

**ASSESSMENT OF FARM LABOUR CHANGING PATTERNS IN
CASSAVA PRODUCTION IN IMO STATE, NIGERIA**

BY

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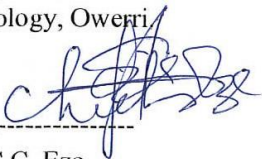
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CERTIFICATION


I certify that this work entitled "Assessment of Farm labour changing patterns in food crop production in Imo State" was carried out by Mbakaogu, Obumneke Emmanuel (REG. NO. 20114772098) in partial fulfillment for the Award of Master of Science (M.Sc.) degree in Agricultural Economics in the Department of Agricultural Economics of the Federal University of Technology, Owerri



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DEDICATION

This research work is dedicated to Almighty God for His abundant mercies throughout the duration of this programme. God guided me to diligently conclude this research and I give Him all the Glory.

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ABSTRACT

This study was carried out in Imo State. The broad objective was to analyse farm labour changing patterns in food crop production in Imo state. The specific objectives were to; examine the socioeconomic characteristics of food crop farmers in the area, identify the sources of farm labour in food crop production, determine the level of farm labour use in the area, determine and compare the availability of farm labour in the dry and wet seasons, determine the factors affecting farm labour supply in the area, and examine the constraints militating against the demand and supply of farm labour in the area. The results showed that the mean age of food crop farmer was 47 years, 68.9% were married, and the mean household size was 8 persons. Majority (43.70%) attained secondary education level, mean farm size was 0.9 hectares; mean farming experience was 26 years and food crop production was majorly for cash and family use. It was then found that food crop farmers demand for hired farm labour was mostly for land preparation (58.8%), weeding (61.5%), agrochemical application (61.5%) and harvesting (60%); while family labour were employed mostly for planting (60%) and post-harvesting activities (66.7%). It showed also that food crop farmers demanded mostly female farm labour for land preparation (58.8%), weeding (58.8%), agrochemical application (84.6%), planting (70%) and post harvesting activities (77.8%); while male farm labour were used mostly for harvesting (60%). The use of female labour for land preparation could be linked to the declining female literacy that increases their availability to farm activities and high engagement of male counterparts in non-farm activities. The results on labour changing pattern showed that in the 1980s, female labourers were rarely used (with mean score of 2.10) for food crop production, while presently the female labour is mostly employed (with mean score of 3.21) with male labourers in food crop production. In land clearing and weeding operations, the results showed that farm operations were mostly carried out manually both in the 1980s (with mean score of 3.56) and presently (with mean score of 3.02). It also showed that agrochemicals such as herbicides were rarely used (with mean score of 1.14) in the 1980s, but were presently mostly used (with mean score of 3.47) in these farm operations in the area; while fertilizer application and harvesting were mostly done manually (with mean score of 3.69 and 3.39) in both periods. Farm labour were rarely allocated (with mean score of 1.81) to off-farm activities in the 1980s, but presently were mostly (with mean score of 3.30) allocated to off-farm activities, indicating that farming (on-farm activities) was the major source of livelihood in the 1980s, but due the high remunerations from off-farm activities and the search for white collar jobs and other non-farm income sources, farm labour presently move to off-farm activities. It was found that the nature of food crop production, in-migration, farm size and distance to the nearest city were positively related to the supply of farm labour; while off-farm activities was negatively related to supply of farm labour. The results showed that high cost of labour, civilization and non-farm engagement, seasonality of agricultural production, out-migration of farm labour, land tenure system and fragmentation and scarcity of farm labour were the major constraints militating against farm labour demand and supply. The study recommended strengthening and organizing rural-urban linkages by ensuring parity in on-farm wage structure comparable with off-farm wages to reduce farm labour migration to off-engagements and rural to urban migration.

Keywords: Labour, Cassava, Production, Patterns, Demand and Supply

CHAPTER ONE

INTRODUCTION

1.2 Background of the Study

Labour is an essential factor in farming (Oluyole and Lawal, 2010). Farming is a labour-intensive activity and demands skilled and unskilled labour (Devi, 2012). In labour intensive system, man's prime function is as an energy source and in most cases; this involves expenditure of considerable human effort (Andrew, 2005). Farm labour is the term used to describe man-hours or man-days of hired and family labour. Most farmers depend on both family and hired labour for food crop production (Tijani *et. al.*, 2010). The implication is that majority of the farming household members obtained their labour from both family and hired labour sources for their agricultural activities. Some agricultural production activities require more farm labour than the other. There is a high labour requirement for instance for cassava production operations including land clearing, land preparation, planting, weeding and harvesting (Janssens, 2001).

Cassava (*Manihot esculenta* Crantz), a starchy root crop, is a major source of food security in Africa because of its ability to grow in low-quality soil, its resistance to drought and disease, and its flexible cultivation cycle (Meridian Institute, 2013). Cassava's harvestable portion, the tubers, can be stored underground until needed, making it an ideal food security crop (Nweke, 2003). Cassava is the most widely consumed food staple in Nigeria (Sanni *et. al.*, 2009). Nigeria is the world's leading cassava producer, with about 21 percent share in the global market (FAO, 2013). A small fraction of cassava output in the country is produced for commercial use in the livestock feed, ethanol, textile, confectionery, and food industries, while the majority is produced by smallholder farmers for subsistence or small scale processing (Knipscheer *et. al.*, 2007). Cassava

is also linked with women because of its important role in household food security, which is often the responsibility of women (Forsythe, Posthumus & Martin, 2016).

There is usually a labour shortage in cassava production especially during the peak farm period, and it usually makes labour input critical. This critical nature of labour in most cases leads to the hiring of labour on a seasonal and contractual basis to reduce the pressure of peak periods. In cassava production, shortage in labour supply, particularly in peak seasons, may be one reason for households to hire farm labour (Amsalu *et. al.*, 2013). Hired labour arrangement is used mainly by farmers who have savings or access to a source of finance for farming. Hired labour use is prevalent during critical operations of land clearing and weeding for cassava production (Abila, 2012), while in some crop enterprises, as a result of this shortage in farm labour, well-to-do farmers substitute human labour with machine power and chemicals. This has forced the farmers to go in for agrochemicals and machines (Devi, 2012).

Farm mechanization may be determined by various factors including farming systems, population density and better market access (Pingali, 2007). Mechanization involves the provision and use of all forms of power sources and mechanical assistance to agriculture, from simple hand tools, to animal draught power (DAP), and to mechanical power technologies (FAO, 2014). Given the heterogeneity in the agro-ecological environment and socioeconomic characteristics of farm households, farm mechanization may play diverse roles. For example, farm mechanization in cassava production may be more effective at reducing labour costs than expanding area cultivated. In such a case, the goal for an effective mechanization policy may be to raise incomes of smallholder farm households through reduced production costs rather than to grow large-scale farms (Takeshima *et. al.*, 2013). Agricultural mechanization and investment in market access

infrastructure eases the burdens of some tedious postharvest operations on farm labour, and reduces farm labour movement.

The massive movement of labour out of agriculture has been accompanied by the reallocation of labour by farm residents from farm to non-farm work. The structure of the farm and the characteristics related to farm production, as well as the labour market conditions, are the main factors which have been found significant in explaining the change in agricultural employment (Tocco *et. al.*, 2012). Cassava production, compared to other agricultural production such as livestock production, is usually associated with a higher probability of leaving the sector (Breustedt and Glauben, 2007). According to Pietola *et. al.* (2003) married farmers have a higher probability of retiring earlier than single farmers, suggesting that couples are more inclined to move away from agricultural activities. Access to markets and reduced distance to urban centres are associated with less on-farm participation in cassava production (Tocco *et. al.*, 2012). Farming system affects the seasonal availability of farm labour for on-farm use (Benjamin and Kimhi, 2006), which in other words, affects the general farm labour use.

The demand for, and supply of labour in the agricultural sector are determined in the labour market, with the participants being workers and farmers. Workers supply labour to farms in exchange for wages, and farmers demand labour from workers in exchange for wages (Conradie, 2005). According to Parkin *et. al.* (2005), farm labour use and changes can shift the labour demand curve when there is a change in the factors, namely, the price of the firm's output, factor prices and technology. In the case of labour supply in the agricultural industry, people may allocate their time to two broad activities - labour supply and leisure. According to Parkin *et. al.* (2005), the supply of labour will change if any of the size of the adult (working age) population who are willing to

work, and technological change and capital accumulation. The farm labour use is strictly dependent on the production technology, which determines the labour intensity within the farm; the expected profits from selling the produced output (output prices), which are subject to the type of competition within the sector; and the relative prices of the factors of production (input prices), which determine the specific factor intensities based on the specialization of the farms (Kancs *et al.*, 2009).

Rural infrastructure comprising of rural roads, markets, irrigation system, water supply, telecommunication facilities, health and educational facilities, are basic to quality of life in rural areas, and are important facilitators of economic growth and development (Ahmed and Donovan, 1992). It plays a very significant role in accelerating agricultural production and produce marketing. A good road network accelerates efficient delivery of farm inputs, enhances the productivity of farm labour, reduces transport cost and also enhances spatial agricultural production and distribution (Inoni and Omotor, 2009). On the other hand, it impacts on rural non-farm sector.

The pattern of non-farm employment is enhanced by the proximity or nearness to city. Non-farm employment is an opportunity for farmers to engage in urban employment and trading while supplementing or substituting domestic agricultural labour with hired labour. For average operator of a farm located in the closest proximity of a larger urban centre, the probability of working off the farm is 39 percent, about two percentage points less than that of the average operator of a farm located 55 km away from a larger urban centre (Alasia and Bollman, 2009). Rising incomes and opportunities for non-farm, however, reduce the use of on-farm labour. Households are pushed into the non-farm sector by a lack of on-farm opportunities, for example, resulting from drought

or small size of land holdings (Davis, 2003). In the face of acute weather variability, non-farm activities could become attractive adaptation options to agricultural activities (Bezabih *et. al.*, 2010). Different studies have investigated the determinants or factors that most influence the decision to participate in non-farm activities and the choice of activity, as well as the extent of rural household participation. Bezu *et. al.* (2009) studied the activity choice in rural non-farm employment. They found education, gender, and land holding to be the most important determinants of activity choice. Mduma and Wobet (2005) found that education level, availability of land, and access to economic centers (rural infrastructure) and credit are the most important factors in determining the number of households that participated in a particular rural local labor market.

1.2 Statement of the Problem

The decline in agricultural productivity is linked to the farming system employed by farmers, and the change in the pattern of farm labour use in agricultural production. Most of the farm work in the rural area is done during the rainy (wet) season, and there is usually scarcity of farm labour due to out-migration and other activities that moved farm labour to non-farm sector during the dry season and sometimes in both seasons. This forces farmers to depend on their own labour (family labour) and could not make appreciable improvement in their production. As reported by IFAD (2007) approximately 800 million people have moved from the countryside to the cities and a high rate of out-migration is expected in the next 50 years. On the other hand, Babatude and Qaim (2010), Oseni and Winters (2009), Lopez-Feldman *et. al.* (2007) and others have identified non-farm activities and its need in maintaining a portfolio of income. Considering these incentives, young and able-bodied farming households migrate to cities in search of non-farm employments.

As a result of this, how then will the farmer offset the farm labour needs and shortages during the peak season and still maintain the expected level of output? Most farmers resort to hired farm labour to improve labour productivity. Unfortunately, hired labour is usually sought by wealthy farmers that have enough capital to pay for the labour as argued by Takane (2008).

Moreover, the changing pattern of farm labour use could be linked to the improvements in farm practices. In cassava production, weeding is now carried out using herbicides. This however substitutes human labour use with agrochemical use, thereby keeping human farm labour unemployed unlike the case in the past in food crop production when there was a little or no use of herbicides. Regrettably, well-to-do farmers substitute human labour with machine power where machines such as tractors now carry out a work that would have been done by a number of human labourers. In cassava production, this is usually experienced during land preparation and clearing.

However, this social dynamics and educational advancement have resulted in a shrinking supply of labour to agriculture. Presently, the drudgery and the unwillingness of the young grade school leavers to undertake the heavy chores of weeding and stumping, pose serious problems for farm labour and its use. Young school leavers now see farming as a profession for peasants. They prefer hunting for white-collar jobs to farming. As a result, there is a scarcity of farm labour in the present day food crop production.

Despite all the studies (Oseni and Winter, 2009; Tijani *et. al.*, 2010; Babatunde and Quaim, 2010; Odoemenem and Odom, 2010; Simonyan and Obiakor, 2012; Ango *et. al.*, 2014; etc) on labour migration, non-farm participation, labour use, etc., the changing patterns of farm labour and the factors that bring about this change have not been empirically studied. Factors such as, changing market access conditions, particularly, highway construction, rising commercial demand for

various staple crops, improved price information and greater haulage capacity; non-farm employment; proximity to the nearest city; migration; etc., contribute to a large extent to the changing need for farm labour and how the farmers react given these factors. Even though these factors mentioned have been solved partly by the widespread of hired labour; changes in gender division of labour; and transfers of labour from poorer households to commercial producers, there has never been any critical look at these key factors mentioned in the study area. This study therefore examined how these factors affect farm labour use and the shift in farm labour patterns in the area of study.

1.3 Objectives of the Study

The broad objective was to analyze farm labour changing patterns in food crop production in Imo state, Nigeria. The specific objectives were to;

- i. examine the socioeconomic characteristics of food crop farmers in the area,
- ii. identify the sources of farm labour in food crop production,
- iii. ascertain the level of modern farm input use in food crop production,
- iv. determine the level of farm labour use and the changing pattern in food crop production,
- v. determine the factors affecting farm labour use in food crop production, and
- vi. examine the constraints militating against the farm labour use in the area

1.4 Hypotheses of the Study

The null hypotheses tested were that;

- i) there is no significant difference in farm labour use in the past (perceived last two decades) and the present day food crop production in the area
- ii) factors such as market access, distance to city, in-migration, farm size, non-farm activities and age do not significantly affect the farm labour use in food crop production

1.5 Justification for the Study

Farm labour availability and use are the very foundation of the economy and the continuity of families, the local communities and the society at large. Farm labour-use in the production of food crop such as cassava is essential to ensuring sustainable development. Therefore, there is need to determine the level of farm labour use and the changing pattern in the study area. Farm labour changing pattern has direct and indirect effects on farm labour availability and use, as it retards or promotes the development of farm enterprises - hence the need of this study.

However, in an effort to gain a fuller understanding of migration and its implications on farm labour availability and use, this study determined the effect of migration on labour availability and use, and the extent to which any identified factor compensates for the negative effect of out migration on farm labour availability.

This study has provided empirical information on farm labour changing patterns among food crop producers in Imo State, and as well, will help both the national and international scholars to develop a better methodology that will ensure the availability and the efficient use of farm labour.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Literature

2.1.1 Concept of Farm Labour

Farm labour is defined in terms of man-hours or man-days of hired and operator and family labour. The labour requirements of farm production for clearing, planting, ploughing, weeding, spraying, harvesting, etc., are very considerable (Olayide and Heady, 1982). It can also be measured as value of goods and services produced in a period of time, divided by the hours of labor used to produce the goods and services (Okyere *et. al.*, 2011). Labour is an essential factor in farming (Oluyole and Lawal, 2010). Labourers constitute a vital input in agricultural production, but they are migrating to different parts of the country for earning a better livelihood, adding to the existing imbalance between labour availability and use (Deshingkar, 2004). Labour productivity or output per worker derives its importance from relationship to economic well being of a nation. For economic growth to result in an increased standard of living, it is necessary for output to grow faster than the labor force in the population, which implies that labor productivity must grow (Ukoha, 2000).

The importance of family labour in farm work and the lack of mechanization in agricultural production imply that the availability of family labor is a prerequisite for a household to increase farm size. The increase in farm size using abundant family labor is possible only under the condition that land is readily available for the expansion of a family's farm (Takane, 2008). Inadequate labour availability to meet production needs is one aspect underlying the use of child

labor (Barrientos *et. al.*, 2008). Labour demands on women are more complicated with severe consequences on agricultural production. With deteriorating economic conditions, women have added cash earning activities to their already heavy workload, thus becoming the cornerstone of livelihood of households, but then with serious health and productivity consequences. Women worked over 9 hours a day, against 3.5 for adult males; and given the gender division of labour and differences in the access to land, labour, finance and education, the technical needs of women farmers are in many ways distinct from those of men (Rahman, 2005 and Rahman *et. al.*, 2004). Women are the backbone of the agricultural sector, accounting for 60% to 80% of agricultural labour and being responsible for 80% of food production (Mgbada, 2000). Female headed households, with their children, spent more days on farm work than did the members of male-headed households in order to cope with the lack of labour. The lower income of female heads of households forced them to rely more on agricultural wage income than their male counterparts (Takane, 2008).

The present day civilization and the corresponding rise in educated youths have resulted in low farm labour availability. The more educated an individual is, the less likely he would be available for agricultural labour (Simonyan and Obiakor, 2012). Social dynamics and educational advancement have resulted in a shrinking supply of labour to agriculture. Human labour is usually substituted with agro chemicals usage and/or machines such as combined harvesters, transplanting machinery, etc. Chemical weed control is widely adopted on account of the easiness in management and labour shortage. Of this, weed control expenses reflect the substitution of labour with chemicals. Decline in the use of human and animal labour and the resultant substitution with machine power and chemicals, and have forced the farmers to go in for machines and agrichemicals especially in cassava production. Chemical weed control practices have substituted

a sizeable women labour employment. The declining labour use and corresponding increase in wages may have a negative impact on the total cost, depending on the degree of substitution. The labour cost constitutes a major share in the total cost of farming (Devi, 2012).

2.1.2 Farm Labour Migration

Labourers constitute a vital input in agricultural production, but they are migrating to different parts of the country to earn a better livelihood. The length of migration and the composition of the flow are critical variables influencing the effects of out-migration on rural areas, especially on employment. Out-migration with frequent returns to the community of origin –allows for a better deployment of labour, since those who are underemployed during the agricultural lean season can find work in town or in other areas. Migrants of this type tend to maintain their agricultural activities while taking advantage of opportunities available in other areas, thus increasing disposable income which can be invested in production or used for consumption (IFAD, 2007). Conversely, longer-term migration to cities or abroad usually means that migrants are unable to return home and engage in agricultural activities and employment during the farming season. Their absence may generate labour shortages (Tacoli, 2002), and increase in labour cost.

2.1.3 Farming System

Farming system is a term used to describe a population of individual's farm practices that have broadly similar resource base, enterprise pattern, household, livelihood and constraints, and for which similar development strategies and interventions would be appropriate. The classification of farming systems of developing countries has been based on the following criteria: available natural resources base (including land, water, grazing areas and forests), climate of which altitude

is one important determinant, landscape, including slope, farm size, tenure and organization, and dominant pattern activities and household livelihood including field crops, livestock, trees, aquaculture, hunting and gathering, processing and non-farm activities, and taking into account the main technologies used, which determine the intensity of production and integration of crops, livestock and other activities. Farming systems prevalent in West Africa are; rotational fallow farming, semi-permanent and permanent, and mixed farming. The basis of African economies and the livelihood of the majority of the population is smallholder household-cum-family based agricultural production system (Food and Agriculture Organization, 2004).

2.1.4 Cassava Production and Uses

Cassava (*Manihot esculenta* Crantz), a starchy root crop, is a major source of food security in Africa because of its ability to grow in low-quality soil, its resistance to drought and disease, and its flexible cultivation cycle (Meridian Institute, 2013). Cassava's harvestable portion, the tubers, can be stored underground until needed, making it an ideal food security crop (Nweke 2003). Cassava is the most widely consumed food staple in Nigeria (Sanni *et. al.*, 2009). Nigeria is the world's leading cassava producer, with about 21 percent share in the global market (FAO, 2013). A small fraction of cassava output in the country is produced for commercial use in the livestock feed, ethanol, textile, confectionery, and food industries, while the majority is produced by small holder farmers for subsistence or small scale processing (Knipscheer *et. al.*, 2007). Cassava is also linked with women because of its important role in household food security, which is often the responsibility of women (Forsythe, Posthumus & Martin, 2016). The main traditional cassava products in Nigeria are *gari*, *fufu*, and *lafun*. *Gari* is roasted cereal with a slightly fermented taste. It is made from yellow-fleshed varieties or from white roots fortified with red palm oil to make it

yellow in color; otherwise, it is creamy white. *Gari* processing in Nigeria is on the rise because it is seen as a convenience food; it is quick and easy to cook and can be stored. In both urban and rural markets, *gari* competes with rice and cereals due to its low price and high convenience. *Fufu*, a fermented paste, is similar to *gari* in its importance in a household's diet. Instant *fufu* is gaining popularity because it is easy to prepare, has a long shelf life, and is packaged compactly. *Lafun* is fermented, dried cassava that is turned into flour and then into a stiff paste to be eaten with sauce (McNulty & Oparinde, 2015).

Fresh cassava is also popular; after being boiled, soaked, or sundried to remove cyanogens, it can be boiled or fried similar to Irish potatoes. High-quality cassava flour (HQCF) has recently become a major product in the food sector as it is milled from dried cassava and used as a substitute for wheat flour in bakery goods. Cassava starch is widely used as an industrial raw material in thickening or binding agents, and parts of the cassava plant are used for livestock feed (Department of Agriculture, DoA 2013). Value chains of industrial and animal feed products from cassava will not be investigated, as the focus of this paper is on the value chains of cassava products for human consumption. Cassava is an inexpensive and dependable source of carbohydrates, but the crop lacks nutritional value and is a poor source of protein, vitamins, and minerals (Phillips *et. al.*, 2004).

2.2 Theoretical Literature

2.2.1 Labor Theory of Value (LTV)

The labor theory of value (LTV) is a theory of value that argues that the economic value of a good or service is determined by the total amount of "socially necessary labor" required to produce it, rather than by the use or pleasure its owner gets from it and its scarcity value. It does not say that the value of a commodity is determined by the actual amount of labor contained in it, but the average amount needed to produce it. This is called "socially necessary labor". Labour theory of value (LTV) is usually associated with Marxian economics, although it is also arguably used in the theories of earlier liberal economists such as Adam Smith and David Ricardo and later also in anarchist economics. Smith saw the price of a commodity in terms of the labor that the purchaser must expend to buy it, which embodies the concept of how much labor a commodity; a tool for example, can save the purchaser. The LTV is central to Marxist theory, which holds that the working class is exploited under capitalism, and dissociates price and value. Marx never referred to his own theory of value as a "labour theory of value" even once (Marx, 1867). Modern economics tends to deny the need for a LTV, concentrating instead on a theory of price determined by demand and supply. The demand for labour is derived from production and distribution activities in the goods and services sectors. As a result, its size and shape are sensitive to what happens in the national economy (Bloom and Humair, 2010).

When speaking in terms of a labor theory of value, "value," without any qualifying adjective should theoretically refer to the amount of labor necessary to produce a marketable commodity, including the labor necessary to develop any real capital used in the production. Both David Ricardo and Karl Marx tried to quantify and embody all labor components in order to develop a theory of the real price, or natural price of a commodity (Junankar, 1993). The labor theory of value as presented by Adam Smith did not require the quantification of past labor, nor did it deal with the labor needed to create the tools (capital) that might be used in producing a commodity.

Smith's theory of value was very similar to the later utility theories in that Smith proclaimed that a commodity was worth whatever labor it would command in others (value in trade) or whatever labor it would "save" the self (value in use), or both. However, this "value" is subject to supply and demand at a particular time.

The real price of everything, what everything really costs to the man who wants to acquire it, is the toil and trouble of acquiring it. What everything is really worth to the man who has acquired it, and who wants to dispose of it or exchange it for something else, is the toil and trouble which it can save to himself, and which it can impose upon other people. Smith's theory of price (which for many is the same as value) has nothing to do with the past labor spent in producing a commodity. It speaks only of the labor that can be "commanded" or "saved" at present. If there is no use for a buggy whip, then the item is economically worthless in trade or in use, regardless of all the labor spent in creating it. Adam Smith held that, in a primitive society, the amount of labor put into producing a good determined its exchange value, with exchange value meaning in this case the amount of labor a good can purchase. However, according to Smith, in a more advanced society the market price is no longer proportional to labor cost since the value of the good now includes compensation for the owner of the means of production: "The whole produce of labour does not always belong to the labourer. He must in most cases share it with the owner of the stock which employs him." "Nevertheless, the 'real value' of such a commodity produced in advanced society is measured by the labor which that commodity will command in exchange. ... But [Smith] disowns what is naturally thought of as the genuine classical labor theory of value, that labour-cost regulates market-value. This theory was Ricardo's, and really his alone" (Whitaker, 2005).

Classical economist David Ricardo's labor theory of value holds that the value of a good (how much of another good or service it exchanges for in the market) is proportional to how much labor was required to produce it, including the labor required to produce the raw materials and machinery used in the process. David Ricardo stated it as, "The value of a commodity, or the quantity of any other commodity for which it will exchange, depends on the relative quantity of labour which is necessary for its production, and not as the greater or less compensation which is paid for that labour." (Ricardo, 1817) In this connection Ricardo seeks to differentiate the quantity of labour necessary to produce a commodity from the wages paid to the laborers for its production. However, Ricardo was troubled with some deviations in prices from proportionality with the labor required to produce them (Fernando, 1990). For example, he said "I cannot get over the difficulty of the wine, which is kept in the cellar for three or four years [i.e., while constantly increasing in exchange value], or that of the oak tree, which perhaps originally had not 2 s. expended on it in the way of labour, and yet comes to be worth £100." (Whitaker, 2005) Of course, a capitalist economy stabilizes this discrepancy until the value added to aged wine is equal to the cost of storage. If anyone can hold onto a bottle for four years and become rich, that would make it hard to find freshly corked wine. There is also the theory that adding to the price of a luxury product increases its exchange-value by mere prestige.

The labor theory as an explanation for value contrasts with the subjective theory of value, which says that value of a good is not determined by how much labor was put into it but by its usefulness in satisfying a want and its scarcity. Ricardo's labor theory of value is not a normative theory, as are some later forms of the labor theory, such as claims that it is *immoral* for an individual to be paid less for his labor than the total revenue that comes from the sales of all the goods he produces. It is arguable to what extent these classical theorists held the labor theory of value as it is commonly

defined (Gordon, 1959). For instance, David Ricardo theorized that prices are determined by the amount of labor but found exceptions for which the labor theory could not account. In a letter, he wrote: "I am not satisfied with the explanation I have given of the principles which regulate value." Adam Smith theorized that the labor theory of value holds true only in the "early and rude state of society" but not in a modern economy where owners of capital are compensated by profit. As a result, "Smith ends up making little use of a labour theory of value"(Canterbery, 2001).

Contrary to popular belief Marx never used the term "Labour theory of value" in any of his works but used the term Law of value, Marx opposed "ascribing a supernatural creative power to labour", arguing as such: Labour is not the source of all wealth. Nature is just as much a source of use values (and it is surely of such that material wealth consists!) as labour, which is itself only the manifestation of a force of nature, human labour power. Here, Marx was distinguishing between exchange value (the subject of the LTV) and use value. Marx used the concept of "socially necessary labour time" to introduce a social perspective distinct from his predecessors and neoclassical economics. Whereas most economists start with the individual's perspective, Marx started with the perspective of society *as a whole*. "Social production" involves a complicated and interconnected division of labor of a wide variety of people who depend on each other for their survival and prosperity. "Abstract" labor refers to a characteristic of commodity-producing labor that is shared by all different kinds of heterogeneous (concrete) types of labor. That is, the concept abstracts from the *particular* characteristics of all of the labor and is akin to average labor (Canterbery, 2001).

"Socially necessary" labour refers to the quantity required to produce a commodity "in a given state of society, under certain social average conditions or production, with a given social average

intensity, and average skill of the labour employed". That is, the value of a product is determined more by societal standards than by individual conditions. This explains why technological breakthroughs lower the price of commodities and put less advanced producers out of business. Finally, it is not labour per se which creates value, but labour power sold by free wage workers to capitalists. Another distinction to be made is that between productive and unproductive labour. Only wage workers of productive sectors of the economy produce value (John, 2009).

The Marxist labour theory of value has been criticized on several counts. It predicts that profits will be higher in labour-intensive industries than in capital-intensive industries, which would be contradicted by measured empirical data inherent in quantitative analysis. Even if Marx has never 'mechanically' simplified the matter in these terms, as capital itself is product of past labour, thus, the 'general tendency of falling profit' does not concern or invalidate the labour origin of value, present in both live and dead labour (capital). This is sometimes referred to as the "Great Contradiction". In volume 3 of Capital, Marx explains why profits are not distributed according to which industries are the most labour-intensive and why this is consistent with his theory. Whether or not this is consistent with the labour theory of value as presented in volume 1 has been a topic of debate. According to Marx, surplus value is extracted by the capitalist class as a whole and then distributed according to the amount of total capital, not the just variable component. In the example given earlier, of making a cup of coffee, the constant capital involved in production is the coffee beans themselves, and the variable capital is the value added by the coffee maker. The value added by the coffee maker is dependent on its technological capabilities, and the coffee maker can only add so much total value to cups of coffee over its lifespan. The amount of value added to the product is thus the amortization of the value of the coffeemaker. We can also note that not all products have equal proportions of value added by amortized capital. Capital intensive industries

such as finance may have a large contribution of capital, while labour-intensive industries like traditional agriculture would have a relatively small one (Ekelund, Robert and Hebert, 1997). The theory can also be sometimes found in non-Marxist traditions (Weizsäcker, Carl Christian von, 2010). For instance, mutualist anarchist theorist Kevin Carson's *Studies in Mutualist Political Economy* opens with an attempt to integrate marginalist critiques into the labor theory of value (Kevin, 2010).

2.3 Empirical Framework

2.3.1 Effects of Migration on Farm Labour

IFAD (2007) observed that employment in the agricultural sector is decreasing, as many rural areas are undergoing a process of “de-agrarianization”, with younger workers seeking to move out of agriculture because of lack of jobs, low incomes and agro-climatic constraints. Increasing numbers of rural people are working in non-agricultural activities in or outside their place of origin in order to diversify their income and reduce risk. According to Reardon *et. al.* (1998) rural non-farm activities accounted for 42 per cent of rural households’ income in Africa, 40 per cent in Latin America and 32 per cent in Asia. Tacoli (2002) and Taylor and Yuñez (2002) opined that the reason for this is population growth and increased pressure on natural resources, exacerbated by economic reform and trade liberalization that has made it impossible to maintain employment in activities that cannot withstand competition. Mukherjee (2002) observed that areas of intensive farming and increased mechanization of agriculture also led to a fall in farm employment. IFAD (2007) further stated that occupational diversification in rural areas is often linked to migration, whether temporary or long term. Evidence suggests that remittances – the money that migrants earn in urban areas and abroad and send back to their places of origin – are gaining in importance

and have in some locations overtaken agriculture as the main source of income for rural households.

Deshingkar and Grimm (2005) opined that there is no consensus on the effects of migration on rural employment and development. According to this author, there are two opposing views. The first one considers that the overall impact of rural out-migration on both departure and a destination area is negative. Supporters of this view cite a number of negative impacts in urban areas: the rising levels of urban unemployment; the expansion of the informal sector; and increasing persistent poverty. In rural areas, the negative impact is labour loss and its disruptive effect on the local economy. A second view considers that migration can have a positive impact on development at national, regional and local levels. Supporters of this view are opposed to policies aimed at restricting migration, arguing that in the past such policies usually achieved the opposite. They consider migration to be a household strategy involving the maintenance of economic and social links between the migrant and his/her household. This view emphasizes the benefits arising from the transfer of resources to rural areas, such as financial or in-kind remittances, skills and innovative ideas. Individual and collective remittances contribute to the subsistence and well-being of rural families and, in some cases, to social and infrastructure improvements. Investment of migrants' income in farm and non-farm activities may also create employment opportunities. Cotula and Toulmin (2004) indicated that supporters of this view recommend designing policies that increase social, economic and financial links between migrants and sending areas.

IFAD (2007) stated that the length of migration and the composition of the flow are critical variables influencing the effects of out-migration on rural areas, especially on employment. Out-migration with frequent returns to the community of origin –allows for a better deployment of

labour, since those who are underemployed during the agricultural lean season can find work in town or in other areas. Migrants of this type tend to maintain their agricultural activities while taking advantage of opportunities available in other areas, thus increasing disposable income which can be invested in production or used for consumption. Tacoli (2002) observed that longer-term migration to cities or abroad usually means that migrants are unable to return home and engage in agricultural activities and employment during the farming season. Their absence may generate labour shortages. Labour shortage may contribute to a destabilization of traditional farming systems at household and community levels. FAO (1995) out-migration of young men and women has led to significant ageing of the rural labour force, with a negative effect on farm production and farm income.

Cotula and Toulmin (2004) suggested that remittances can compensate the negative impact of out-migration by allowing hired labour to replace the agricultural labour force lost. De Haas (2003) found that migrants usually entrusted land cultivation to other household members (women in particular), to sharecroppers or to hired labourers. This has resulted in improved wage levels and sharecropping conditions. According to the study by Deshingkar and Grimm (2005) carried out in areas of high out-migration in China, total grain output declined by less than 2 per cent, while household disposable income increased by 16 per cent as a result of migration. The author further observed that the capacity of remittances to compensate the labour shortage caused by predominantly male out-migration depends on the amount of remittances received. According to Baver (1995) newly created jobs are often primarily for men, while women tend to be stuck in traditional forms of employment. Often, women have to step in, doing more work and engaging themselves in traditionally male chores. For example, in some Central American and Caribbean countries certain agricultural activities have become female-dominated. FAO (1995) found that in

Haiti the number of females in the agricultural labour force increased from 30 per cent in 1980 to 37 per cent in 1990. Although the “feminization” of agriculture in these countries could be seen as a positive trend, with an improvement in women’s status and autonomy, it is important to recognize that rural women are forced to continue to carry out household and family responsibilities in addition to the agricultural chores. As a result, their daily workload is increased. The same observation has been made in rural areas in Sub-Saharan Africa, where this situation rarely confers more power to women in the domestic sphere and in village decision making as women remain under the control of the lineage system during the migration of their husbands. Lanly (1997) observed that in some rural communities, out-migration can be seen as a means to reducing pressure on household consumption and on the land. Potts and Mutambirwa (1990) observed that in regions of high population density, out-migration of part of the population may be a way to alleviate underemployment in agriculture and protect the livelihoods of those farmers who stay behind. While remaining rural population may thus obtain access to more land and other resources which can make their farms economically viable.

2.3.2 Effects of Seasonality on Farm Labour Use.

Amsalu *et. al.* (2013) observed that participation of households in labour exchange can be due to initial differences in absolute and relative factor endowments. Thus, shortage in farm labour supply, particularly in peak seasons, maybe one reason for households to hire farm labour. The other reason could be supply of labour to non-farm activities by households engaged in farming as those households allocating their labour to off-farm activities and hiring farm labour simultaneously may be beneficial. The authors further observed that the demand for farm labour

is significantly affected by farm attributes, non-farm income and family composition. The findings with regards to farm labour use imply that measures taken to influence returns to labour on farm may produce different results for labour market participant and non-participant households. Moreover, increasing the non-farm employment opportunities can help release the liquidity constraint and thus promote increased use of hired farm labour. The decision of households to supply labour to on-farm work and to hire farm labour depends on the seasonal nature of agriculture along with many other socio-economic features. During peak agricultural seasons, there is a tendency to hire farm labour and allocate more to farm activity. Shortage of farm labour may lead to low farm productivity, a situation which has been considered a major problem especially in some developing countries. Gebremedhin and Switon (2001) opined that the strategies suggested to deal with such problem were the development of capital intensive agricultural technology and use of labour intensive technology that required an increase in farm labour supply. According to Anim (2011), some of the labour intensive technologies introduced would require more labour, thus creating peak labour uses at planting and harvesting, while other labour intensive technologies create peak labour by increasing regularity of operations. On the other hand, lack of adequate farm labour could be a barrier to the adoption of more sustainable labour intensive farming system. Tegegne *et. al.* (2001) concluded that the strategy of labour intensive farming system was to offer the potential to increase productivity and farm incomes through the employment of intensive farm labour, yet it has been generally overlooked and overshadowed instead by myriads of research on non-farm labour.

2.3.3 Labour Scarcity and Effect on Wage Rate

Devi (2012) observed that the labour scarcity in agriculture was accelerated by the shrinking labour supply owing to the preference of younger generation for a stable employment or other casual works in the non-farm sector. The physical drudgery associated with farming and aspects like lower social status also prompted for this changed social preference. The widening supply-demand gap in labour market impacted the observed rise in wage rates. Kannan (1998), observed that labour scarcity in agriculture, especially in rice farming, is reported to be an important reason behind declining rice paddy. In response to this signal, there have been several alternative attempts of substituting the hired labour with family labour, capital (combined harvesters, transplanting machinery, etc. or chemicals (herbicides). The general aversion of young generation for farm works, the breaking up of joint family system, changes in the demographic pattern, etc. can be assumed as the major reasons for this. The skilled nature of some of the activities and shrinking family size restrict the chances of family labour involvement. According to the study by Prabakar *et. al.* (2011), among the various reasons for labour scarcity in agriculture, the ‘higher wages in other locally available jobs’ was ranked ‘first’ because the higher wage rate prevailing in the non-agricultural works like masonry, carpentry, electrical and plumbing works, which are locally available, attract the labourers.

2.3.4 Farm Labour Substitution with Machine and/or Chemical in Agricultural Production

Devi (2012) observed that the use of draught animals has been common for preliminary land preparation and leveling works, and consequent to mechanization, the share of animal and human labour got reduced. Pingali (2007) observed that farm mechanization may be determined by various factors including farming systems, population density, and labor wages. According to FAO

(2014) agricultural mechanization is the process of improving farm labour productivity through the use of agricultural machinery, implements and tools, and it involves the provision and use of all forms of power sources and mechanical assistance to agriculture, from simple hand tools, to animal draught power (DAP), and to mechanical power technologies. Farm mechanization may play diverse roles. For example, farm mechanization may be more effective at reducing labor costs than expanding area cultivated. In such a case, the goal for an effective mechanization policy may be to raise incomes of smallholder farm households through reduced production costs rather than to grow large-scale farms. Takeshima *et. al.* (2013) observed that most farmers are growers of major staple crops like maize, cassava, sorghum, yam, and legumes, except for rice growers, vegetable growers in the North, and cocoa growers in the South. According to this author, in the South, the majority of types are small-scale, low-input growers of maize, cassava, and yam, without explicit landownership; they are asset poor, reside in relatively populous areas, and rely mostly on crop sales for their income. The remaining types are relatively larger-scale sorghum/root crop growers (who are also landless and poor) and cocoa growers with slightly higher incomes and stronger landownership (who reside relatively close to the town and major rivers) and medium-scale, mostly input-intensive rice growers who are highly mechanized, have higher incomes and more assets, and operate in remote areas facing higher real wages for land preparation.

According to PrOpCom (2011) the market for mechanization services is underdeveloped in countries such as Nigeria, with an uneven supply across locations. Tractor services in Nigeria are mostly provided by the government through either subsidized direct sales or public tractor-hiring services, and to a lesser extent by the private owner-operators. Animal traction is still more commonly used, particularly in the North West and North East, where 60 percent of farmers used either their own animals or rented animals for traction. According to Jansen (1993), although

animal traction can typically reduce labor needs by half in Nigeria, it is intermediary compared with tractors with more than 10 horsepower (hp). Takeshima and Salau (2010) observed that, the use of tractors is still relatively rare in Nigeria. In the 2010 rainy season, only 6 percent of the country's farmers used tractors, either their own or rented. PrOpCom (2011) suggested that supporting private mechanization services has become increasingly important and Nigeria FMARD (2012) described it as one of the goals of its future mechanization policy.

According to Takeshima *et. al.* (2013) in the North most household types are small-scale growers of sorghum, legumes, millet, and maize, are income and asset poor, typically cultivate less than 1 ha of rain fed land with relatively low input intensity, and rely mostly on crop sales for their income. Most such growers are distinguished by their level of household assets, literacy, use of inputs, and location. Two of the other types are maize growers with slightly higher incomes and household assets, one of which engage in land-extensive production with little animal traction or hired harvesting labor. The remaining type is the mechanized growers of cereals, who are highly mechanized, have higher incomes and more assets, operate in remote areas facing higher real wages for land preparation, and use inputs like chemicals or harvesting labor relatively more intensively. Devi (2012) observed that chemical weed control practices have substituted a sizeable women labour employment. According to this author, the pace of substitution has been faster since 2000. In rice farming, the adoption of chemical technology to address the supply constraints in labour market is largely in weed management. The labour availability for weed control (mainly women labour) is shrinking on account of the scarcity and skill factors.

2.3.5 Agricultural Production, Off-Farm, Non-farm and On-Farm Activities in Nigeria

Barrett *et al* (2001) opined that since the last three decades or so, there has been increasing evidence showing that small-holder farm households in developing countries rarely rely on agriculture alone, but often maintain a portfolio of income activities in which non-farm activities are an important component. Ogen (2007) observed that domestic food production began to fall and the country transform from a food sufficient net exporter to a net importer of many agricultural products including palm oil, rice, wheat and maize. Akpan (2009) added that the value of food import continued to grow in recent years reaching a value of USD 0.1 billion in 2006. Apart from the neglect suffered by the agricultural sector in Nigeria the decline in agricultural production has been attributed to low productivity of the sector. This is believed to be due to inadequate credit for investment in productivity-enhancing technologies, among others. Liverpool-Taise *et. al.* (2011) reported that there is a pervasive inefficiency and low productivity among Nigeria farmers: most smallholder farmer's produce significantly below their production frontier and profit margins from agricultural enterprises are generally low. This low return in agricultural production has prevented a substantial reduction of poverty, especially in the rural areas in Nigeria. According to Oseni and winter (2009), though the poverty rate has decreased in recent years, the general belief is that the current poverty level should not be as high as it is. OPM (2004), reported that the majority of households across all income strata in Nigeria are involved in several off-farm activities, whose importance has increased over the last 25 years. The report suggests that non-farm activities account for an average of 36% of adult working hours per annum and 60% of cash income. Meagher (1999) explained that non-farm activities in Nigeria are diverse, partly seasonal and often performed within the family compound. They include, but are not limited to, agro processing, snack and food making, transport, retail, household trade and tailoring. In a similar way, Okali *et.*

al. (2001) found that income diversification is increasing in the rural areas through the sub-urbanization of individual activities like paper mills, packaging and home construction activities.

Oseni and Winter (2009) found that 31% of farm households in Nigeria participate in various non-farm activities and that non-farm income makes up 27% of total annual household income, on average. The authors indicated that southern households earn more from non-farm activities than northern households where about 50% of household income is from non-farm sources. Non-farm self-employment is the most common forms of off-farm activities in Nigeria followed by non-farm wage employment. Haggblade *et. al.* (2010) indicate that non-farm income accounts for between 35% and 50% of total income of rural households in developing countries. Davis *et al.* (2007) put the global figure at approximately 58%, with some countries having a share as high as 75% of total income on average. Haggblade *et. al.* (2007) opined that the share of off-farm income is expected to increase substantially in the coming years, especially in sub-Saharan Africa where increasing population growth and limited agricultural resources are threatening the growth of the agricultural sector. Pfeiffer *et. al.* (2009) observed that in Nigeria, evidence on the importance of off-farm income diversification and its effect on agricultural production are scarce, it could be positive when off-farm incomes are spent on financing farm investment so that the positive investment effect outweighs the negative effect of removing family labour from agriculture According to Lopez-Feldman *et. al.* (2007) two potential direct effects of off-farm income have been recognized, the first is the liquidity-relaxing effect that might potentially lead to increased expenses on farm inputs and investment and the second is the lost-labour effect that might potentially lead to a decrease in family labour availability for farm work and reduction in output.

regression, multiple regression is often essential even when the investigator is only interested in the effects of one of the independent variables (Varaksin *et. al.*, 2004).

$$y = (X_1, X_2, \dots, X_k) \dots\dots\dots eqn (2.4)$$

Where y is a variable whose movements and values may be described or explained by the variables X_1, X_2, \dots, X_k . The letters are known as repressors' and assumed to have a causal relationship to the dependent variable y . The efficiency of its application depends on the model and the set of explanatory variables (predictors) chosen. The most popular regression model is described by a linear equation expressing the dependence of the mean value of the variable (response, outcome) to be explained on the set of predictors (Draper and Smith, 1998).

CHAPTER THREE

METHODOLOGY

3.1 Study Area

Imo State where this study was carried out is one of the 36 states of Nigeria and lies to the southeast area of Nigeria and shares common boundaries with Abia State on the east and northeast, Rivers State on the south, and Anambra state on the west and northwest, with Owerri as its capital. The State lies between latitude $5^{\circ} 4^I$ and $6^{\circ} 3^I$ N and longitude $6^{\circ} 15^I$ and $7^{\circ} 34^I$ E (Okoro *et. al.*, 2014).

The agro-ecological features of the area as a rainforest zone was reported to have two major seasons, raining and dry season (King'uyu, 2011, Okoli, 2003). The state has humid climate with a rainfall range of 1990 and 2200mm and mean temperature of above 20⁰, with net radiation varying from about 60Kcal/cm²yr⁻¹ to 80 Kcal.cm²yr⁻¹. Temperature and rainfall are the major factors affecting plant growth and crop yield (Lobell *et al.*, 2007). A change in temperature and rainfall intensity can be disastrous to agricultural practices since increased rainfall and low temperature can result to flooding of farm lands and cause a resultant low productivity (Odjugo and Atedhor, 2007).

Imo state is made up of three (3) Agricultural Zones, which are Owerri, Okigwe and Orlu Agricultural Zones, with a total land area of 5,067.20 km² (Ministry of Land Survey and Urban Planning Owerri, 1992). The state is made up of twenty-seven Local Government Areas. The twenty-seven Local Government Areas are; Aboh Mbaise, Ahiazu Mbaise, Ehime Mbano, Ezinihitte, Ideato North, Ideato South, Ihitte/Uboma, Ikeduru, Isiala Mbano, Isu, Mbaitoli, Ngor Okpala, Njaba, Nkwerre, Nwangele, Obowo, Oguta, Ohaji/Egbema, Okigwe, Onuimo, Orlu, Orsu, Oru East, Oru West, Owerri Municipal, Owerri North and Owerri West. The population of the state is 5,408,800 persons with many subsistence farmers (NPC, 2019).

Most of the inhabitants are government employees and the staple food crops grown in the area include; cassava, cocoyam, plantain, yam, maize, okra, garden egg, pepper, melon and vegetables etc and the livestock reared include sheep, goat, fish, pig and poultry. However, the farm labour changing patterns among cassava-based farmers were the major respondents since cassava is the predominant staple food crop produced in the area.

3.2 Sample Selection

Imo State of Nigeria was chosen purposively for the study due to the fact that food crop especially cassava-based farmers who use both family and hired labour are found in the area; and due to proximity and accessibility of cassava-based farmers in the area.

Multi-stage sampling technique was adopted in the selection of the sample. However, due to unequal number of Local Government Areas in various agricultural zones of the state, proportionate sampling technique was employed. The proportionate allocation of the hth sample size is given as in Lawal *et al.* (2018):

$$nh = \frac{n}{N} \times Nh \dots\dots\dots \text{eqn (3.1)}$$

Where,

$\frac{n}{N}$ = sampling fraction

n= sample size that would be drawn

Nh = Size of the hth stratum.

Stratum:	Owerri	Orlu	Okigwe
Stratum size	11	10	6

n = 9 LGAs

N = 27

The size of the hth stratum (Nh) is calculated as:

$$\text{Owerri} = 9/27 \times 11 = 0.33 \times 11 \Rightarrow 4 \quad \text{i.e } 4/9 \times 100 = 44.44\%$$

$$\text{Orlu} = 9/27 \times 10 = 0.33 \times 10 \Rightarrow 3 \quad \text{i.e } 3/9 \times 100 = 33.33\%$$

$$\text{Okigwe} = 9/27 \times 6 = 0.33 \times 6 \Rightarrow 2 \quad \text{i.e } 2/9 \times 100 = 22.22\%$$

The first stage involved proportionate selection of three (3) Local Government Areas from Orlu, four (4) from Owerri, and two (2) from Okigwe zone, making a total of nine (9) LGAs. The second stage involved random selection of three (3) communities from each of the selected Local Government Areas. This gave a total of 27 communities sampled. The third stage involved random selection of one (1) village from each selected community, making a total of twenty-seven (27) villages. The final stage involved purposive selection of five (5) cassava-based farmer households from each of the selected villages, making a total of one hundred and thirty-five (135) respondents for the study, as shown in the table below:

Table 3.1: Distribution of Sampled Respondents according to LGAs, Communities and Villages.

S/N	OWERRI			ORLU			OKIGWE		
	Communities	Villages	S/N	Communities	Villages	S/N	Communities	Villages	
1	Imerenwa	Umuoye	1	Okwu- Amaraihe	Ezeogwu	1	Ibeafor	Umuofeke	
2	Obike	Mbutu	2	Isiama	Isieke	2	Ibenkwo	Umuaro	
3	Eziama	Amaedo	3	Okwu- Ufuruaku	Amaokwu	3	Ikigwu	Ubanaka	
4	Imoko	Umuafoeze	4	Ozara	Umuogu	4	Anara	Aguna	
5	Umuerim	Umuke	5	Umuhu	Umuofia	5	Umuenyi	Umuezelaku	

6	Onicha Nwa- Nkwo	Umuaghara	6	Umuezem	Umuaso	6	Ihube	Amagu
7	Oregwe	Umueze	7	Obodo Ukwu	Umume			
8	Akabo/Amatta	Abazu	8	Urualla	Amaokwu			
9	Atta	Agu	9	Osina	Durunogbu			
10	Umudim	Dimodu						
11	Ogbaku	Umuaku						
12	Ogbujioma	Umuabagwo- Obibi						

3.3 Data Collection

Data for this study were collected from both primary and secondary sources to achieve the objectives of the study. The primary data were obtained from the use of well-structured questionnaire. One hundred and thirty-five (135) questionnaire were administered to the selected farming households and all were retrieved as accurate having done some repeated visits to ensure their accuracy and therefore were used for the study. In addition, oral interview and observations were made, while other vital information were collected from the community heads. The variables sourced from the respondents included; the socioeconomic data of the farmers, sources of labour, the farming system and types of labour employed, non-farm, off farm activities, out and In-migrations, distance to the nearest city and constraint to farm labour use. While secondary information was obtained from Journals, textbooks, published and unpublished studies, internet service domains, etc., were used for literature review. The questionnaire was administered and collected by the researcher. The changing pattern of farm labour use data was based on the general farmers' perception in the past two decades and the actual data in the present day (2015) production season.

The farm labour changing patterns was determined using a-4 point likert scale, coded as, Mostly Used (MU), Sometimes Used(SU), Rarely Used (RU) and Not Used (NU). The responses were given scores of 4, 3, 2 and 1, respectively. The values were added to obtain a score of 10, which was then divided by 4 to obtain 2.5, taken as the mean (Mostly Used). Therefore,

$$\bar{x} \geq 2.5 \Rightarrow \textit{Mostly Used}$$

$$\bar{x} < 2.5 \Rightarrow \textit{Rarely Used}$$

3.4.4 Factors Influencing Farm Labour Use

Multiple regression technique was used to determine the factors influencing farm labour use in food crop production. The implicit model is stated as in Gujarati (2004):

$$Y_i = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9) \dots \dots \dots \text{eqn(3.4)}$$

where,

Y_i = Index of farm labour use of the i th cassava-based farmer.

X_1 = Dummy variable for food crop Objective; 1, if for cash, 0, if otherwise.

X_2 = Dummy variable for market access; 1, if located in market that has many buyers, 0, if otherwise.

X_3 = Distance to the nearest city (Kilometers)

X_4 = Dummy variable for In-migration; 1, if In-migration exist in the area; 0, if otherwise.

X_5 = Farm Size (hectares)

Where,

Z = the value to be tested

\bar{X}_1 = Mean of farm labour use as perceived in the past two decades in food crop production

\bar{X}_2 = Mean of farm labour use in the present day production

S_1^2 = Variance of farm labour as perceived in the past two decades in food crop production

S_2^2 = Variance of farm labour use in the present day food crop production

n_1 = number of samples for farm labour used as perceived in the past two decades in food crop production

n_2 = number of samples for farm labour used in the present day food crop production

Hypothesis II

The null hypothesis that the factors such as market access, distance to city, in-migration, farm size, non-farm activities and age do not significantly affect the farm labour use in the food crop production was realized from the regression results of objective (v), using the F-statistics stated as in Gujarati (2004):

$$F = \frac{\frac{R^2}{(K-1)}}{\frac{1-R^2}{(n-K)}} \dots \dots \dots \text{eqn}(3.6)$$

With

$V_1 = K-1$ (upper degree of freedom) and

$V_2 = n-k$ (lower degree of freedom)

Where

R^2 = Coefficient of the multiple determination.

K = the number of estimated parameters plus constant.

n = the number of observations.

In this case, if $F_{cal} > F_{tab}$, the hypothesis was rejected, and the alternative accepted

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Socioeconomic Characteristics of Farmers in the Area

4.1.1 Age

The distribution of respondents by age in the study area is presented in Table 4.1

Table 4.1 Percentage distribution of food crop farmers by age

Age range	Frequency	Percentage
20-40	37	27.4
41-60	82	60.7
61-80	16	11.9
Total	135	100.00
Mean	47 years	

Source: Field Survey data, 2015

Table 4.1 showed that majority (60.7%) of the respondents were within the age range of 41-60 years. The mean age of the respondents was 47 years. This implies that cassava-based production is carried out mostly by farmers who are below 50 years old. This is an indication that cassava-based production in the area is dominated by young and energetic farmers. This is in line with Simonyan and Obiakor (2012) in the analysis of Household Labour Use. Farmer's age is associated with their risk-bearing abilities, and aged farmers are less likely to handle risks involved in agricultural production, as reported by Adeyonu *et. al.* (2021). Nwaru and Iheke (2010) noted that the risk bearing abilities and innovativeness of a farmer, his mental abilities to cope with the daily challenges of farm production activities and his ability to do manual work decreases with age.

4.1.2 Sex

The distribution of respondents by sex in the study area is presented in Table 4.2

Table 4.2 Percentage distribution of food crop farmers by sex

Sex	Frequency	Percentage
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Male	43	31.9
Female	92	68.1
Total	135	100.0

Source: Field Survey data, 2015

Table 4.2 showed that majority (68.1%) of the respondents were female. This is an indication that cassava-based production in the area is carried out mostly by female farmers. Cassava production is dominated by female-headed farmers, and described as “women’s crop” by Forsythe *et. al.* (2015).

4.1.3 Marital Status

The distribution of respondents by marital status in the study area is presented in Table 4.3

Table 4.3 Percentage distribution of food crop farmers by marital status

Marital Status	Frequency	Percentage
Single	42	31.1
Married	93	68.9
Total	135	100.0

Source: Field Survey data, 2015

Table 4.3 showed that majority (68.9%) respondents were found married. This implies that most cassava-based farmers are married. This implies that most maize farmers of World Bank intervention projects were married. Married farmers are likely to be under pressure to produce more, not only for family consumption but also for sale (Opara, 2010). According to Onubuogu, Chidebelu, and Eboh (2013), they tend to have easy access to production variables such as land and large family size which are traditionally owned and provided by household heads (husbands) to compliment family labour, enhance production, resource use efficiency of the household farmers and to reduce the cost of hired labour.

4.1.4 Household Size

The distribution of respondents by household size in the study area is presented in Table 4.4

Table 4.4 Percentage distribution of cassava-based farmers by household size

Household size	Frequency	Percentage
1-5	17	12.5
6-10	92	68.2
11-15	24	17.8

16-20	2	1.5
Total	135	100.00
Mean	8 persons	

Source: Field Survey data, 2015

Table 4.4 showed that majority (68.2%) of the respondents had household size ranging from 6-10 persons. It was found that the mean household size was 8 persons. This implies that cassava-based farmers in the area have more family labour and more mouth to be fed. According to Okoye *et. al.* (2008) large household size are more likely to provide more family labour required for farm operations such as weed control, fertilizer application, though out migration of family members and child's education decrease the availability of family labour. Family labour availability is of utmost importance in easing the amount spent on hired labour since the farmers have more persons to take care of; boost productivity, and increase their farm income.

4.1.5 Educational Level

The distribution of respondents by educational in the study area is presented in Table 4.5.

Table 4.5 Percentage distribution of farmers by level of education

Educational Level	Frequency	Percentage
No formal education	2	1.5
Primary education	32	23.7
Secondary education	59	43.7

Tertiary education	42	31.1
Total	135	100.0

Source: Field Survey data, 2015

Table 4.5 shows the percentage distribution of respondents by educational level. It showed that majority (43.7%) of the respondents attained secondary education. This implies that most food crop farmers in the area completed their secondary education. Educational attainment is an important variable in food crop production. Ajibefun and Aderinola (2004) asserted that educated farmers are expected to be more receptive to improved farming techniques while farmers with low level of education or without education would be less receptive to improved farming techniques. Some improved farming techniques are labour intensive. Simonyan and Obiakor (2012) on the other hand, observed that the more educated an individual is, the less likely would he be available for agricultural labour, but more likely to access non-farm labour markets as observed by Satriawan and Swinton (2007).

4.1.6 Farm Size

The distribution of respondents by farm size in the study area is presented in Table 4.6.

Table 4.6 Frequency and percentage distribution of farmers by farm size

Farm Size	Frequency	Percentage
0 – 0.5	22	16.3
0.6 – 1.1	94	69.6
1.2 – 1.7	19	14.1

Total	135	100.0
Mean	0.9	

Source: Field Survey data, 2015

Table 4.6 showed that majority (69.6%) of the respondents were found to have between 0.6 – 1.1 hectares of farm land. It was then found that the mean farm size was 0.9 hectares. The size of farm land determines the level of farm labour required, as opined by Ezedinma *et. al.* (2000) that the greater the farm size, the greater would be the input requirement including labour for farm production activities.

4.1.7 Method of Farm Land Acquisition

The distribution of respondents by method of farm land acquisition in the study area is presented in Table 4.7.

Table 4.7 Percentage distribution of farmers by method of farm land acquisition

Land Acquisition	Frequency	Percentage
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Inheritance	88	65.2
Purchased	30	22.2
Rented/hired	17	12.6
Total	135	100.0

Source: Field Survey data, 2015

Table 4.7 shows the percentage distribution of respondents by method of farm land acquisition. It showed that majority (65.2%) of the respondents inherited their farm land. This is an indication that most food crop farmers in the area acquired their farm land by inheritance. Mode of land acquisition plays an important role in cassava production. Farmers that inherited their lands are more likely to conserve and preserve their lands more than those with either rented or leased land as reported by Fosu-Mensah *et al.* (2011), and hence money that would have been used to purchase or rent land is then used to contract more hired labours in case of any shortfall in farm labour.

4.1.8 Farming Experience

The distribution of respondents by farming experience in the study area is presented in Table 4.8.

Table 4.8 Percentage distribution of farmers by farming experience.

Farming Experience	Frequency	Percentage
1-10	9	6.7
11 –20	32	23.7

21-30	78	57.8
31-40	10	7.4
41-50	6	4.4
Total	135	100.0
Mean	26	

Source: Field Survey data, 2015

Table 4.8 showed that majority (57.8%) of the respondents had between 21-30 years of experience in farming. The mean year of experience in farming was 26 years. High years of experience in farming is an essential factor that increases the technical know-how of farmers and the efficient allocation of farm labour in cassava farming.

4.1.9 Nature/Production Motives in the Area

The distribution of respondents by production motives in the area in the study area is presented in Table 4.9.

Table 4.9 Percentage distribution of farmers by nature of crop production

Reasons	Frequency	Percentage
Cash only	39	28.9
Family use only	21	15.6
Cash and family use	75	55.6
Total	135	100.0

Source: Computed Results, 2015

Table 4.9 showed that majority (55.6%) of the respondents indicated cash and family use as the main reason for undertaking cassava-based production. This is an indication that most cassava farmers produce both for cash and family consumption. The production motive of cassava farmers determines how efficient resources are allocated either for profit maximization (for cash in this case) or maximization of subsistence-benefits (family use in this case). Farming for cash conditions the farmers to optimize the cost of hired labour in order to make more profits, while subsistence farming rely more on family labour.

4.2 Sources of Farm Labour and Modern Farm Input Use

4.2.1 Sources of Farm Labour

Table 4.10 shows the percentage distribution of respondents by sources of farm labour. It shows the various sources of farm labour, namely; family labour, communal labour and hired labour.

Table 4.10 Percentage distribution of farmers by sources of farm labour

Sources of labour	Frequency	Percentage
Family	24	17.8
Communal	1	0.7
Hired	43	31.9
Family and Hired	67	49.6

Total	135	100.0
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Source: Computed Results, 2015

Table 4.10 showed that majority (49.6%) of the respondents indicated the combination of family and hired labour as their labour sources. This implies that family and hired labour are the major farm labour sources in the area, as observed by Tijani *et. al.* (2010) that majority of farming household members depend on both family and hired labour.

4.3 Modern Farm Input Use by Cassava-Based Farmers

Table 4.11 shows the proportion and index of modern farm inputs by cassava-based farmers. It shows the modern farm inputs, namely agrochemicals (fertilizer, herbicides, pesticides, etc), improved planting material, and mechanized land preparation/ridging.

Table 4.11 Proportion and index of modern farm inputs by cassava-based farmers

Modern inputs	Cassava-Based Farmers	
	Index	Remark
Agrochemicals	86 (1.69)	Most
Improved planting material	66 (1.29)	Few

Mechanized land preparation/ridging	4 (0.09)	None
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FAMinp ≤ 0 = no farmer is using the input; 1 = few farmers are using the input; >1 = most farmers are using the input

Source: Computed Results, 2015

The results showed that few food crop farmers used improved planting materials in cassava production (1.29). This is an indication that most cassava farmers in the area still cultivating local planting materials. It also showed that most farmers used agrochemicals (1.69). This implies that cassava farmers in the area are substituting farm labour with agrochemicals such as herbicides and pesticides. This could be linked to shortages in farm labour, high cost of labour and affordable prices of these agrochemicals especially herbicides which now substituted manual weeding in cassava production, as observed by Devi (2012) that these factors forced the farmers to go for agrochemicals.

4.4 Farm Labour Use

4.4.1 Farm labour Use for different Farm Operations

Table 4.12 shows the percentage and the mean farm labour use by sources for different farm operations. It shows the level of labour use by gender for the various farm operations, namely;

land preparation and weeding, planting, agrochemical application, harvesting and post-harvesting activities.

Table 4.12 Percentage and the mean farm labour use by sources for different farm operations per 0.9 hectare

Farm Operations	Major Farm labour sources		
	Hired	Family	Total
Land preparation	14 (66.7%)	7 (33.3%)	21
Weeding	14 (66.7%)	7 (33.3%)	21
Planting	4 (40.0%)	6 (60.0%)	10
Agrochemical application	4 (44.4%)	5 (55.6%)	9
Harvesting	9 (60.0%)	6 (40.0%)	15
Post-harvesting activities	3 (33.3%)	6 (66.7%)	9

Source: Field Survey data, 2015

In relation to family labour use, Table 4.12 showed that cassava-based farmers used hired farm labour mostly for land preparation and weeding (66.7%), and harvesting (60%); while family labour were employed mostly for planting (60%) and post-harvesting activities (66.7%). This implies that farmers in the area hire farm labour for land preparation, weeding and harvesting due to high labour requirement and the tedious nature of these farm operations. This is line with Janssens (2001) who asserted that there is a high labour requirement for instance for cassava production operations including land clearing, land preparation, weeding and harvesting. This could be linked to shortages in farm labour, as opined by Amsalu *et. al.* (2013) that shortage in

farm labour use, particularly in peak seasons, may be one reason for households to hire farm labour.

4.4.2 Farm labour Use by Gender

Table 4.13 shows the percentage distribution of farm labour use for different operations by gender. It shows the level of farm labour used for different farm operations by gender.

Table 4.13 Percentage distribution of farm labour use for different farm operations by gender per 0.9 hectares

Farm Operations	Male	Female
Land preparation	41.2% (17)	58.8% (35)
Weeding	41.2% (17)	58.8% (35)
Planting	30.0% (12)	70.0% (41)
Agrochemical application	15.4% (6)	84.6% (50)
Harvesting	60.0% (25)	40.0% (24)
Post-harvesting activities	22.2% (9)	77.8% (46)

Source: Field Survey data, 2015

Table 4.13 showed that food crop farmers used mostly female farm labour for land preparation and weeding (58.8%), agrochemical application (84.6%), planting (70%) and post harvesting activities (77.8%); while male farm labour were used mostly for harvesting (60%). This is an indication that food crop farmers in the area used male farm laborers for harvesting; while female

labourers are used for land preparation and weeding, agrochemical application, planting and post harvesting activities. This is in line with Satyavathi *et. al.* (2010), who also observed that female labourers are involved in land preparation. Palacios-Lopez *et. al.* (2017) argued that in Nigeria, there is no clear difference in female labour shares across agricultural activities such as land preparation, planting/weeding and harvesting. Land preparation and weeding dominated by female labour in the area could be linked to the fact that cassava is seen as a “women’s crop” as opined by Forsythe *et al.* (2015). According to Simonvan and Obiakor (2012) some of the roles are carried out by the male members of the household and others by the female members. There is an amount of distinction between male and female roles in food crop production. Land clearing is mainly male dominated activities while the females are more often responsible for the mound or ridge making which is also categorized as land preparation, planting, weeding and harvesting. According to Baudron *et. al.* (2019), women dread land preparation the most, while men dread weeding the most, and not dominated by female labour as commonly thought.

4.4.3 Farm Labour Use in the Wet and Dry Season

Tables 4.14 shows the percentage and the mean farm labour use in the wet and dry season for various farm operations.

Table 4.14 Percentage and the mean farm labour use in the wet and dry season for various farm operations

Farm operations	Wet		Dry		Mean
	Labour Use	Percentage	Labour Use	Percentage	
Land preparation and planting	25	92.6	2	7.4	27

Weeding and agrochemical application	8	61.5	5	38.5	13
Harvesting and post-harvesting activities	10	41.7	14	58.3	24

Source: Field Survey Data, 2015

Farm operations such as land preparation and planting, weeding and agrochemical applications, and harvesting and post-harvesting activities were combined due to the fact that the respondents interviewed could not individually separate the farm labour use for each of these activities in the dry and wet seasons. The results showed that in relation to farm labour use during the dry season, most farm labour were used during the wet season for land preparation (92.6%), and weeding and agrochemical application (61.5%), while higher use of labour during the dry season was for harvesting and post-harvesting activities (58.3%). This is an indication that farm operations such as land preparation and weeding and agrochemical application require higher use farm labour during the wet season; and harvesting and post-harvesting activities during the dry season. Timely land preparation and planting in rain fed cassava farming help to establish a uniform crop stand, take full advantage of the growing season and obtain high yields (FAO/International Atomic Energy Agency, 2018). According to Kouakou *et. al.* (2016), harvesting cassava during relatively dry weather is the best since the soil does not stick to the harvesting implement or roots easily. Amponsah *et. al.* (2014) argued that manual harvesting of cassava during the dry season is laborious, slow and associated with drudgery and high root damage.

4.4.4 Farm Labour Use in the Past and Present Day Cassava crop Production

Table 4.15 shows the farm labour use in the past (1980s as perceived) and present day (2015) production for various farm operations.

Table 4.15 Mean farm labour use in the past production season and present day production for various farm operations

Farm operations	Past (1980s)	Present(2015)	%Decrease
Land preparation	39	21	46.15
Weeding	39	21	46.15
Planting	27	10	62.96
Harvesting	32	24	25.00
Post-harvesting activities	32	24	25.00

Source: Field Survey Data, 2015

Table 4.15 showed that the mean farm labour use in the past production season decreased by 46.15% for land preparation and weeding, 62.96% for planting, and 25.00% for harvesting and post-harvesting activities. This reduction in farm labour use could be linked to farm labour out-migration and migration to non-farm sectors. It could also be linked to the educational advancement of farmers' family, especially increase in female education. Increase in female literacy could be an attributing factor since cassava is usually seen as female crop, as cassava-based production is dominated by female farmers as reported by Forsythe *et. al.* (2016). Table 4.16 shows the Z-test results for farm labour use in the past and present day cassava-based production.

Table 4.16 Z-test for farm labour use in the past and present day cassava-based production

Items	Values	
	Past (1980s)	Present (2015)
Mean	31.62	23.28
Variance	58.85	170.44
Observations	135	135
Z-value	4.91166	

Source: Computed Results, 2015

The results showed that the Z-calculated was 4.91166. In relation to Z-critical, the null hypothesis that there is no significant difference in farm labour use in the past and present day food crop production was rejected. The study therefore accepted the alternative hypothesis and concluded that there is a significant difference in farm labour use in the past food and present day food crop production, as the farm labour use in the past is higher than that of the present day farm labour use.

4.5 Farm Labour Changing Patterns

Table 4.17 shows the level of farm labour changing patterns in past (1980s) and present day (2015) food crop production. It shows the changing pattern in gender, labour substitution and labour allocation in cassava-based food production. The results showed that female labourers were rarely used (2.10) for cassava-based food production, while presently the female labour is mostly employed (3.21) with male labourers in cassava-based food production. This is an indication that the pattern of labour use by gender moved from male to female labour in the area. In the last two decades, the contribution of women to socioeconomic development were not visible, perhaps set

of social norms enabled men to dominate women as reported by Bose *et. al.* (2009), but presently scores of agricultural programmes encouraged the participation of women in agricultural production especially in cassava-based food production. Pala-Lopez *et. al.* (2017) argued that women provide less labour invested in farming than the often-claimed high (60-80percent) of labour.

Table 4.17 Level of Farm Labour Changing Pattern in the past and present day (2015) Cassava-based food production

Farm labour use	Past (1980s)						Present (2015)						
	Mostly used	Sometimes used	Rarely used	Not used	Mean	Remark	Mostly used	Sometimes used	Rarely used	Not used	Mean	Remark	
Gender													
i. Male	72	46	15	2	3.39	MU	32	3	34	0	2.54	MU	
ii. Female	2	10	123	0	2.10	RU	66	37	26	6	3.21	MU	
Labour Substitution													
a) Land clearing and Weeding													
i. Manual	80	50	5	0	3.56	MU	27	88	16	4	3.02	MU	
ii. Chemicals	0	0	14	55	1.14	RU	74	51	10	0	3.47	MU	
iii. Mechanized	0	0	24	111	1.18	RU	0	6	40	83	1.39	RU	
b) Fertilizer Application and Harvesting													
i. Manual	96	36	3	0	3.69	MU	68	52	15	0	3.39	MU	
ii. Mechanized	0	0	0	0	0		0	0	0	0	0		
c) Labour Sources													
i. Hired	3	36	96	0	2.31	RU	94	32	9	0	3.63	MU	
ii. Family	88	37	10	0	3.58	MU	88	37	10	0	3.58	MU	
Labour Allocation/movement													
i. On-farm	102	30	2	1	3.73	MU	38	55	42	0	2.97	MU	
ii. Non-farm	1	4	98	32	1.81	RU	63	52	18	2	3.30	MU	

DECISIONS: $\bar{x} \geq 2.5$ (Mostly used); $\bar{x} < 2.5$ (Rarely used); MU (Mostly Used); RU (Rarely Used)

Source: Field Survey Data, 2015

In land clearing and weeding operations, the results showed that these farm operations were mostly carried out manually both in the past (3.56) and present day production (3.02). It also showed that agrochemicals such as herbicides were rarely used (1.14) in the past, but were presently mostly used (3.47) in these farm operations in the area; while fertilization application and harvesting were mostly done manually (3.69 and 3.39) in both periods. The changing pattern from manual to the use of agrochemicals in land clearing and weeding could be linked to scarcity of labour due to migration and the cost of labour which is higher than the use of these chemicals. According to Devi (2012), the use of chemical technology to address the supply constraints in labour market is largely in weed management. Weed control expenses reflect the substitution of labour with chemicals. Chemical weed control is widely used on account of the easiness in management and labour shortage, and reflecting the dependence on chemicals replacing human labour for food crop management.

The results showed that hired farm labour were rarely used (2.31) in the past, but presently were mostly used (3.63); while family labour sources mostly used (3.58 and 3.58) in both periods. This could be linked to the changing agricultural system from subsistence to commercial farming, and the need to expand and meet up with the need of the increasing population, hence employing more labour (hired). In addition, the present use of hired labour could also be linked to the lost-labour effect that decreases the availability of family labour due to migration, as reported by Lopez-Feldman *et. al.* (2007).

The results showed also that labour allocation to on-farm operations was mostly done (3.73 and 2.97) in both periods. It showed that farm labour were rarely allocated (1.81) to non-farm activities in the past, but presently were mostly (3.30) allocated to non-farm activities. This implies that

farming (on-farm activities) was the major source of livelihood in the past, and due the high remunerations from non-farm activities and the search for white collar jobs and other non-farm income sources, farm labour presently move to non-farm activities. As reported by Prabakar *et. al.* (2011) that among the various reasons for labour scarcity in agriculture, the higher wages in other locally available jobs was ranked ‘first’ because the higher wage rate prevailing in the non-agricultural works attract the labourers.

4.6 Factors Affecting Farm Labour Use

Table 4.18 shows the multiple regression results of the factors affecting farm labour use from the four functional forms for linear, semi log exponential and double log. Based on the values of R^2 , F-values, number of significant parameters and the apriori expectation, the linear function was chosen as the lead equation. The coefficient of multiple determinations (R^2) was 0.6671. This implies that 66.71% variability in farm labour use was explained by the variables, while the remaining 33.29% was not accounted for by the variables.

The results showed that the coefficient of nature of food crop production (0.5188) was positive and significant at 10% level of significance. This implies that increase in farmer’s production objective for cash by 1%, increases the need and use of farm labour by 51.88%. The coefficient of distance to the nearest city (0.20097) was positive and significant at 1% probability level. This implies that increase in the distance to the nearest city by 1% increases the use of farm labour by 20.10%. This could be linked to the fact that decrease in the proximity to urban areas accounts for more net loss in farm labour due to out-migration, as movement to city results in scarcity of farm labour. According to Miluka *et. al.* (2007) and McCarthy *et. al.* (2006) out-migration negatively affects traditional agricultural activities.

The coefficients of In-migration (0.6045) and farm size (0.2111) were positive and significant at 5% probability level respectively. This implies that increase in the number of in-migrants and farm size by 1% increases farm labour use by 60.45% and 21.11% respectively. In-migration is an important variable in farm labour supply, as the influx of migrants increases the opportunities for farm labour use.

Table 4.18 Estimated Results of the factor affecting farm labour Use

Variable	Linear	Exponential	Semi-log	Double-log
Constant	-1.58049 (-2.30400)	-1.702538 (-3.525407)	-3.082583 (-0.95346)	-2.4748799 (-1.497449)
Nature of food production	0.51877 (1.778409)***	0.3163785 (1.540592)	0.7338888 (1.800002)***	0.410209 (1.96815)***
Market Access	-0.33002 (-1.33897)	-0.215240 (-1.240466)	-0.307724 (-0.8936237)	-0.222895 (-1.266197)
Distance to city	0.20097 (14.70245)*	0.0784947 (8.156546)*	1.812187 (6.74018)*	1.017248 (7.401280)*
In-migration	0.60447 (2.499484)**	0.4295845 (2.523156)**	0.5460249 (1.600364)	0.497579 (2.852810)*
Farm size	0.211151 (2.139641)**	0.17218168 (2.478307)**	0.562362 (2.015463)**	0.4560583 (3.197360)*
Non-farm activities	-0.6822919 (-2.35580)**	-0.1631557 (-0.800016)	-1.1412580 (-2.832023)*	-0.327734 (-1.590885)
Age	-0.0049298 (-0.382784)	-0.0032966 (-0.362975)	0.0669927 (0.079253)	-0.118727 (-0.2747)
Education	0.00006 (0.99837)	0.01729 (0.00648)	1.04046 (0.01920)	0.63854 (0.89741)
Farming experience	0.03736 (1.00735)	0.53965 (0.55836)	0.70011 (0.03651)	0.28410 (1.0101)
R²	0.6671	0.3952	0.3389	0.3781
Adjusted R²	0.6431	0.3517	0.2913	0.3333
F-value	35.001	11.606	9.121	10.804

* significant at 1%; ** significant at 5%; ***significant at 10%

Source: Field Survey Data, 2015.

Finally, the coefficient of non-farm activities (-0.6823) was negative and significant at 5% probability level. This implies that increase in non-farm activities by 1% decreases the availability and use of farm labour. This is in line with Lopez-Feldman *et al.* (2007) who observed the lost-

labour effect of non-farm activities which decreases especially family labour availability for farm work. This could stem from the need for income diversification (Abdullahi and Crolerees, 2001) and higher returns to labour as observed by Kilic *et. al.* (2009). Non-farm engagement of farm labour affects farm labour use as it reduces the availability of farm labour for on-farm activities.

Table 4.18 showed that the F-calculated was 35.001, while F-critical was 2.0825. Therefore, the null hypothesis that factors such as market access, distance to city, in-migration, farm size, non-farm activities and age do not significantly affect the farm labour use in the area was rejected. The study however accepted the alternative hypothesis and concluded that factors such as nature of food production, distance to city, in-migration, farm size and non-farm activities significantly affect farm labour use in food crop production.

4.7 Constraints Militating against Farm Labour Use

Table 4.19 shows the multiple response and distribution of respondents by constraints militating against farm labour in the area. It shows various identified constraints that militated against farm labour use, namely; high cost of labour, low soil fertility and productivity, civilization and non-farm engagement, seasonality of food crop production, out-migration of farm labour, far distance to farm labour, ill-health, land tenure system and fragmentation, and scarcity of farm labour.

Table 4.19 Percentage distribution of food crop farmers by constraints militating against farm labour use

Constraints	Frequency*	%Distribution
High cost of labour	128	94.81
Low soil fertility and productivity	6	4.44
Civilization -farm engagement	119	88.15
Seasonality of food crop production	102	75.56
Out-migration of farm labour	122	90.37
Far distance to farm labour	55	40.74
Ill-health	67	49.63
Land tenure system and fragmentation	101	74.81
Scarcity of farm labour	89	65.93

*multiple response

Source: Field Survey Data, 2015

The results showed that majority of the respondents indicated high cost of labour (94.81%), civilization and non-farm engagement (88.15%), seasonality of agricultural production (75.56%), out-migration of farm labour (90.37%), land tenure system and fragmentation (74.81%) and scarcity of farm labour (65.95%) as the major constraints militating against farm labour use. This is an indication that factors such as high cost of labour, civilization and non-farm engagement, seasonality of food crop production, out-migration of farm labour, land tenure system and fragmentation and scarcity of farm labour constrained farm labour use in the area. Land fragmentation has been a major constraint to farm labour use. Size of land cultivated has a significant effect on the use of farm labor, as observed by Amsalu *et. al.* (2013). In addition, the finding is in line with the assertion made by Abila (2012) that high cost and scarcity of farm labour is a major problem in cassava production.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study was carried out in Imo State. The broad objective was to analyse farm labour changing patterns in food crop production in Imo state, Nigeria. The specific objectives were to; examine the socioeconomic characteristics of food crop farmers in the area, identify the sources of farm labour in food crop production, ascertain the level of modern farm input use in food crop production, determine the level of farm labour use and the changing pattern in food crop production, determine the factors affecting farm labour use in food crop production, and examine the constraints militating against the farm labour use in the area. The null hypotheses tested were that; there is no significant difference in farm labour use in the past and present day food crop production in the area, and factors such as market access, distance to city, in-migration, farm size, non-farm activities and age do not significantly affect farm labour use in food crop production. Proportionate and multi-stage sampling techniques were adopted for the study. One hundred and thirty-five (135) respondents were selected for the study. Appropriate analytical models were employed in data analysis.

The results showed that the majority (60.7%) of the respondents were between 41-60 years age category, with a mean age of 47 years, majority of the respondents were married (68.9%) and were mostly female farmers (68.1%); with a mean household size of 8 persons. It was found that majority (43.70%) of the respondent's attained secondary education. It was also found that majority (65.2%) inherited their farm land; with 0.9 hectares farm size; about 26 years of farming

experience, and food crop production majorly (55.6%) for cash and family use. The analysis of data showed that family and hired farm labour were the major (49.6%) sources of farm labour in the area. It was then found that food crop farmers use hired farm labour mostly for land preparation (58.8%), weeding/agrochemical application (61.5%) and harvesting (60%); while family labour were employed mostly for planting (60%) and post-harvesting activities (66.7%). The results showed that few food crop farmers used improved planting materials in cassava production (1.29). This is an indication that most cassava farmers in the area still use cultivating local planting materials instead of the improved species. It also showed that most farmers used agrochemicals (1.69). This implies that cassava farmers in the area are substituting farm labour with agrochemicals such as herbicides and pesticides.

It showed also that food crop farmers used mostly female farm labour for land preparation (58.8%), weeding (58.8%), agrochemical application (84.6%), planting (70%) and post harvesting activities (77.8%); while male farm labour were used mostly for harvesting (60%). The results showed that food crop farmers in the area were substituting farm labour with agrochemicals such as herbicides and pesticides in cassava-based production. The results showed that in relation to labour use during the dry season, most farm labour were used during the wet season for land preparation (92.6%) and weeding and agrochemical application (61.5%), while higher use of labour during the dry season was for harvesting and post-harvesting activities (58.3%). Results showed that the mean farm labour use in the past production season decreased by 46.15% for land preparation and weeding, 62.96% for planting, and 25.00% for harvesting and post-harvesting activities. The results on labour changing pattern showed that in the past, female labourers were rarely used (2.10) for food crop production, while presently the female labour is mostly employed (3.21) with male labourers in food crop production. This is an indication that the pattern of labour use by gender

moved from male to female labour in food crop production in the area. In land clearing and weeding operations, the results showed that these farm operations were mostly carried out manually both in the past (3.56) and presently (3.02). It also showed that agrochemicals such as herbicides were rarely used (1.14) in the past, but were presently mostly used (3.47) in these farm operations in the area; while fertilization application and harvesting were mostly done manually (3.69 and 3.39) in both periods. The changing pattern from manual to the use of agrochemicals in land clearing and weeding could be linked to scarcity of labour due to migration and the cost of labour which is higher than the use of these chemicals.

The results showed that hired farm labour were rarely used (2.31) in the past, but presently were mostly used (3.63); while family labour sources mostly used (3.58 and 3.58) in both periods. This could be linked to the changing agricultural system from subsistence to commercial farming, and the need to expand and meet up with the need of the increasing population, hence employing more labour (hired). It also showed that labour allocation to on-farm operations was mostly done (3.73 and 2.97) in both periods. It showed that farm labour were rarely allocated (1.81) to non-farm activities in the past, but presently were mostly (3.30) allocated to non-farm activities, indicating that farming (on-farm activities) was the major source of livelihood in the past, but due to the high remunerations from non-farm activities and the search for white collar jobs and other non-farm income sources, farm labour presently move to non-farm activities.

The results of multiple regression analysis showed that the coefficient of multiple determinations (R^2) was 0.6671, indicating that 66.71% variability in farm labour use was explained by the model, while the remaining 33.29% was not accounted for by the model. The results showed that the coefficient of nature of food crop production (0.5188) was positive and significant at 10% level of

significance, implying that increase in hectares of farm land allocated for commercial production by 1%, increases the need and use of farm labour by 51.88%. The coefficient of distance to the nearest city (0.20097) was positive and significant at 1% probability level, indicating that increase in the distance to the nearest city by 1% increases the use of farm labour by 20.10%. This could be linked to the fact that decrease in the proximity to urban areas accounts for more net loss in farm labour due to out-migration, as movement to city results in scarcity of farm labour. The coefficients of In-migration (0.6045) and farm size (0.2111) were positive and significant at 5% probability level respectively, implying that increase in the number of in-migrants and farm size by 1% increases farm labour use by 60.45% and 21.11% respectively. The coefficient of non-farm activities (-0.6823) was negative and significant at 5% probability level, indicating that increase in non-farm activities by 1% decreases the availability and use of farm labour.

Results showed that the F-calculated was 35.001, while F-critical was 2.0825. Therefore, the null hypothesis that factors such as market access, distance to city, in-migration, farm size, non-farm activities and age do not significantly affect the farm labour use in the area was rejected. The study however accepted the alternative hypothesis and concluded that factors such as nature of food production, distance to city, in-migration, farm size and non-farm activities significantly affect farm labour use in food crop production. Results showed that the Z-calculated was 4.91166. In relation to Z-critical, the null hypothesis that there is no significant difference in farm labour use in the past and present day food crop production was rejected. The study therefore accepted the alternative hypothesis and concluded that there is a significant difference in farm labour use in the past food and present day food crop production. Finally, results showed that high cost of labour (94.81%), civilization and non-farm engagement (88.15%), seasonality of agricultural production

(75.56%), out-migration of farm labour (90.37%), land tenure system and fragmentation (74.81%) and scarcity of farm labour (65.95%) as the major constraints militating against farm labour use.

5.2 Conclusion

The study concluded that most cassava-based farmers in the study area are 47 years old, married, with a mean household size of 8 persons; have completed their secondary education, and have about 0.9 hectares of farm land with over about 26 years of farming experience. It was concluded that family and hired labour are the major sources of farm labour, and that use of hired labour is mostly for land preparation, weeding/agrochemical application and harvesting; while family labour is mostly used for planting and post-harvesting activities. Female farm labour is mostly used for land preparation, weeding, agrochemical application, planting and post-harvesting activities. During the wet season, high number of farm labour is used for land preparation and weeding. Farm labour use in the past production season decreases across the various farm operations in food crop production. It was concluded that the pattern of labour use by gender moved from male to female labour in food crop production in the area; as chemical weed control now replace human labour in food crop production. The study also concluded that high cost of labour, civilization and non-farm engagement, seasonality of agricultural production, out-migration of farm labour, land tenure system and fragmentation, and scarcity of farm labour are the major constraints militating against farm labour use in food crop production. Finally, there is a significant difference between farm labour use in the past and present day food crop production and factors such as nature of food production, distance to city, in-migration, farm size and non-farm activities significantly affect farm labour use in food crop production.

5.3 Recommendations

Based on the findings, the study recommended that;

- 1) In view of the farm labour changing pattern and the influence of migration on farm labour use, the rural-urban linkages should be strengthened and organized by ensuring parity in on-farm wage structure comparable with non-farm wages to reduce farm labour migration to non-farm engagements. This will not only ensure continuous farm labour availability but will reduce the migration of able-bodied youths to cities in search of non-farm employment.
- 2) As to high cost of hiring farm labour, all the stakeholders in food crop production should develop labour-saving technologies such as cassava harvesters, simple mechanized tools for land clearing that will minimize the cost of hiring farm labour and ensure optimum labour use especially during land clearing and harvesting.
- 3) Considering the differences in farm labour use in the wet and dry season, farm labour use in both seasons should be harmonized to encourage development of agricultural technologies such as irrigation system, etc., that will bridge the gap and ensure all-year round farm labour availability and use. This will also ensure regularity in farm labour use in both seasons.

5.4 Contributions to Knowledge

This study contributed immensely to body of knowledge on farm labour use and changing patterns in food crop production. The results of this study validate the following contributions:

1. The labour changing pattern showed that in the 1980s, female labourers were rarely used (with mean score of 2.10) for food crop production, while presently the female labour is mostly employed (with mean score of 3.21) with male labourers in food crop production.
2. In land clearing and weeding operations, the farm operations were mostly carried out manually both in the 1980s (with mean score of 3.56) and presently (with mean score of 3.02).
3. Agrochemicals such as herbicides were rarely used (with mean score of 1.14) in the 1980s, but were presently mostly used (with mean score of 3.47) in these farm operations in the area; while fertilization application and harvesting were mostly done manually (with mean score of 3.69 and 3.39) in both periods.
4. High cost of labour, civilization and non-farm engagement, seasonality of agricultural production, out-migration of farm labour, land tenure system and fragmentation and scarcity of farm labour were the major constraints militating against farm labour demand and supply.

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