use of planting materials, productivity increases. This is more so with the use of improved varieties of planting materials (seeds and cuttings).

Table 1. Distribution of respondents based on their socio-economic characteristics

| Variables | Frequency | Percentage (%) | Mean |
|---|---|---|---|
| Gender (dummy: male =1, female = 0) | | | |
| Male | 27 | 45.0 | |
| Female | 33 | 55.0 | |
| Age (years) | | | |
| 31 – 40 | 04 | 6.67 | |
| 41 – 50 | 27 | 45.00 | |
| 51 – 60 | 15 | 25.00 | |
| 61 – 70 | 14 | 23.33 | 52 |
| Marital status | | | |
| Married | 36 | 60.0 | |
| Widowed | 15 | 25.0 | |
| Single | 4 | 6.70 | |
| Divorced | 5 | 8.30 | |
| Educational level | | | |
| No education | 06 | 10.0 | |
| Primary | 31 | 51.6 | |
| Secondary | 19 | 31.7 | |
| Tertiary | 04 | 6.7 | |
| Farm size (hectares) | | | |
| 0.1 – 0.5 | 07 | 11.67 | |
| 0.6 – 1.0 | 31 | 51.67 | |
| 1.1 – 1.5 | 22 | 36.67 | 0.93 |
| Primary occupation | | | |
| Farming | 44 | 73.33 | |
| Non-farming | 16 | 26.67 | |
| Household size (number) | | | |
| 1 – 4 | 09 | 15 | |
| 5 – 8 | 49 | 81.67 | |
| 9 – 12 | 02 | 3.33 | 6 |
| Extension visits | | | |
| Visited | 22 | 36.67 | |
| Not visited | 38 | 63.33 | |
| Average plot distance(km) | | | |
| 1-5 | 58 | 96.67 | |
| 6-10 | 2 | 3.33 | 3.2 |

Table 2. Factors influencing smallholder farmers'land productivity

| Variable | Linear | Exponential | Double log + | Semi log |
|---|---|---|---|---|
| Intercept | 70.074 | 4.339 | 3.998 | 0.185 |
| | (2.24) ** | (18.59) *** | (4.15)*** | (0.14) |
| Land fragmentation index ($X_1$) | 3.574 | -0.026 | -0.315 | -0.361 |
| | (2.14)** | (-2.11)** | (-3.53) *** | (-2.30) ** |
| Fertilizer ($X_2$) | 42.357 | 0.366 | 0.261 | 1.790 |
| | (1.22) | (1.41) | (2.28) ** | (0.54) |
| Labour($X_3$) | 7.231 | 0.062 | 0.240 | 0.269 |
| | (1.53) * | (1.75) * | (2.96) *** | (2.40) ** |
| Planting materials (seeds, cuttings)($X_4$) | 0.007 | 0.519 E-4 | 0.294 | 0.029 |
| | (0.29) | (0.25) | (2.60) *** | (0.25) |
| Capital($X_5$) | -8.489 E-4 | -9.30 E-06 | -0.063 | -0.159 |
| | (-0.64) | (-0.94) | (-0.40) | (-0.49) |
| $R^2$ | 0.5693 | 0.6392 | 0.7604 | 0.4877 |
| $R^{-2}$ | 0.5147 | 0.5745 | 0.7282 | 0.4165 |
| F- ratio | 4.68*** | 5.42*** | 8.32*** | 3.57*** |

***= Significant at 1%, **= Significant at 5%, *= Significant at 10%, + = lead equation
Figures in parenthesis are the t-ratios.

**4. Conclusion and recommendations**

It could be concluded that there is a high degree of land fragmentation in the study area, which has a negative effect on farm productivity. It increases both travelling time and cost of traveling between plots, hence lower labour productivity and raises the transport cost for inputs and outputs. These reduce overall productivity of the farm. It poses a great challenge to the much-desired agricultural modernization/mechanization and commercialization in Nigeria. This therefore depicts the need for urgent land reform policies and programmes that would give farmers access to more contiguous land holdings for increased agricultural production. In particular, there is the need for review of the land use decree to grant genuine farmers access to contiguous land holdings. It was also recommended that productivity enhancing support services such as fertilizers and other agrochemicals, improved varieties, and extension services should be made readily available and at affordable prices to farmers by the government (Ministry of Agriculture, Agricultural Development Programmes) and other development partners in the agricultural sub-sector. This is so if the country is to achieve self-sufficiency in food production

**References:**

1. Amos, T. T. (2007). An analysis of productivity and technical efficiency of smallholder cocoa farms in Nigeria. *Journal of Social Science*, 15(2): 127-133.

2. Battese, G. E., Coelti, T. J. and Colby, T. C. (1989). Estimation of frontier production functions and the efficiencies of Indian farms using panel data from ICRISAT village land studies.*Journal of Quantitative Economies,* 5:327-348.

3. Bentley J. W. (1987). Economic and ecological approaches to land fragmentation: In defense of a much maligned phenomenon, *Annual Review of Anthropology 16*, 31-67.

4. Binswanger, H., Deininger, K. and Feder, G. (1993). Power, Distortions, Revolt and Reform in Agricultural Land Relations, in Behrman, Jere and T.N. Srinivasan, eds, *Handbook of Development Economics* (Amsterdam: Elsevier).

5. Bizimana, C. W., Nieuwoudt, L. and Ferner, S. R. D. (2004). Farm size, land fragmentation and economic efficiency in Southern Rwanda, *Agrekon*, 43 (2): 244-262.

6. Blarel B., Hazell P., Place F., Quiggin J. (1992). The economics of farmfragmentation: Evidence from Ghana and Rwanda, *World Bank EconomicReview 6*(2): 233-254.

7. Boliari, N. (2013a). Does land fragmentationaffect land productivity?Empirical evidence from Bulgaria. *Review of Agricultural and Environmental Studies,* 94 (3): 273-302

8. Boliari N. (2013b). Land fragmentation in Bulgaria: reconsidering its measurement and extent, *Review of European Studies* 5(1): 99-109.

9. Byringiro, F. and Reardon, T. (1996). Farm productivity in Rwanda: The effects of farm size, erosion and soil conservation investments, *Agricultural Economics*, 15 (2): 127-136.

10. Carlyle, W. J. (1983). Fragmentation and consolidation in Manitoba, *Can, Geogr.,* 27: 17 – 34.

11. Heston, A. and Kumar, D. (1983). The persistence of land fragmentation in peasant agriculture. An analysis of South Asia Cases, *Explorations in Economic History*, 20: 199 – 220.

12. Huang, C. J. and Bagi, F. S.(1984). Technical Efficiency on Individual farms in Northwest India, *Southern Economist Journal*, 51: 108 – 115.

13. Hung P. V., MacAulay T. G., Marsh S. P. (2007). The economics of land fragmentation in the north of Vietnam, *Australian Journal of Agricultural and Resource Economics 51*(2), 195-211.

14. Idowu, O. and Ajani, Y. (2008). Gender Dimensions of Agriculture, Poverty, Nutrition, and Food Security in Nigeria. Nigeria Strategy Support Program Brief No. 5. International Food Policy Research Institute.

15. Iheke, O. R. (2006). Gender and Resource Use Efficiency in Rice Production Systems in Abia State of Nigeria. MSc Thesis, Michael Okpara University of Agriculture, Umudike.

16. Iheke, O. R. (2010). Impact of Migrant Remittances on Efficiency and Welfare of Rural Smallholder Arable Crop Households in South Eastern Nigeria. Ph. D. Dissertation. Michael Okpara University of Agriculture, Umudike, Nigeria.

17. Iheke, O. R. and Ukaegbu, H. I. (2015). Effect of Poor Health and Farmers' Socioeconomic Variables on Total Factor Productivity of Arable Crop Farm Households in Abia State, Nigeria. *Nigerian Journal of Agriculture, Food and Environment.* 11(3):141-146.

18. Iheke, O. R., and Nwaru, J. C. (2014). Impact of Innovation on Smallholders' Productivity and Poverty Status: The Case of Arable Crop Farmers in South-East, Nigeria. Asian Journal of Agricultural Extension, Economics & Sociology 3(4): 301-318.

19. Ilbery, B. W. (1984). Farm fragmentation in the Vale of Evesham. *Area* 16: 159–165.

20. Jabarin, S. A. and Epplin, F. M. (1994).Impact of land fragmentation on cost f producing wheat in the rain-fed region of Northern Jordan, *Agricultural Economics*, 11: 191 – 196.

21. Januszewski J. (1968). Index of land consolidation as a criterion of the degree of concentration, *GeographiaPolonica 14*, 291-296.

22. Jha, R., Nagarajan, H. K. and Prasanna, S. (2005).Land Fragmentation and its Implications for Productivity: Evidence from Southern India. ASARC Working Paper 2005/01. Australia South Asia Research Centre, RSPAS, Division of Economics, Australian National University.

23. Lerman Z. (2005). Farm fragmentation and productivity: Evidence from Georgia, Discussion Paper No. 8.05, Department of Agricultural Economics and Management, The Hebrew University of Jerusalem, 10p.

24. National Population Commission (NPC). (2006). The Population Census of the Federal Republic of Nigeria Analytical report at the National Population Commission- Abuja.

25. Niroula, G. S. and Thapa, G. B. (2007). Impact of Land Fragmentation on Input Use, Crop Yield and Production Efficiency in the Mountains of Nepal. *Land Degradation and Development,* 18: 237-248.

26. Nwaru, J.C. (2004).*Rural Credit Markets and Resource Use in Arable Crop Production in Imo State of Nigeria.* PhD Thesis Michael Okpara University of Agriculture, Umudike.

27. Nwaru, J. C., Iheke, O. R. and Onyenweaku, C. E. (2011). Impact of Migrant Remittances on the Welfare of Arable Crop Farm Households in South Eastern Nigeria, Human Ecology Review, l 18 (2): 159-166.

28. Rahman, S. and Rahman, M. (2008).Impact of land fragmentation and resource ownership on productivity and efficiency: The case of rice producers in Bangladesh. *Land Use Policy* 26: 95–103.

29. Sabates-Wheeler, R. (2002). Consolidation Initiatives after Land Reform: Responses to Multiple Dimensions of Land Fragmentation in Eastern Europe Agriculture. *Journal of International Development,* 14:1005-1018.

30. Shuhao, T. (2005). *Land fragmentation and rice production: A case study of small farms in Jiangam Provicne , P. R. Chian*, PhD Thesis, Wageningen University.

31. Simmons A. J. (1964). An index of farm structure, with a Nottingham shire example, *East Midlands Geographer 3*, 255-261.

32. Wu, Z., Liu, M. and Davis, J. (2005). Land Consolidation and Productivity in Chinese Household Crop Production. *China Economic Review* 16, 28–49.

مجله بین‌المللی علوم، تحقیقات و فناوری کشاورزی در نظام‌های آموزش و ترویج
قابل دستیابی در: http://ijasrt.iau-shoushtar.ac.ir
شاپا نسخه چاپی:۷۵۸۸-۲۲۵۱
شاپا نسخه برخط: ۷۵۹۶-۲۲۵۱
۲۰۱-۱۹۵:(۳)۵ :۲۰۱۵

۲۱ اردیبهشت ۱۳۹۵ :دریافت نسخه اولیه
۲۶ خرداد ۱۳۹۵ :ارسال پاسخ داوری
۳ تیر ۱۳۹۵ :دریافت نسخه اصلاحی
۱۹ مهر ۱۳۹۵ :پذیرش

# اثر خرد شدن اراضی بر بهره‌وری خرده‌مالکان در ایالت آیمو، نیجریه

**آی هکه، ا. آر و آماچی، ا. تی**

*گروه اقتصاد کشاورزی، دانشگاه کشاورزی میخائیل اکپارا، یومودیکا، نیجریه*

*Email: ralphiheke@gmail.com*

## چکیده

هدف از این تحقیق ارزیابی اثر خرد شدن اراضی بر بهره‌وری خرده‌مالکان در ایالت آیمو، نیجریه بود. از شاخص سیمپسون برای سنجش میزان خرد شدن اراضی استفاده شد. به منظور جمع‌آوری داده‌ها از پرسشنامه ساختاریافته استفاده شد. از آمار توصیفی، شاخص سیمپسون و رگرسیون برای توصیف و تحلیل داده‌ها بهره گرفته شد. نتایج نشان داد که بیشتر افراد زن بودند. میانگین سن پاسخگویان ۵۲ سال بود. حدود ۹۰ درصد افراد دارای تحصیلات رسمی بودند. میانگین زمین زیرکشت یک هکتار بود. شغل اصلی اکثر افراد زراعت بود. حدود ۶۳/۳۳ درصد افراد در فصل زراعی جاری توسط مأموران ترویج مورد بازدید قرار نگرفته بودند. شاخص سیمپسون ۷۱/۹۱ درصد بود که نشان دهنده میزان بالای خرد شدن اراضی است. از عوامل مؤثر و معنی‌دار بر سطح بهره‌روری زارعان شامل خردشدن اراضی، کودهای شیمیایی، نیروی کار و نهاده‌های مورد نیاز کشت بود. سیاست‌های اصلاحات اراضی که فراهم کننده دسترسی کشاورزان به زمین‌های یکپارچه بیشتر برای افزایش تولیدات کشاورزی است، توصیه می‌شود.

**کلمات کلیدی:** اراضی، خرد شدن، خرده‌مالکان، بهره‌وری