Land Fragmentation and Crop Production: Evidence from the Rural Communities in GAAV District, Konshisha L.G. Area of Benue State, Nigeria

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Abstract:
The aim of this paper was to investigate land fragmentation in relation to crop production in the rural environments of Gaav District in Konshisha L.G. Area of Benue State. Objectively, attempts were made to identify methods of land acquisition, causes of land fragmentation, and the level association between land fragmentation and crop production in the study area. The study was basically a survey and analytical design involving personal observation, focus group discussion, structured interview and the use of the questionnaire to collect data on the variables of interest. The study population included household heads and the rural farmers. However, the data were collected on ordinal scales of measurement, and were analyzed with the use of the Chi-Square statistical technique to test the level of association existing between land fragmentation and crop production in the area. The result however revealed different methods of land acquisition to include: inheritance, lease/outright purchase, and government allocations. Major causes of land fragmentation were identified to include the traditional farming methods, land tenure systems, increase in population, settlement patterns and government policies on land. Furthermore, the Chi-Square statistical test showed X^2(4, N=316) = 6.384, P = .17, implying that the respondents did not differ significantly in the opinion that land fragmentation reduces crop production. Based on these findings however, the study recommended that government should develop policy frameworks that would encourage private and corporate participation in land acquisition for the development of commercial agriculture at a reduced or no cost implications. Create and ensure unconditional financial facilities that would be accessible to individuals and corporate organizations who are actively involved in commercial farming activities in the area.

Keywords: Land fragmentation, crop production, land tenure systems, rural farmers rural environments, land acquisition, and commercial agriculture

1. Introduction/Review of Related Literature

In conventional consideration, land is made up of the solid part of the earth surface. It constitutes the soil together with vegetation, rivers, streams, ponds, hills and mountains and airspace immediately above the land. It is the totality of something fundamental to human existence. It is not only the source of wealth, but also depicts the character and quality of men who inhabit it and whom it serves (Hiller, 2004). Put differently, Ulrich and Amacher (1986) maintained that land comprises all natural resources that can be used as inputs to production. Igbozirike (1990), maintained that land is an area of the earth surface, the characteristics of which embrace all attributes of the biosphere, vertically above and below this area.

The continuous growth in population and the increasing demand for land for different purposes including agricultural production in the rural environments tend to create room for households to operate more than one non-contiguous parcels of land in their communities. This continually encourages what is referred to as "land fragmentation" - a phenomenon most commonly prevalent in the rural African societies. According to Singh (1994) land fragmentation is simply the division of land or segmentation of land under which a cultivator owns an operational holding of more than one plots of land which may be separated from one another.

In a rural environment, where agricultural practices tend to dominate the rural economic, there are indications that land needs be distributed among the local people for their seasonal agricultural practices. As the case may be, the extent to which rural land parcels

continue to be shared among the people might not be easily noticed and as such, the devastating effect and possible economic dangers posed may not readily come to manifestation.

In Gaav District of Konshisha local government area of Benue State where agriculture is the dominant economic activity, it is obvious that land parcels are continually shared to new entrants- grown up men who are entitled to land by inheritance. The intensity and magnitude by which land parcels continue to be shared in this area has thereforebecome a subject of great concern in this discourse. However, having an appreciable understanding and a fair knowledge of this phenomenon in Gaav District of Konshisha local government area of Benue State in no distant time would be of assistance. In view of the above therefore, an inquiry into various methods of land acquisitionand comparative assessment of different sizes of plots of land in the area will enhance our in-depth understanding of the situation on ground. Significantly, it would mark the beginning of our conscious efforts to provide appropriate measures for effective land resource management in order to encourage and enhance full agricultural potentials in Gaav District of Konshisha local government area.

In consideration of the discussions so far, this study therefore sought to: (1) identify the major methods of land acquisition in Gaav District of Konshisha local government area, (2) identify major causes of land fragmentation in the area and (3) determine the level of association between land fragmentation and crop production in the area.

The study design was based on a survey and analytical methodology involving the review of related literature using available means, personal observation, experience, focus group discussion and the use of the questionnaire.

However, the result of the study revealed significant methods of land acquisition in the study area to include: inheritance, government allocation of lands and lease/outright purchases. The study has also identified major causes of land fragmentation some of which include; the traditional farming methods, land tenure systems, increase in population, settlement patterns and government policies on land in Gaav District of Konshisha local government area of Benue State. However, it has been established that land fragmentation has significant implications on crop production in Gaav District of Konshisha local government area of Benue State. Based on the outcome of this study therefore, it has been recommended that government should develop policy frameworks aimed at encouraging private and corporate participation in land acquisition for the development of commercial agriculture at a reduced or no cost implications. Open up financial facilities and make them accessible to individuals and corporate organizations who are actively involved in commercial farming agriculture in the area.

2. Study Area

Gaav District is one of the Districts in Konshisha Local Government Area of Benue State. The District is made up of seven council wards which include Mbakyer, Mbawar, Mbake, Mbanor, Mbatem, Mbatsen and Mbavaa council wards. Gaav District lies between latitudes 6^0 and 8^0 north of the equator and longitudes 8^0 and 10^0 east. The area is bordered by the Mbatyav District of Gboko Local Govenrment Area and the Ukan of Ushongo Local Government Area on the north, the Kunav people of Vandeikya local government area on the East, the Ugabu people of Cross River State on the south and the Shangev-tiev District in the same Konshisha local government on the west. For a detailed description of the study area, (Please see Figures 1&2).
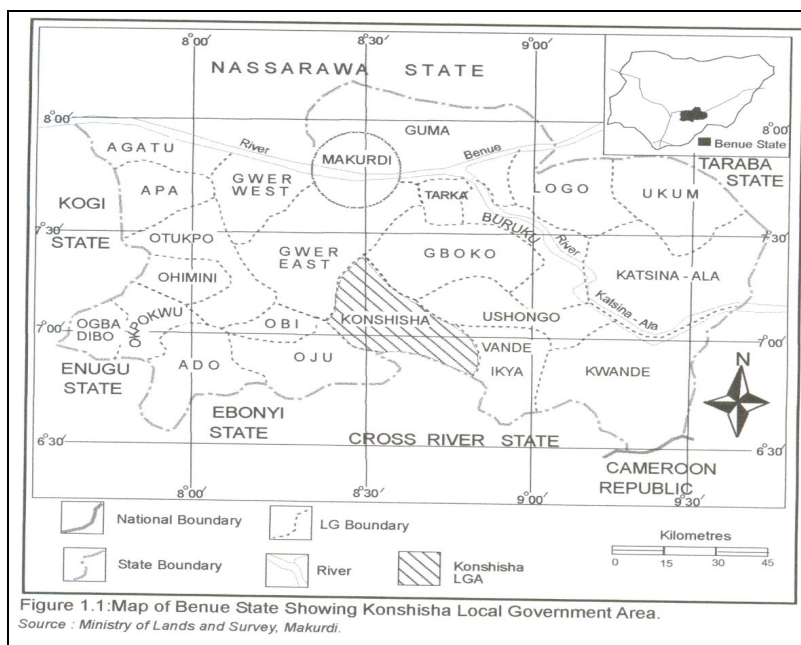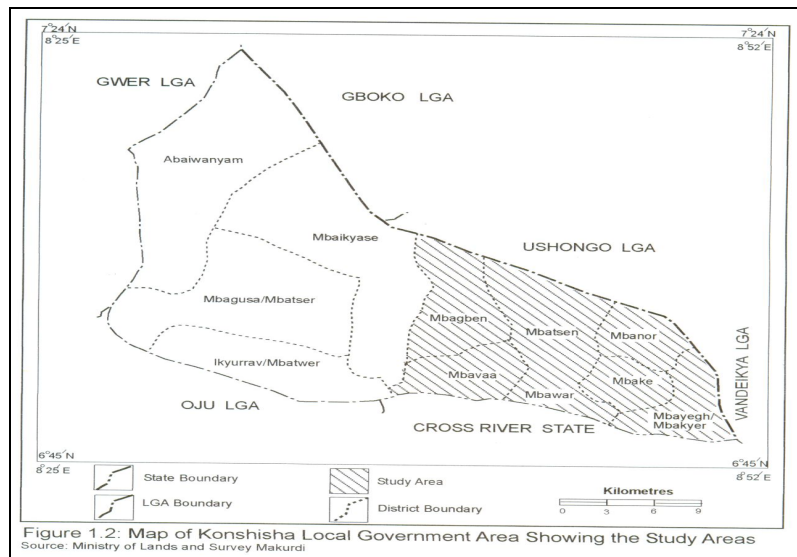

Figure 1.1:Map of Benue State Showing Konshisha Local Government Area.
Source : Ministry of Lands and Survey, Makurdi.

Figure 1

Figure 1.2: Map of Konshisha Local Government Area Showing the Study Areas
Source: Ministry of Lands and Survey Makurdi

Figure 2

The Agila and Selagi hills with no appreciating heights found around Mbatsen council ward of the District constitute the major physical landforms in the area. The District is rich in mineral compositions like zinc and tin. The drainage system is characterized by a network of streams. However, Rivers Konshisha and Kpa are the major drainage systems in the area. The vegetative cover comprises the semi-natural vegetation which has resulted from human activities on the natural vegetation. However, the vegetation in Gaav can be categorized into forest and Savanna vegetative zones. The forest vegetation is prevalent in the southern part of the area extending to the Mbavaa council ward towards the Ugabu area of Cross River State. Some of the outstanding species include Mahongany, Parkia, Iron tree, and Bamboo trees etc. The savanna vegetation covers the remaining part of Gaav District characterized by scattered trees, shrubs and the dominant species of grasses known as spear grass.

The soils are rich in alluvial deposits, the presence of streams account for this condition following action of water bodies on the banks. This allows the alluvial deposition with dry leaves that fall from the trees to enrich the fertility content of the soil. This type of soil is common in marshy area and tends to create what is known as the Fadama soils, good for low land rice cultivation. The inhabitants of Gaav District are predominantly local farmers, other economic activities include, livestock raring, hunting, fishing, blacksmithing, and carving etc. Crops produced in the area include yam, cassava, guinea corn, and citrus among others. The projected population of 140,081 people in 2012 was recorded for the area.

Land tenure system constitutes the rules that determine ownership rights in land; its uses, possessions, leverages, outright sales, and other ways disposed of within societies. Accordingly these rules are established by the state, customs, and rights that accrue to individuals, families, communities or organizations. Land right in Gaav District is not different from the rest of Tiv land. Every grown up male has a right to farmlands. In every household in Gaav District, all the household heads have significant rights to land so as to take care of himself and other members of his family.

3. Materials and Methods

This segment of the paper highlights the design of the study, the various tools and procedures used for the collection of appropriate data required for the study. However, the study was strictly structured to be a survey and analytical design. The data used for the study were basically collected using nominal scale of measurement and centered on the variables of land fragmentation and crop production in Gaav District of Konshisha Local Government Area. The target population for the study was strictly on adults, specifically family heads who were holders of land titles and equally engaged in agricultural production in the area. Samples were randomly taken in the selected rural communitiescovering the seven council wards of Mbakyer, Mbawar, Mbake, Mbanor, Mbatem, Mbatsen and Mbavaa council wards..Other relevant information on the field was obtained through personal observation, focus group discussions and the use of the questionnaire. Data requirements for the study centered on methods of land acquisition, causes of land fragmentation, and implications of land fragmentation on crop production in Gaav District of Konshisha Local Government Area of Benue State.

The participants were adult people particularly the local farmers who were mostly engaged in crop production and who have basic knowledge about land acquisition and agricultural practices in the area. Observations were centered on farm units and instruments used by the local farmers. Some farm sizes and the distances between them were randomly selected and to be measured to determine their sizes and the distance between them. Focus group discussion was inevitable as the people were gathered together for direct discussions bordering on land tenure systems and farming practices in the area.

The use of copies of the questionnaire was very helpful as specific questions directed to the respondents and their responses were of immense assistance to diffuse relevant information needed for this investigation. However, a total of 399 copies of the questionnaire were distributed across the seven council wards in Konshisha Local Government Area. Adult men were mostly preferred for the study.

This became necessary because of their knowledge and understanding of issues relative to changes on the rural landscape in the area. However, the random sampling technique was adopted to sample opinions of the participants in the area.

3.1. Method of Data Analysis
At the completion of data collection, all responses were treated in figures as represented in tables 1, 2 and 3. This helped to show at a glance the trend of data and the related variables.
The data collected for this study were analysedusing simple percentages with the help of the capabilities offered in "Statistical Package for Social Sciences" (SPSS) using the Chi-square statistical technique. Chi-square is the most commonly encountered statistical technique for analyzing nominal data. It is a nonparametric test because it does not rely on the assumptions of normality and metric variables etc. as many other parametric statistical tests do. The statistical technique works by comparing the expected frequency of scores with the actual frequency of scores that are observed in a study in a bid to determine if the frequency of scores observed differ significantly from that which could be observed due to chance.
The basic requirement for using the Chi-square statistical technique is that samples must be randomly selected. This means that the researcher must use a common accepted sampling method for choosing his subjects. However, this is important because the goal of the research is to make an inference back on the general population and so the samples need to be adequately selected.
The Chi square (X^2) test of significance is given by the formula:

$$X^2 = \sum \frac{(O-E)^2}{E}$$

Where X^2 = Chi-square sign,
- = observed frequency,
- E = expected frequency, and
- $\sum$ = summation sign.

In the best circumstances, it was adopted as an analytical tool to determine the level of association that exists between the set of data on the variables obtained.

4. Research Findings
The result of this study has revealed and is presented under the subheadings including methods of land acquisition, causes of land fragmentation and implications of land fragmentation on crop production in Gaav District of Konshisha L. G. Area.

4.1. Methods of Land Acquisition in Gaav District of Konshisha LGA

Variables of Land Acquisition	Responses	Percentage (%)
Inheritance	207	65
Government allocation	40	13
Lease/Purchase	69	22
Total	316	100

Table 1: Methods of Land Acquisition in Gaav District of Konshisha
Source: Author's Field Survey (2014)

Table 1 contains different methods of land acquisition in Gaav District of Konshisha L. G. Area of Benue State. As shown in the table, 65 percent of the respondents identified inheritance as an outstanding method of land acquisition in the area. This is followed by lease and outright purchase of land scoring 22 percent and government allocation of lands parcels with 13 percent.

4.2. Causes of Land Fragmentation

Variables of Land Fragmentation	Responses	Percentage (%)
Traditional farming method	27	8.5
Land tenure system	203	64.5
Increase population	30	10.0
Settlement pattern	29	9.0
Government policies	27	8.5
Total	316	100.0

Table 2: Responses on causes of land fragmentation
Source: Author's Field Survey (2014)

The responses on causes of land fragmentation in the rural environments of Gaav District in Konshisha L. G. Area of Benue State as shown in Table 2 indicate that 64 percent of the respondents identified land tenure system to be the major cause of land fragmentation,

8.5 percent identified the traditional farming methods while 10 percent, nine percent, and 8.5 percent identified increase in population, settlement patterns and government policies on land respectively.

4.3. Land Fragmentation and Crop Production in Gaav District

			Male	Female	Total
			Gender of Respondents		**Total**
			Male	**Female**	
Do you agree that land fragmentation reduces crop production in your locality	Strongly Agree	Count	88	60	148
		Expected Count	91.8	56.2	148.0
		% within Land Fragmentation Reduces Crop Production	59.5%	40.5%	100.0%
		% within Gender of Respondents	44.9%	50.0%	46.8%
	Agree	Count	76	34	110
		Expected Count	68.2	41.8	110.0
		% within Land Fragmentation Reduces Crop Production	69.1%	30.9%	100.0%
		% within Gender of Respondents	38.8%	28.3%	34.8%
	Disagree	Count	14	14	28
		Expected Count	17.4	10.6	28.0
		% within Land Fragmentation Reduces Crop Production	50.0%	50.0%	100.0%
		% within Gender of Respondents	7.1%	11.7%	8.9%
	Strongly Disagree	Count	12	5	17
		Expected Count	10.5	6.5	17.0
		% within Land Fragmentation Reduces Crop Production	70.6%	29.4%	100.0%
		% within Gender of Respondents	6.1%	4.2%	5.4%
	Undecided	Count	6	7	13
		Expected Count	8.1	4.9	13.0
		% within Land Fragmentation Reduces Crop Production	46.2%	53.8%	100.0%
		% within Gender of Respondents	3.1%	5.8%	4.1%
Total		Count	196	120	316
		Expected Count	196.0	120.0	316.0
		% within Land Fragmentation Reduces Crop Production	62.0%	38.0%	100.0%
		% within Gender of Respondents	100.0%	100.0%	100.0%

Table 3: Land fragmentation reduces crop production Gender of respondents cross tabulation*

Table 3 represents the SPSS – the computer based cross tabulation result involving opinion of the respondents on the statement contained in the research instrument"*land fragmentation reduces crop production in your locality*". Onthe male and female categories (gender of the respondents), 45 percent and 50 percent of males and females respectively strongly agreed that land fragmentation reduces crop production in the locality and at the same time, 38.8 percent and 28.3 percent of males and females agree with the statement that land fragmentation reduces crop production in their locality.

4.4. The Chi- Square Test Results

	Value	Degree of Freedom	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.384[a]	4	.172
Likelihood Ratio	6.368	4	.173
No of Valid Cases	316		
a. 1 cells (10.0%) have expected count less than 5. The minimum expected count is 4.94.			

Table 4: Chi-Square Tests

On the level of association between male and female respondents on the opinion that land fragmentation reduces crop production in the rural environments of Gaav District, the Pearson Chi – Square test statistic asshown in Table 4 is represented byX^2 (4, N = 316) = 6.384, p = .17.

- **Decision**: Since the significant level of the test statistic is .17 greater than 0.05, the association between male and female in their opinion that land fragmentation reduces crop production in their locality is not significant.

5. Discussion of Findings

Based on the outcome of the study, it is indicated that a total of 316 participants constituting 68 percent and 32 percent of males and females respectively took part in the study. On different methods of land acquisition in the rural environments, 65 percent of the respondents believe in acquiring land by inheritance, 22 percent acquire land through lease and outright purchase while 13 percent has access to land through government allocation in Gaav District of Konshisha L. G. Area of Benue State. This implies that a greater number of land parcels acquired in the areaisthrough inheritance. Traditionally, in Tiv nation, land is regarded as an important asset and ownership is strictly distributed among the male children according to the people's laws and customs.

It is also on record that land fragmentation is a common phenomenon in the rural environments of Gaav District in Konshisha l. G. Area. In line with the responses in this study, it is recorded that 64 percent of the respondents identified land tenure system to be the major cause of land fragmentation, 8.5 percent identified the traditional farming methods while 10 percent, nine percent, and 8.5 percent identified increase in population, settlement patterns and government policies on land. Based on this analysis, it is clear indicated that the major cause of land fragmentation in the area is land tenure system. The implication here is that, the more parcels of land are continually distributed among the male members of a particular family; the more lands are subjected to fragmentations. This revelation is corroborated with Ochapa (1986) and Amonor (1994) that the tendency for family lands to be shared among surviving male children of the deceased parent leads to fragmentation and scattering of plots of land for the offspring. However, an average size of a farm in Gaav District is measured to be 0.62 hectare. Only a few farmlands are measured up to one hectare. Apart from reduction in farm sizes, land fragmentation also discourages farm mechanization, promotes disjointed farmlands, facilitates loss of farmlands to boundaries and ensue difficulty in farm supervision at all times. This research finding corresponds with the findings of Raghbendra (2005) that land fragmentation leads to increase in traveling time between fields (farm far apart), high cost of supervising workers on separate farms. In another submission, Richard (2002) pointed out that land fragmentation makes farming mechanization impossible.

Furthermore, land fragmentation has specific implications on crop production. When a particular land parcels is consistently subjected to sharing into smaller sub-divisions in order that the needs of members of the family can be gathered for, the implication is that the smaller units of land parcel will be unable to yield high in crop production. With reference to the outcome of the Chi- Square statistic result analyzed to ascertain the hypothesis that land fragmentation does not reduce crop production on the male and female categories (Gender of the Respondents), the result however, revealed thus; X^2 **(4, N=316) = 6.384, P = .17.**Since **P > 0.05** significant level, the implication is that male and female do not differ significantly in their opinion that land fragmentation reduces crop production in the rural environments of Gaav District.

6. Conclusion

Based on the research findings, it is concluded that the major methods of land acquisition in Gaav District of Konshisha L. G. Area include; inheritance, lease/outright purchase and government allocation of useable. The major causes of land fragmentation in the area include land tenure system, the traditional farming methods, increase in population and the nature of settlement patterns. However, there is a high degree of land fragmentation in Gaav District of Konshisha L. G. Area of Benue State. The scenario has remarkable implications on crop production in the rural environments of Gaav District in Konshisha local governmentarea of Benue State.

7. Recommendation

In an effort to put land fragmentation on checks, it is recommended that government should develop policy frameworks that encourage private participation in land acquisition for the development of commercial agriculture at a reduced or no cost implications. Open up financial facilities and make them accessible to individuals and corporate organizations who are actively involved in commercial farming activities. This is believed will appropriately check further land fragmentation, encourage commercial farming and mechanization, and improves crop production for economic development in Gaav District of Konshisha Local Government Area.

8. References

1. Adewuyi, A. S. and Okunmade, W. F. (2001)."Economic Efficiency of Crop Farmers Kwara State, Nigeria", Nigeria Agric Development Studies.
2. Alexander, W. J. (1988). Economic Geography Today (3rd Ed) U.S.A. Prentice Hall, Inc Engle Wood Cliff N.J.
3. Blare, B. and Hazell, P. (1992). The Economics of farm fragmentation. The World Bank Economic Review.
4. Edward, A. (2004). The Texas A & M University System Agriculture programme. Texas, Published by Agricultural Communication.
5. George, W. (1983). Conservation Economy Disbugue, Lawa, Melbounce. England, Australia Oxford.
6. Goh, C. (1981). Certificate physical and Human Geography.West African Education. Ibadan. University Press Limited.
7. Hou, F. A. (2009). Study on the effect of land fragmentation on the agricultural mechanization.

8. Hristov, J. (2009). Assessment of the impact of high fragmented land upon the productivity and profitability of the farms. Available at: http://www.oroniagor.org/cropproduction.
9. Igbozurike, U. M. (1990).Land in the Context of Rural Development: In Geographical perspective on Nigeria's Development, Edited by Ayem, B. and Famian A. N.G.A. Pub. 1990.
10. Kopeva, D., Noev, N. and Evtimov, V. (1999): Land Fragmentation and Consolidation in Bulgaria.
11. Mark, B. and David, M. Levine (1999).Basic Business Statistics. Prentice-Hall Pub. Seventh Edition.
12. Nayolna, A. (2010) Understanding field studies and project writing in Geography. Gold Ink Company Publisher.
13. Nguyen, T. Cheng, E. J. C. Findlay (1996). Land fragmentation and farm productivity in China in the 1990s
14. Omale, K. F: Land use Decree (1978). Planning Issues in Nigeria Land Tenure System and Land use act. Frontline Publication Ltd Lagos
15. Olayide, O. (1995). Elements of Rural Economy, Nigeria Ibandan.
16. Singh, J. (1994). Agricultural Geography 2nd Ed. Total Publishing (Oy Ltd New York) McGraw Hall.
17. The World Bank 2005.On ASEACH Working Paper 2005/2012.
18. Truman, A., Hartshorn, J., and Alexander, W. (2010) Economic Geography. Pearson Education Pub. 3rded.
19. Wang, X. (2002). Rural Land Fragmentation and Rural House Hold production Chinese Rural Economy.
20. Zhang Y.J. and Zhou J. W. (2008).Dual argument on positive and negative effect of land fragmentation