



## **Effect of Labour Scarcity on Rice Production and Yield in Guma Local Government Area of Benue State**

**Esther Seember Pinga <sup>a\*</sup>, David Gomez <sup>b</sup>, Lamin K. M. Fatty <sup>c</sup>  
and Juliet Ogadinma Onyemma <sup>d</sup>**

<sup>a</sup> *Department of Sociology, Benue State University, Benue State, Makurdi, Nigeria.*

<sup>b</sup> *Department of Agriculture, Office of the Director, Cape St. Mary's Bakau, the Gambia.*

<sup>c</sup> *School of Agriculture and Environmental Sciences, University of The Gambia, Faraba Campus,  
P. O. Box-3530, Banjul, the Gambia.*

<sup>d</sup> *National Root Crops Research Institute Umadike, Umahia, Abia State, Nigeria.*

### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

The study assesses the effects of labour scarcity on rice production and yield in Guma Local Government Area of Benue State. Survey research design was adopted; with a population of 5125 registered smallholder rice farmers, out of which 371 respondents were sampled using the multi-stage sampling strategy. The questionnaire was then used to collect data from the sample. Data collected was analyzed using Statistical Package for Social Sciences (SPSS 20.0) from which simple frequencies and percentages were presented in tables and graphs to answer the research questions. Findings indicated that scarcity of labour for rice production is caused by Farmers/Herdsmen clashes, migration due to improved education; preference for other rural jobs, drudgery of farm activities as well as lack of basic social amenities in the rural areas. The findings also revealed that labour scarcity affects rice production and yield adversely in the study area as it leads to poor rice yields, smaller sizes of rice farms, poor income, preference for other crops as well increased poverty levels.

**Keywords:** *Effects; labour scarcity; rice production; yield; Benue State.*

\*Corresponding author: E-mail: [epinga@bsum.edu.ng](mailto:epinga@bsum.edu.ng);

## 1. INTRODUCTION

Small scale farmers are the key players in rice production in Nigeria. This is because in Nigeria agriculture has always been dominated by this group of farmers who cultivate less than 3 hectares but represent a substantial proportion of the total population and produce about 90-95% of the total agricultural output in the country (Oyeyinka & Bolarinwa; Yuguda; Babafada; all in Madu & Aniobi, 2018).

Human labour is about the main source of labour available to smallholder farmers in Nigeria as it accounts for domestic food supply in the nation; hence the need to continue supplying food to the ever-growing population anchors on human labour productivity. The availability or scarcity of labour has been found to have an impact on planting precision, better weed control, timely harvesting and crop processing [1]. This, therefore, shows that non-availability of labour is one of the major constraints in peasant production, especially during planting, weeding and harvesting.

In India, Prabakara, Devia and Selvamb [2] writing about their findings on the implications of labour scarcity on rice yield revealed that there is a prevalence of acute labour scarcity in the district of Tamil Nadu and it has affected the productivity levels of almost all crops and is even leading towards the permanent changes in the cropping pattern.

More recently, Chaba and Damodara, [3] reported a major challenge in rice transplanting that happens across over 30 million hectares at the beginning of the monsoon rainfall season. More than 95% of the rice area in India is dependent on manual labour for crop establishment and the lockdown had triggered a huge reverse migration from the northwestern states of Haryana and Punjab, with estimates suggesting that around 1 million labourers have returned to their home states with little prospect of returning in the near future.

According to Anim [4], the farming communities of South Africa now have smaller portions of farmland as well as a preference for other rural jobs which have contributed in keeping the young people away from the farm. His findings revealed that young people preferred to work as mason, rural electricians, loading and offloading rather than agriculture which has adversely affected farm labour supply.

Back home in Nigeria, activities of killer herdsmen have severely affected the lives of the rural dwellers, so much that many have fled their ancestral homes with no hope of returning. Ijirshar, Ker and Terlumun [5] reported that from Benue to Taraba, Nasarawa and Plateau in the North Central region and Zamfara State in the North West, clashes between famers and herdsmen have left in its trail heavy losses of lives and property. These losses of lives have adversely affected farming activities and other related businesses as well as socio-economic activities. This has resulted in a drastic reduction in farm outputs, a development that has heightened the fear of hunger. Already most farmers in the affected states have abandoned farms and schools for the for fear of being attacked by the herdsmen.

Globally, rice is a very important food. It is an ancient crop consumed as healthy and staple food by more than half of the world's population; rice is consumed by over 4.8 billion people in 176 countries and is the most important food crop for over 2.89 billion people in Asia, over 40 million people in Africa as well as over 150.3 million people in America [6].

According to Imolehin and Wada [7] in the 1960s, Nigeria was almost 99 percent self-sufficient in the rice production consumed by its citizens. Over the following two decades (1970s and 1980s) self-sufficiency declined to 38 percent, resulting in the importation of rice from other countries such as Thailand, Bangkok, and China to compliment the indigenous rice

This falling yield of rice led to supply deficit situation in the country and in response to the situation, successive Nigerian governments have intervened in the rice sub-sector by increasing tariff on rice importation so that local production could be encouraged and hence expand the market for the local rice [8]. The Nigerian Government has invested huge amount of money towards the improvement of rice varieties over the years. These initiatives have led to the development of several varieties of rice, such as: Faro 54, 57, 52 and CP. The investment by Government in developing the cultivation of rice in Nigeria will be in vain if there is severe scarcity of labour in the rural areas.

Rice production occurs in all agro-ecological zones in Nigeria with the middle belt enjoying a comparative advantage in production over the other parts of the country. In the middle belt of

Nigeria, Benue is the buckle that holds the belt. It is referred to as the food basket of the nation. Guma Local Government Area of Benue State alone has the capacity to produce enough rice to feed the whole of north central Nigeria. It is mainly popular for the vast availability of fertile lowlands (Fadama), accompanied by lush vegetation which is very essential for the production of rice locally. However, these fertile lowlands perfect for rice production have been underused for so many decades due to so many challenges such as Fulani herdsmen mayhem, lack of capital and inputs among others. One major factor which will be extensively discussed here is the effects of labour scarcity on rice production and yield in Guma local government area of Benue State. Thus, this study was undertaken to enumerate the major causes and effects of labour scarcity on rice yield in the study area; while at it, some recommendations were also proffered to nip this menace in the bud before it escalates and brings about more shortage of rice in Nigeria.

## 2. MATERIALS AND METHODS

### 2.1 Study Area

Guma Local Government Area is one of the twenty-three (23) local government areas in Nigeria. Its headquarters is Gbajimba. It has an estimated distance of about 37km from Makurdi, the Benue State headquarters. The landmass area has been put on 2,882 km<sup>2</sup> with an estimated a population of 191,599 at the 2006 census.

The local government area was created out of the former in 1987 by the then military regime of the late Col. Fidelis A. Makka. It was named after 'River Guma' in Benue State. It shares boundaries with Logo Local Government Area to the east, Makurdi Local Government Area and to the south, Doma Local Government Area of Nassarawa State to the west. Though Guma local government is predominantly occupied by the Tiv people, other tribes to live in Guma, there are Jukuns, Hausas, as well as Kabuwas. Guma Local Government Area has been politically divided into ten council wards; these are Kaambe, Abinsi, Uvir, Saghev, Ndzorov, Nyiev, Mbabai, Mbayer or Ymanadev, Mbawa, and Mbasombo.

Like every other rural Nigerian community, the people of Guma Local government Area are predominantly farmers. Most of the Tiv speaking people especially engage in the cultivation of

various types of crops such as Yams, cassava, rice, millet, sorghum, groundnuts and maize. They also cultivate vegetables like okra, garden eggs, spinach, tomatoes and pepper. On the other hand, most of the non-Tiv speaking indigenes of Guma like the Jukuns and Hausas are predominantly fishermen and traders. The presence of the River Guma from which the local Government derived its name also serves as a means of livelihood for both the farmers and fishermen.

### 2.2 Population and Sampling Procedure

There were two hundred and sixty-six (266) rice farmer groups registered with the local and state government agencies in charge of cooperative registrations and validated into the International Fund for Agricultural Development (IFAD) Value Chain Development Program (VCDP) in Guma Local Government Area for the 2019 farming season. Each of these farmer groups contained about ten (10) to twenty-five (25) people. This summed up to a total of five thousand, one hundred and twenty-five (5125) small-holder rice farmers; segregated by sex thus: 3218 males and 1907 females in the study area. The area has the highest number of rice farmer groups in the whole of Benue State. These formed our total population. This study adopted the sample size determination formula given by Taro-Yamane in Emaikwu [9] which is stated as follows:

$$n = \frac{N}{1 + N(E)^2}$$

Where n= the sample size required; N= the population size; E= the level of significance. Using this formula, a sample size of 371 was determined.

Two-stage sampling technique was used to select smallholder rice farmers as respondents for this study. First was to purposively select five out of the ten political council wards that make up the entire Guma local government area. While the second stage was to randomly select seventy-four (74) smallholder farmers from at least ten (10) farmer groups in each of the selected council wards and seventy-five (75) from the last council ward visited to make up a sample size of three hundred and seventy-one (371). Thus three hundred and seventy-one (371) small-holder rice farmers responded to the questionnaires and data was collected from October to December 2019 in Guma Local Government Area of Benue State.

## 2.3 Data Analysis

The analyses have been broadly divided into two sections, A and B. The first part of the survey has to do with the socio-demographic characteristics of respondents and the second part has to do with the research objective. These have been presented in tables using simple frequencies and percentages. All these were done with the aid of Statistical Package for Social Sciences (SPSS). Descriptive analyses of what was presented in the tables have been given below to give a clearer picture of what the figures in the table represent.

## 3. RESULTS AND DISCUSSION

### 3.1 Socio-Economic Characteristics of the Respondents

Data for this study was collected using well-structured pre-tested questionnaires which were administered on the field by the researcher and her assistant; the findings are presented in Table 1. The table displays the variables used to describe the respondents, the frequency as well as the percentages as it relates to the entire number of sampled respondents.

From the figures in Table 1, the first variable that was asked was the sex of the respondents. A whole 223 (60%) of the total respondents were males as against the remaining 148 (40%) who were females. That there are more males in rice production than females has agreed with the findings of other authors including Shabu [10] who reported in his work that because of access to land which is mostly owned by men and the fact that rice is perceived as a highly profitable cash crop, men more than women take part in the cultivation of rice in Guma Local Government Area of Benue State.

From the same table above, the figures for the ages of respondents were displayed according to the categorization on the questionnaires. The ages of respondents had been grouped into four categories, the first category, 15-25 years had only 64 (17%) of the total respondents within the age brackets. The next category, 26-35 years also had a low 66 (18%) of the total respondents within this age bracket. Another category between ages 36-45 years had the largest frequency and percentage of 146 (39%) of the total respondents within this age bracket. The last category had respondents that were 45 years and above, these accounted for the

remaining 95 (26%) of the total respondents. These figures simply show that there are fewer youths in the rice farming business and the bulk of the work is left in the hands of the fast ageing population. Other authors have also raised the red flag on this issue across Nigeria and the globe, in Nigeria for instance, the findings of Oluyole and Lawal [11] and that of Nnamdu and Akintola [12] both revealed this sad reality which also agreed with the findings of Prabakara, Devia and Selvamb [2] in India. So it will be safe to say that agriculture is in the hands of the ageing population and this is a global phenomenon that must be taken very seriously.

The educational background of the respondents was also investigated, the findings as presented in the same Table 1 above showed that a large number of the farmers, about 120 (32%) of the total respondents had no formal education at all. Another bulk of 130 (35%) of the total respondents only had primary education, some of which did not even complete the said primary education. A total of 67 (18%) of the total respondents had partly or fully completed secondary education, while only 54 (15%) of them had attained tertiary education. This implies that most youths who have some level of education which usually compels them to leave the rural areas to urban areas to access the same education, never go back to settle down in the rural areas after they have obtained it, but rather stay in urban areas in search of white-collar jobs, this also explains why farming is now predominantly left in the hands of the ageing population.

The size of one's family is very essential especially in the rural areas where more members can also imply more hands to work on the farm. The family sizes were categorized into four groups. Only 13 (4%) of the respondents were in the category of 5 and below. The bulk of the respondents 137 (37%) said that they had between 6-10 members in their families. Another 113 (31%) said they had between 11-15 family members. While 94 (24%) of the respondents said they had between 16-20 members of the household, yet another 13 (4) said they had between 20 and more members in their households. From the figures and the analysis, it is clear that the rural settings in Guma Local Government Area of Benue State have large family sizes; this is due to the polygamous nature of some men, as well as the fact that the extended family system has been the tradition of the Tiv man since time immemorial.

**Table1. Socio-Demographic Characteristics of Respondents**

<b>Variable</b>	<b>Frequency</b>	<b>Percentage (%)</b>
<b>Sex</b>		
Male	223	60
Female	148	40
<b>Age (Years)</b>		
15-25	64	17
26-35	66	18
36-45	146	39
45 and above	95	26
<b>Education</b>		
None	120	32
Primary	130	35
Secondary	67	18
Tertiary	54	15
<b>Family Size</b>		
5 and below	13	4
6-10	137	37
11-15	113	31
16-20	94	24
20 and above	14	4
<b>Size of Rice Farm</b>		
Less than one Hectare	139	38
One to Two Hectares	120	32
Two to Four Hectares	69	18
Four to Five Hectares	43	12

Source: Field work, 2019

Last on the table of socio-demographic characteristics of farmers was the categorization for sizes of rice farms of the respondents. From the figures in the table above, a whole 139 (38%) of the total respondents had rice farms that were less than one hectare in sizes. Another large 120 (32%) of the respondents had rice farms between one and two hectares only. Respondents who had two to four hectares of rice were only 69 (18%) and another smaller number 43(12%) had four to five hectares of rice. This agrees with the findings of many other authors Oyeyinka and Bolarinwa; Yuguda; Babafada; all in Madu & Aniobi, [8], and Atagher [13] who have asserted that the bulk of agriculture in Nigeria is in the hands of small-holder farmers.

### **3.2 Causes of Labour Scarcity in Guma Local Government Area of Benue State**

Table 2 displays the major causes of labour scarcity in Guma local government area of Benue State.

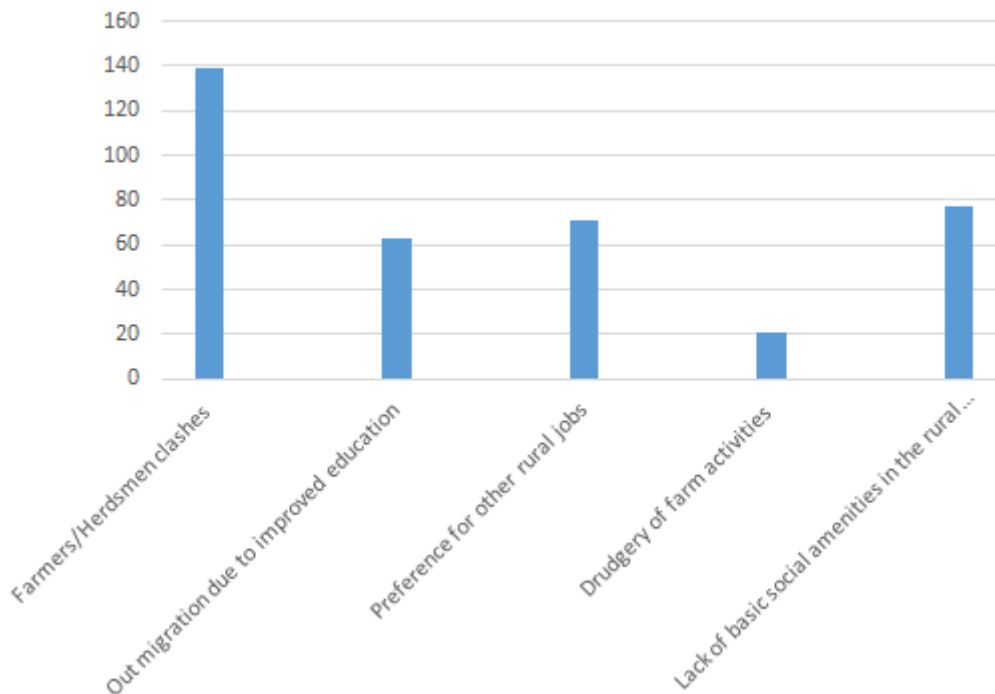
From the table and the graphs above, the findings showed that, threat to life as a result of

clashes; be it from Farmer/ herdsmen clashes or communal clashes have been one of the major problems affecting labour supply to the farm. Many young men in a bid to resist the invasion of foreigners to their homeland or defend themselves against other hostile communities have lost their lives; while others fled to other places of safety, all these have affected farm labour supply. This agrees with the findings of Ijirshar, Ker & Terlumun [5] where they reported that seven out of the 23 local government areas in Benue state have been adversely affected by farmer-herdsmen clashes and has negative effects on agricultural productivity. Some respondents observed that due to the incessant clashes and loss of lives, farmer group members were no longer living in the same communities, and this has affected their farming activities as a group. The main idea of having farmers in groups is so that they can help each other out in terms of finances and labour. One main advantage that has been promoted amongst the farmer groups is ownership of group rice farms away from their individual farms. Where there was security of lives, farmers have in the past used proceeds from these group farms to support themselves in purchase of inputs and payment for labour for their members.

**Table 2. Causes of Labour Scarcity in Guma Local Government Area of Benue State**

Item	Frequency	Percent	Cumulative percent
Farmers/Herdsman clashes	139	37.5	37.5
Out migration due to improved education	63	17.0	54.4
Preference for other rural jobs	71	19.1	73.6
Drudgery of farm activities	21	5.7	79.2
Lack of basic social amenities in the rural areas	77	20.8	99.9
Total	371	100.0	100.00

Source: Field Work 2019



**Fig. 1. Causes of Labour Scarcity in Guma Local Government Area of Benue State**

About 17% of the total respondents agreed that young people migrate from the rural to the urban areas in search of education, after acquiring the knowledge, they do not return back to the rural areas but relocate completely, and this also has negative consequences for labour supply to the farm, this also agrees with the findings of Chaba and Damodara, [3] in India where a reverse migration due to Covid 19 lockdown had negative effects on supply of labour for rice production.

Some young people are in the rural areas, but they have preference for other rural jobs. The advent of using motorcycles as a major means of transportation in the rural areas has made some youths to completely abandon the farm after they have used resources from the farm to purchase a motorcycle, they then tend to depend on it for survival and avoid the farm, this also has

adversely affected the availability of labour and caused scarcity.

About 20% of the total respondents however were of the view that it is the absence of the basic social amenities in the rural areas that make life very difficult and unbearable for the youths to stay there and supply farm labour. Some authors [6,12, 5] have even argued that the menace of insecurity has gone on unabated because of the lack of access roads to the remote areas that serve as a hideout for these deadly murderers. Security agencies cannot quickly access the affected areas in time of attack, this makes the rural people very vulnerable to attacks, and this in turn has affected labour supply adversely. Some respondents have observed that the experience of seeing other farmers being slaughtered in their farms has left them emotionally shattered and no

longer willing to go their farms that are in certain vulnerable areas even though they are the very fertile fadama lands suitable for rice production. Hired labourers are also very reluctant to work in such areas; these have adversely affected labour supply.

Only 5% of the sampled respondents agreed that the drudgery of farm activities especially in the situation such as Guma where limited mechanization has discouraged people from agriculture has further added to the scarcity that affects farm labour supply. Similarly, Prabakara, Devia, and Selvamb, [2], also had findings that agreed with the figures in the table above, they stressed the importance of labour in agriculture and lamented how farm labour supply is gradually diminishing, and most of the factors stated as the reasons for such scarcity here in Nigeria have also been found in India with exactly the same effects on farm labour supply.

### 3.3 Implications for Rice Production and Yield

Scarcity of labour surely has implications for rice yield, the farmers were asked in what ways they felt that these problems discussed above have affected total rice yield. The responses collected were again analyzed and have been presented in Table 3.

From the figures in Table 3 and illustrations from the graph above, respondents were asked to choose the immediate effects of labour scarcity on rice production and yield. From the options given, 15% of the total respondents agreed that labour scarcity bring about poor rice yields. Farmers observed that due to scarcity of labour, it was extremely difficult to cultivate individual farms and still come together to cultivate group farms which are usually larger. One farmer lamented on how the fadama land where they used to cultivate their group farm was no longer accessible due to clashes, and recounted that

the group had harvested 80 100kg sized bags of rice from the same land in 2017.

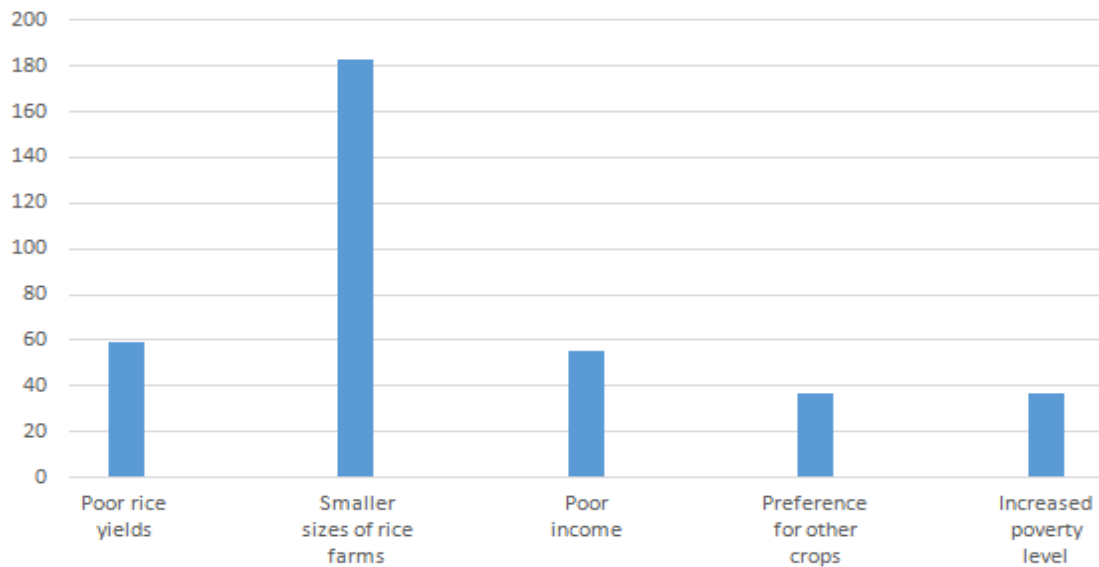
The largest percentage of respondents about 49%, were of the view that labour scarcity has led to the cultivation of smaller sizes of rice farms even in the situation where the farmer had a large field suitable for rice production. Respondents observed that due to the labour intensive nature of rice cultivation, scarcity of labour has forced farmers to cut down on the sizes of their farms to avoid wastage. In some instances farmers had cultivated large plots and were not able to meet up with the labour demands and ended up with fewer yields than those who cultivated smaller portions and were able to manage them well. So over the years, the farmers have observed and concluded that it was better to cultivate smaller portions and manage them well than to cultivate more and waste resources but end up with poor yields. This is reflected in the large percentage of respondents who agreed with this option, but it is also true that smaller portions mean lower yields. Where farmers who used to harvest 50, 60 and 70 100kg bags of rice before, now have 20 or even less than 10 bags due to smaller portions of rice farms for fear of not getting labour is alarming.

Another 14% of the respondents agreed that the challenges have affected the income of rice farmers adversely and in a long run affected the standard of living of the entire household. While 10% of the respondents said, the challenges have pushed other people in the rural areas to prefer other jobs like using motor bikes and small cars for transportation business to earn a living rather than farming; yet another 10% of the respondents said, there is increased poverty in the rural areas due to the effects of labour scarcity. These findings have also aligned with the findings of other scholars in other areas. For instance, Anim [4], reporting his findings in the farming communities of South Africa had mentioned that, there were smaller portions of

**Table 3. Implications for Rice Production and Yield**

Item	Frequency	Percent	Valid Percent	Cumulative Percent
Poor rice yields	59	15.9	15.9	15.9
Smaller sizes of rice farms	183	49.3	49.3	65.2
Poor income	55	14.8	14.8	80.1
Preference for other crops	37	10.0	10.0	90.0
Increased poverty level	37	10.0	10.0	100.0
Total	371	100.0	100.0	

Source: Field Work 2019



**Fig. 2. Implications for Rice Production and Yield**

farmland now as well as a preference for other rural jobs which have contributed in keeping the young people away from the farm. Though some of the jobs mentioned as the options available do not agree with those available in Guma, while Anim mentioned Mason, rural electricians, loading and offloading of cargos as some options, in Guma Local Government area however, we have the local transportation business using motorcycles and small cars, fishing as well as felling of trees for charcoal production as other options.

Similarly, Prabakara, Devia and Selvamb [3], writing on labour scarcity and its immense impact on agriculture in India also mentioned the preference to other rural jobs which they attributed to the low returns which accrues to the farmer from his agricultural products after a whole year and also the drudgery which goes with farm activities especially where mechanization is nearly absent.

The federal government of Nigeria through the ministry of Agriculture and natural resources has several programs that are aimed at assisting small holder farmers to get farm machineries to help alleviate the effects of labour scarcity. The IFAD VCDP program is one of such projects which have facilitated some farmers groups in Benue to buy a few machines for their farm work.

The Benue state government on its part is implementing the anti-open grazing law which

was enacted in the state in response to the incessant clashes between farmers and herders so as to curtail the losses of lives, farm produce, farmlands and cattle. To effectively enforce this law, they have also established a livestock guard task force which is to monitor and seize cattle found grazing openly and destroying farms, this has been on for the past few years. Whether the implementation of this law and its enforcement will bring the desired peace required for framers to return back to their ancestral homes remains to be seen.

#### 4. CONCLUSION

Based on the findings of the study, it was concluded that there is scarcity of labour which is caused mainly by Fulani-Herdsmen/Communal Crisis with 37%, followed by the lack of social amenities in the rural areas with 21%; this was closely followed by a preference for other rural jobs with 19%. Migration due to improved education had 16% while drudgery of farm activities was the least with only 6%.

The findings of the study also indicated that the scarcity of labour in rice production in the study area has adversely affected rice yied. Farmers have resorted to smaller sizes of rice farms; this had the largest frequency of 49%, followed by poor rice yields with 16%, poor income had 15%: preference for other crops as well as increased poverty level for rice farmers both had 10% respectively.



From the foregoing, it was recommended that:

1. Mechanization is the best solution to labour scarcity, thus rice farmers in the study area should make deliberate efforts to leverage of the help government and IFAD is giving rural farmers now to purchase farm machineries like tractors, planters, harvesters, threshers etc and mechanize their farms, this recommendation agrees with the findings of Ajah [14].
2. It is the role of the government to provide security, thus the anti-open grazing law should be implemented fully in Benue State to control the farmers-herders clashes in the Guma and so encourage people to live and farm peacefully.
3. Government should also provide basic social amenities such as good roads networks, water, electricity, hospitals/clinics and markets; these will reduce population and urban areas and youths who live in rural areas will be comfortable and strive in agriculture.

### COMPETING INTERESTS

Authors have declared that no competing interests exist.

### REFERENCES

1. Oluyole KA, Dada OA, Oni OA, Adebisi S, Oduwale OO. Farm labour structure and its determinants among cocoa farmers in Nigeria. *American Journal of Rural Development*. 2013;1(2):46-58.
2. Prbakara C, Devia SK, Selvamb S. Labour scarcity – its immensity and impact on agriculture; 2011. Available:<http://ageconsearch.umn.edu/bits/tream/119387/2/2-C-Prbakar.pdf>
3. Chaba AA, Damodara H. 2020 The Covid Nudge: Labour Shortage makes Punjab, Haryana Farmers Switch from Paddy to Cotton; *The Indian Express* Retrieved On the 10<sup>th</sup> November 2021. Available:<https://indianexpress.com/article/india/covid-19-punjab-haryana-farmers-paddy-cotton6385600/>.
4. Anim FD. Factors affecting rural household farm labour supply in farming communities of South Africa. *Journal of Human Ecology*. 2011;34(1):23-28.

5. Ijirshar V, Ker UG, Terlumun Y, C. Socio-economic effects of farmers-Fulani herdsman's conflict on farmers output in Benue, Nigeria" In Bakpo F S and F E Ugbeda. Eds. *Proceeding of An International Academic Conference of the International Multidisciplinary Research and Academic Society*, Obudu, Cross River State: Nigeria;2015.
6. Shabu T, Gyuse TT, Abawua JI. Economic impact of Olam out-grower programme on rice farming in Kaambe district of Guma local government area of Benue State, Nigeria. *International Journal of Humanities and Social Science*. 2011; 1(17):17–28.
7. Imolehin ED, Wada AC. Meeting the Rice Production and Consumption Demands of Nigeria with Improved Technologies; *National Cereals Research Institute*; Badeggi, Nigeria;2000.
8. Madu AB, Aniobi UJ. Profitability analysis of paddy production: A case of agricultural zone 1, Niger State Nigeria; *Journal of Bangladesh Agricultural University*. 2018;16(1):88–92. 201
9. Emaikwu SO. *Fundamentals of research methodology and statistics (Revised Edition)*. Makurdi: Selfers Academic Press Limited;2015.
10. Shabu T. Determination of resource use efficiency of rice farmers in Kaambe district of Guma Local Government Area of Benue State, Nigeria. *World Journal of Agricultural Research*. 2013;1(6):143-148
11. Oluyole KA, Lawal JO. Precision farm labour supply for effective cocoa production in Nigeria. *Search Journal of Applied Sciences*. 2010;1(5):16-24.
12. Nnamdu JN, Akintola A. Farm labour supply and utilization for food crop production in Nigeria;2015. Available:[https://www.researchgate.net/publication/271732867\\_FARM\\_LABOUR\\_SUPPLY\\_AND\\_UTILIZATION\\_FOR\\_FOOD\\_CROP\\_PRODUCTION\\_IN\\_NIGERIA](https://www.researchgate.net/publication/271732867_FARM_LABOUR_SUPPLY_AND_UTILIZATION_FOR_FOOD_CROP_PRODUCTION_IN_NIGERIA)
13. Atagher MM. Effects of the Benue ADP's cassava production technologies on the productivity and incomes of women farmers in Benue State of Nigeria. Unpublished doctoral thesis presented to the department of Agriculture, University of Nigeria, Nsukka;2013.

14. Ajah J. Factors limiting small-scale farmers' access and use of tractors for agricultural mechanization in Abuja, North Central Zone, Nigeria; The European Journal of Sustainable Development. 2014; 3(1):115-124.

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