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# Analysis of the Pattern of Farm Labour use among Small Scale Farmers in Zangon Kataf LGA, Kaduna State, Nigeria

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**Abstract**
The study examined the pattern of farm labour use among small scale farmers in Zangon Kataf LGA, Kaduna State, Nigeria which is located at Latitude $9^{o}$ $12^{0}$ and Longitude $10^{0}$ $21^{0}$ E. The study objectives were: examine the type of farm tools in use on the farm, determine the operation wise labour employment in crop production, assess the family hired labor ratio based on different operations and estimate the determinants of household labour use in the study area. A total of 156 farmers were randomly selected through multistage sampling procedure. Primary data was used which was collected using a structured questionnaire. Descriptive statistics involving frequencies and percentages were used for data analysis. Similarly, ANOVA and regression analysis were used for data analysis. The findings revealed that the mean household size was 7.5 persons while the mean farm size was found to be 5.6 ha. The findings also revealed that farmers in the area were still using local implements like hand hoes, sickles, cutlasses, hoes and rakes. The ANOVA analysis revealed that land preparation, weeding and threshing had the highest requirement for family labour and the differences in the family labour usage for all farm operations was found to have an F value of 2.256 which was significant at 5% level of probability. Similarly, the differences in the amounts spent on hired labour for the various farm operations were found to be significant at 1%. The highest amounts of money spent on hired labour were for the following operations: land preparation (N28,150.00), weeding (N12,557.14) and planting (N11,692.31) per household in 2014.The result of the regression analysis indicated that the exponential production function had the best fit with an $R^2$ value of 0.989. The coefficients of age, farm size,

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use of modern farm inputs, cooperative membership, visit by an extension agent, years of farming experience and farm income were all significant at 1% level of significance and determined the household labour use in the study area. The study recommended that the State and Zangon Kataf Local Government should assist the farmers in providing subsidized farm services and linkage to credit sources for increased productivity and production.

**Keywords**: *Farm Implements, Family labour, Hired labourers*

**Background to the Study**

Agriculture still remains the main employer of over 70 percent of the country's labour force and accounts for about 40 percent of the nation's Gross Domestic Product (World Bank, 2012). It employs nearly three-quarters of Nigeria's work force, as is the case in most of sub-sahara Africa (SSA). It is the principal source of food and livelihood in Nigeria, making it a critical component of programs that seek to reduce poverty and attain food security in Nigeria (Philip *et al.,* 2009). It is serving as a vehicle for diversifying the economy and enabling economic development. According to Agwu and Chukwu (2006), household roles in crop production are not static but tend to be dynamic in response to pressure from the changing social, cultural and economic milieu. Durno and Stuart (2005) posited that labour used in crop production depends on household characteristics, resources, type of labour used and gender of labour waged/exchange.

Simonyan and Obiakor ( 2012) stressed that division of roles and responsibilities among the households cut across management, performance of tasks, decision making, and ownership control over resources and distribution of benefit/product. A household's priorities may be influenced by its individual members in a variety of ways which implies that certain categories of people (the elderly women, elderly men and very young children) in a household may be prohibited from engaging in some specific labour activities due to their nature. With the role segment, the socio-cultural allocation of functions between male and female may or may not be consistent depending on the changes in cultural, social, economic and institutional conditions which may occur over time with potentially critical impact on traditional household roles, opportunities and constraints in agricultural production and processing

Makarau *et al.,* (2013) posited that it is evidently true that in Nigeria, farmers' yields fall below global yields. These low yields according to Abdulrahaman and Yahaya (2009) are due to decline in the unit output from the various agricultural inputs

such as capital, land, labour and management. Other constraints according to them include; soil fertility decline, soil borne diseases and pest, inadequate planting materials, high cost of labour, labour intensive operations and marketing of the product.

The main objective of the study was to analyze the pattern of farm labour use by smallholder farmers in Zangon Kataf LGA. The specific objectives were to:

1. examine the type of farm tools used on the farm
2. determine the operation wise labour employed in crop production
3. Assess the family to hired labour ratio based on different operations
4. Estimate the determinants of household labour use in the study area

The motivation for the study was the observed shortage of farm labour in the area. The study was justified in the fact that farm labour constraints in the area is one of the major limiting factors to increased farm productivity and production.

**Literature Review**

**Conceptual Framework**

It has been argued that agricultural development is a necessary concomitant of economic growth. This is because agriculture contributes to savings, foreign exchange, wage goods and surplus labour to industrial and/or to other tertiary sectors of the economy (KADP, 1988). However, because of the subsistence nature of agriculture predominant in Kaduna State, there is hardly any surplus either in terms of capital or labour for re-investment in the non-farm sectors of the economy. It should be noted that under the peasant system of farming, agriculture is highly labour intensive and economically unviable and non competitive. Therefore, generation of surplus is possible only through transformation of agriculture and adoption of cost reducing technology (KADP, 1988).

Studies have shown that the supply of labour has been one of the major constraints in the horizontal and vertical development of agriculture in Nigeria. It has been argued that the African households operate in a socio-economic environment, where there is a strong linkage between the farm and the rural household, between the farm and non- farm employment of its members. Non- farm activities compete directly with other (on farm) use of family labour, and as a result, there is no agricultural surplus labour. This factor has been complicated by what Goran (1986) calls premature urbanization which resulted in actual labour shortages for agriculture.

Given the many demands for labour in farm and non- farm activities, market and non market production, work and leisure, labour use in alternative uses should be used as efficiently as possible. This underscores the fact that an understanding of the pattern and constraints of labour use in agriculture for various operations in crop production, its use across seasons, its costs etc is important. Lewis (1954) in KADP (1988) categorized the economy of any country into two, i.e 'modern' and 'traditional' or 'subsistence' sectors. Often, the modern sector is attributed to industry while the traditional sector to agriculture with the assumption that surplus labour exists in the agricultural sector, where land is limited, marginal product of labour equals zero, and average product of labour is close to a subsistence minimum. Ranis (1988) argued that the withdrawal of labour out of agriculture will not reduce the total agricultural outputs. If and when this happens, the unlimited supply of labour from agriculture will then be released for the industrial sector. As a result, the industrial wage rate was assumed to be constant in real terms at a level slightly higher than the average product in traditional agriculture. This difference provided the incentive for migration of labour from agriculture to industry.

Simonyan and Obiakor (2012) found high cost of labour as the third ranked constraint in yam production in their study area after high cost of seed yam and unavailability of credit. In the maximum likelihood estimates of stochastic frontier of the Cobb-Douglas function, they found $Y_2$ (labour) to have a coefficient of 0.0731 and a t-ratio of 3.1054 which was significant at 1% level of probability implying that any increase in labour will lead to increase in technical efficiency.

Makarau *et al.*, (2013) revealed that vegetable production was constrained by high cost of labour and labour intensive operations, thus explaining the importance of labour in all aspects of agriculture. The study by Makarau *et al.*, (2013) showed the following findings in regards to respondents' constraints to vegetable production. High cost of labour 85 (68%) was ranked 2$^{nd}$ and labour intensiveness 35 (28%) was ranked 5$^{th}$. Other constraints included inadequate capital 120 (96%) ranked 1$^{st}$, inadequate tractor hiring services 43 (34.4%) was ranked 3$^{rd}$, inadequate farm inputs 41(32.8%) was ranked 4$^{th}$ etc.

Dar (2014) reported that with significant movement of rural labour from farm to non-farm activities, labour scarcity had emerged as one of the burning constraints to agricultural production in India. Dar (2014) opined that the issue of agricultural labour shortage very closely affects poverty alleviation and basic food security of 600 million small holder farmers in India as these are the most hit by labour scarcity since they do not have the means to afford high wages of farm workers to carry out labour intensive production. According to Bantilan (2014) India's labour market is

baset with four major challenges – tightening of agricultural labour supply, attracting and retaining talented youth in agriculture; sustainable employment for rural labour force; and increasing labour productivity.

## Methodology

### Geographical Location of the Study Area

Zangon Kataf LGA is located in the Southern part of Kaduna State and lies between Latitude $9^0 12^0$ and longitude $10^0$ $21^0$ E. It is bounded in the North by Kachia LGA, in the South by Kaura LGA, in the West by Lere and Kaura LGAs and in the East by Jema'a LGA. The LGA lies in the Southern Guinea Savannah Zone of Nigeria, with an annual mean rainfall of 1270 – 1500 mm and mean annual temperature of $25^0$C – $30^0$C. The soil type is sandy loam which favors the production of most crops including maize, sorghum, soybean, groundnut, yam etc. Majority of the inhabitants are peasant farmers with small farm holdings. Crop and livestock production is the primary occupation for most of the inhabitants with few civil servants, petty traders, artisans, business men etc. Zangon Kataf LGA is one of the 23 LGAs in Kaduna State (Achi,2008). The population of the LGA was estimated to be nearly 378,000 during the 2006 census (NPC, 2006). The LGA is inhabited by the Atyap, Bajju, Ikulu and Kamantan ethnic nationalities. There are however the Hausas, Fulani, Yoruba, Igbo and so on.

### Sampling Frame and Procedure

The Zangon Kataf LGA consists of four chiefdoms namely: Atyap, Bajju, Ikulu and Kamantan. In order to undertake the sampling, a multi stage sampling was carried out. First, random sampling was carried out which involved the selection of fourteen out of the 52 districts as follows: five districts each from Atyap and Bajju chiefdoms and two districts each from Ikulu and Kamantan chiefdoms respectively. Approximately 13 respondents were selected from each district giving a total of 156 respondents as the districts were assumed to be of equal population.

### Data Collection

Data on the socio-economic characteristics of each of the household heads, type of farm assets owned or hired, labour use etc were collected using a structured questionnaire. The questionnaire was administered by enumerators who were trained to do so.

### Data Analysis

Descriptive statistics such as mean, standard deviation, frequency distribution, and percentages were used. This was done to achieve objective (i). ANOVA was used to achieve objective (ii), ratios were used to achieve objective (iii) while object (iv) was

analyzed using ordinary least square regression analysis. The generalized econometric model used was as follows;

$Y=f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X8, X_9, X_{10}, X_{11}, X_{12}, X_{13,}X_{14} +e)$……. (1)
Specified explicitly using the three functional forms;

Linear
$Y=b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + e$……(2)

Semi-log
$Y= b_0 + b_1InX_1 + b_2InX_2 + b_3InX_3 + b_4InX_4 + b_5InX_5 + b_6InX_6 + b_7InX_7 + b_8InX_8 + b_9InX_9 + b_{10}InX_{10} + b_{11}InX_{11} + b_{12}InX_{12} + b_{13}InX_{13} + b_{14}lnX_{14} + e$……. (3)

Exponential
$LnY= b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + b_{11}X_{11} + b_{12}X_{12} + b_{13}X_{13} + b_{14}X_{14} + e$.. ……..... ……...(4)

Where;
Y = Household labour (man days) $X_1$ = Age (years) $X_2$ = Family size (numeric) $X_3$ = Farm size (hectare ) $X_{4=}$use of modern farm inputs $X_5$ = Years of farming experience(years) $X_6$ =Contact with extension agent (dummy variable; 1=yes, 0=no) $X_7$ = Hired labour (Man days) $X_8$ = Credit Access (dummy variable; 1-yes, 0=no) $X_9$ = Other incomes (naira) $X_{10}$ = Membership of cooperative society (dummy variable, 1=yes, 0=no) $X_{11}$ = Educational (1=yes no=2) $X_{12}$ =Farm income (Naira) $X_{13}$ =Farming as primary occupation (dummy variable; 1=yes, 0=no) $X_{14}$ = Cost of labour (naira) e = Error term $b_0$=Intercept $b_0$ + $b_1$, $b_2$, $b_3$, $b_4$, $b_5$, $b_6$, $b_7$, $b_8$, $b_9$, $b_{10}$, $b_{11}$, $b_{12,}b_{13}$ and $b_{14}$ = regression coefficients. The lead equation of the regression model was chosen based on high value of $R^2$ (which is the coefficient of multiple determination), number and signs of significant variables.

**Analysis of Variance (ANOVA)**
The analysis of variance is a method for testing the hypothesis that there is no difference between two or more population means. It is often used (when there is just one explanatory variable) for testing the hypothesis that there is no difference between a number of treatments. The analysis of variance could either be a one way test which is to test for differences between different groups or a two way test which will test for the differences between the different groups (differences within the groups) or if required the variability within each of the groups. In general one way anova technique can be used to study the effect of k(>2) levels of a single factor. To determine if different levels of the factor affect measured observations differently,

the following hypotheses are tested:

$H_0$: $\mu_i = \mu$ all i=1, 2,……, k……(5)

$H_1$: $\mu_i \neq \mu$ some i=1, 2,……, k……..(6)

Where $\mu$ is the population mean for level i.
If the null hypothesis is true, the F statistics has an F distribution with k-I and n-k degrees of freedom in the numerator/denominator respectively. If the alternate hypothesis is true, then F tends to be large. $H_0$ is rejected in favour of $H_1$ if the F statistic is sufficiently large (Cockran and Cox,1994).

**Results and Discussion**
**Farmers Socio-economic Characteristics**
he average number of family members was found to be 7.5 with standard deviation of 3.3. Majority of the households (66.7%) had a family size of 6-10 members followed by those households with family size of 11-15 members (6.1%). The size of each household determines the number of household members who may be available for farm work. Manza (2014) argued that in subsistence agriculture as practiced in the study area, household size is important as it determines to a large extent the supply of labour to the farm. However, where a sizable percentage of the family members are children and the elderly, or that some have left home to school or in search of white collar jobs, a large family size may be of little or no advantage to the household on the farm. Manza (2014) opined that the significance of household size in agriculture hinges on the fact that the availability of labour for farm production, the total area cultivated to different crop enterprises, the amount of farm produce retained for domestic consumption, and the marketable surplus are all determined by the size of the farm household.

The majority of the households (43.4%) had 0.1-4 ha followed by 8.1-12 ha (24.8%) and 4.1-8 ha (24%). The average farm size was 5.6ha. This implies that most farms were small scaled and small farm size impedes productivity, crop diversification and consequently, the food status of the households. Adebayo (2011) stated that farm size is an important fixed factor in agricultural production. This is because it determines to a large extent the level of agricultural production. The size of the farm cultivated by a farmer is a function of population pressure, family size, labour availability and experience of the farmers. Other factors such as availability of factors of production like farm inputs, farm credit, remittances, received/money available to pay for hired labour will determine the farm size cultivated at any particular time by a household.

**Farm Tools Used on the Farm**

Evidence from the study showed that farmers in the study area still use local farm implements thus indicating that much of the farm labour is still largely manual. Although a few of such tools were hired for farm operations, however, a greater majority of the farm implements used were owned by the farmers. These include the following owned per household: cutlasses (3), hand hoe (4), sickles (6), farm rake (1), and hoe (4) per house hold. In addition, on the average each household owned 1.7 ox-drawn ridgers while no household had any ox-drawn plough or harrow. The implication of this finding is that the ownership of local farm implements limits the farm size, farm productivity and production. The almost none availability of ox drawn implements suggest that the use of animal power for farm operations is almost none existent. This therefore means that absence of implements would limit farm lands that could be put under production; farm productivity would be low and ultimately farm production.

**Labour Utilization for the Different Farm Operations**

The result of the study in Table 1a shows the mean number of days spent by the households on the various farm operations in 2014. The result shows that the requirement of labour was highest for land preparation, followed by harvesting, and threshing. For obvious reasons, labour requirement for spraying was least. This is because the labour requirement for spraying compared to other farm operations is generally low in the area. The ANOVA result showed that the differences in the labour requirement in the different operations had an F-value of 2.256 which was found to be significant at 5% level of probability.

Table 1b shows the average number of hired labourers used for the various farm operations. Land preparation (16.9) followed by weeding (14.5) were the farm operations in which hired labourers were used mostly while the least were spraying (5), threshing (7.3), land clearing (7.6) and planting (7.7). There was no significant difference in the number of hired labourers used for the various farming operations as the F value was 0.783. This could also mean that the same number of hired labourers was used for all the farming operations. The mean number of hired labourers used ranged from 5 to 17 with land preparation having the highest hired number of labourers of 65 while spraying had 10 labourers per household.

The result of the study in Table 1c shows the amount of money spent on hired labourers for the various farm operations in 2014 in the study area. The highest amount was spent on land preparation and planting respectively. The operations with the highest hired labour costs were land preparation (N28,150.00) followed by weeding (N12,557.14) and planting (N11,692.31). The least average amount spent was on fertilizer application (N3,388.89) followed by spraying (N4,182.35) and

harvesting (N6,045.45). The F value of 3.545 shows that there is a significant difference between the amounts spent on hired labour used for the various farm operations. This was found to be significant at 1% level of probability.

**Proportion of Family Labour to Hired labour in Farm Operations**

A comparative analysis of the proportion of family labour to hired labour used in the various farm operations as shown on Table 2 shows that the ratio of family labour to hired labour was highest for threshing in favour of family labour followed by harvesting, land preparation and land clearing where 1.6017, 1.3315, 1.2405 and 1.2101 of family labour was used to 1 unit of hired labour for these operations respectively. On the other hand, the highest requirement of hired labour compared to family labour was for transportation, fertilizer application and weeding where the labour requirement was 1.2744:1, 1.0865:1 and 1.0330:1 respectively. Generally speaking, the family labour input in most of the farm operations was higher than for the hired labour & input.

A seasonal consideration of labour requirement would suggest that land clearing, harvesting, threshing and transportation were farm operations carried mostly in the dry season while land preparation, planting, weeding, fertilizer application and spraying were farm operations which took place during the rainy season. According to the finding on Table 2, an average of 40.8282 man days was used during the dry season as against 56.9764 during the rainy season. On the other hand, 33.7723 hired labour was used during the dry season compared to 53.5345 man days were used during the rainy season. The implication for these findings is that each of the households has an enormous challenge in meeting the farm labour requirements whether this was for family labour or hired labour. The second implication is that when the size of the family labour decreases, the challenge of cultivating the same size of land would decrease and therefore a household must raise some adequate financial resources to be able to pay for the hired labour.

**Determinants of Farm Labour Use by Households**

The result in Table 3 shows the regression estimate of the determinants of household labour use for various farm operations in Zangon Kataf LGA of Kaduna State. The result shows that among the three functional forms, the exponential function was chosen as the lead equation with $R^2$ value of 0.989 which indicate that about 98.9% variability in household labour use was explained by the independent variables included in the model. The F value was highly significant at 1% level of probability indicating a regression of best fit. The age, farm size, use of modern farm inputs, membership of cooperatives, farming as a primary occupation, contact with an extension agent, years of farming experience, farm income and cost of labour were significant at 1% probability.

Family size was not significant at even10% and negatively related to family labour use. This result implies that the family labour use decreased with increase in family size. It would have been expected that the higher the family size, the higher the labour that would be available. The negative relationship might have been due to the fact that most members of the family were of school age or had gone to Kaduna or else- where in search of white collar jobs rather than being part of the active labour force. On the other hand, increased demand for more income to sustain the large family may have forced some household members to resort to off-farm employment. This finding agreed with that of Simonyan and Obiakor (2012) in having negative coefficient but differed from Onyenweaku and Nwaru ( 2005) who reported a positive relationship of family size with labour and that those large families ease labour constraints thereby leading to increase in productivity and income of the household. Farm size was found to be significant at 1% and positively related to household labour use. This implies that as the farm size increases, labour use will equally increase. Ezindima et al (2000) found that the greater the farm size, the greater would be the input requirement including labour for farm production activities .The cost of labour was significant at 1% and positively related to household labour use. This implies that as the cost of labour increased, family labour use increased too. Ezindima ( 2006) argued that increased labour cost serves as a disincentive for households to use hired labour hence the need to rely on members of their household for labour supply on their farms.

Hired labour (amount) and hired number of labourers were not significant at even 10% and both were negatively related to the family labour use. The result implies that family labour use decreased with increase in hired labour. Families will only rely on hired labour if their labour supply was inadequate. This explains the negative relationship between the amount for hired labour/the number of hired labourers and family labour. Credit is essential in the purchase of production inputs, improves access to land and adoption of innovations which enhances productivity. However, credit was not even significant at 10% and negatively related to family labour use. This implies that family labour use decreased with credit, hence the lower the access to credit the higher the use of family labour. Membership of a cooperative society was significant at 1% probability but negatively related to family labour use. This result implies that farmers will rely less on their family members for labour if they belong to a cooperative society. Farmers with farming as their primary occupation was not even significant at 10% probability and positive which means that farmers should rely more on agriculture for their livelihood in the study area. This finding did not agree with that of Simonyan and Obiakor (2012).

Age was significant at 1% and positively related to family labour use. This implies that as the age of the farmer increased, labour use increased also. Aged respondents were more likely to make increased use of family labour because of decrease in physical strength as they grow older particularly if they lack the financial resources to hire labourers for farm work. Nwaru and Iheke (2010) argued that the risk bearing abilities and innovativeness of a farmer is his mental abilities to cope with the daily challenges and demand of farm production activities and his ability to do manual work decreases with age. This explains the positive relationship between age and family labour use as the farmer will rely more on others to work on his farm.

**Conclusion**

The following conclusions were drawn

1. Most of the farm implements in use were still local
2. Farm operations such as land preparation, planting and weeding require more labour than the others
3. A higher proportion of family labour compared to hired labour was used in most of the farm operations
4. Age, farm size, use of modern farm inputs, years of farming experience and cost of labour were significant at 1% and positively related to farm labour use

**Recommendations**

1. The Kaduna State Government and Zangon Kataf LGA should assist the farmers to access subsidized farm operation services of modern farm implements and linkage to credit services for increased productivity and production
2. The different community development associations should create forum for awareness on the use of animal traction among the farmers in the LGA

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**Table 1a: Summarized Statistics of Number of days Family Members were used for Various Farming Operations.**

| Farm Operation | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| Land clearing | 1.00 | 21.00 | 9.1429 | 6.44333 |
| Land preparation | 1.00 | 90.00 | 21.0000 | 23.46629 |
| Planting | 1.00 | 18.00 | 7.9091 | 5.83874 |
| Weeding | 3.00 | 30.00 | 14.0000 | 8.58681 |
| Fertilizer application | 1.00 | 28.00 | 8.6923 | 7.15757 |
| Spraying of herbicides | 1.00 | 14.00 | 5.3750 | 4.13824 |
| Harvesting | 2.00 | 42.00 | 12.5385 | 11.56586 |
| Threshing | 1.00 | 30.00 | 11.6923 | 10.20118 |
| Transportation | 1.00 | 21.00 | 7.4545 | 5.88836 |
| Valid N (listwise) | | | | |

**Source: Field Survey, 2015**

**Table 1b: Summarized Statistics of Number of hired labourers used for Various Farming Operations.**

| C¯uL h Ŭőu¯ÆČ | a ėė TL a aximum a ean | { ÆŇ Deviation |
|---|---|---|
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**Source: Field Survey, 2015**

**Table 1c: Summarized Statistics of Amount paid to hired Staffs for various Farming Operations.**

| Farm Operation | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|
| Land clearing | 2000.00 | 26000.00 | 9450.0000 | 8281.33779 |
| Land preparation | 1000.00 | 100000.00 | 28150.0000 | 29303.35889 |
| Planting | .00 | 100000.00 | 11692.3077 | 26738.34517 |
| Weeding | 400.00 | 60000.00 | 12557.1429 | 13181.86525 |
| Fertilizer application | .00 | 7000.00 | 3388.8889 | 2315.40733 |
| Spraying of herbicides | .00 | 8600.00 | 4182.3529 | 2617.30665 |
| Harvesting | .00 | 20000.00 | 6045.4545 | 5506.60760 |
| Threshing | .00 | 30000.00 | 6546.1538 | 8000.16827 |
| Transportation | 450.00 | 60000.00 | 10873.5294 | 14810.66041 |
| Valid N (listwise) | | | | |

**Source: Field Survey, 2015**

**Table 2: Proportion of Family labour to Hired labour in Farm Operations**

| C¯uL h Ŭőų¯ÄĕČį | Family (mean) | Labour (mean) | Hired labour | | Ratio Hired labour |
|---|---|---|---|---|---|
| | | | Family labour : | | |
| Land clearing | 9.1429 | 7.556 | 0.5475 | : | 0.4525 |
| Land preparation | 21.0000 | 16.9286 | 0.5537 | : | 0.4463 |
| Planting | 7.9091 | 7.7000 | 0.5067 | : | 0.4933 |
| Weeding | 14.0000 | 14.4615 | 0.4919 | : | 0.5081 |
| Fertilizer application | 8.6923 | 9.4444 | 0.4793 | : | 0.5207 |
| Spraying of herbicides | 5.3750 | 5.0000 | 0.5181 | : | 0.4289 |
| Harvesting | 12.5385 | 9.4167 | 0.5711 | : | 0.4289 |
| Threshing | 11.6923 | 7.3000 | 0.6156 | : | 0.3844 |
| Transportation | 7.4545 | 9.5000 | 0.4397 | : | 0.5603 |

**Source: Field Survey Data, 2015**

**Table 3: Determinants of Household labour use among Small Scale Farmers in Zangon Kataf LGA**

| | Linear | Exponential | SEMI - LOG |
|---|---|---|---|
| | Coefficient (sig. Value) | Coefficient (sig. Value) | Coefficient (sig. Value) |
| (Constant) | 1370.927 (0.914) | 1.182 (0.156) | -48861.324(0.061) |
| Age | 377.369 (0.002)* | 9236000 (0.000)* | 1.686 (0.000)* |
| Family size | -691.506 (0.030)** | -2837000 (0.354) | -0.169 (0.583) |
| Farm size | 107.965 (0.031)** | 257100 (0.000)* | 0.484 (0.001)* |
| Modern farm inputs | -1883.449 (0.390) | 5940000 (0.014)* | -0.538 (0.138) |
| Farming experience | -55.473 (0.615) | 133400 (0.000)* | 1.012 (0.000)* |
| Contact with extension agents | -2476.312 (0.331) | -5657000 (0.007)* | -1.143 (0.003)* |
| Cooperative society membership | -2872.198 (0.222) | -5424000 (0.010)* | -1.349 (0.001)* |
| Farmers who benefited from credit facility | -563.371 (0.832) | -37850000 (0.851) | 0.062 (0.880) |
| Educational status | 679.929 (0.825) | 178830(0.539) | 0.346(0.209) |
| Farm income | -.004 (0.223) | -179000 (0.007)* | -0.215 (0.100) |
| Other income | .004 (0.384) | 3738000 (0.519) | -0.030 (0.839) |
| Farmers with farming as their primary occupation | 2064.127 (0.407) | 3159000 (0.135) | 0.567 (0.147) |
| Hired labour (amount) | -1.461 (0.066) | -2837000 (0.354) | -0.463 (0.073)*** |
| Hired labour (persons) | -0.855 (0.010)* | -712500 (0.340) | -1.229 (0.534) |
| Cost of labour | 0.036 (0.321) | 210210 (0.003)* | 0.112 (0.120) |
| $R^2$ | 0.981 | 0.989 | 0.922 |
| F | 28.87(0.037)** | 29.1(0.009)* | 27.34(0.048)** |

**Source: Field Survey Data, 2015 * ** *** Repr. 1%, 5% and 10% Probability Respectively**