PROFITABILITY ANALYSIS OF OIL PALM FRESH FRUIT BUNCH PRODUCTION IN UHUNMWONDE LGA, EDO STATE, NIGERIA

BY

Oluebubechukwu Jessica MEMEH (Miss)
AGR1700036

DEPARTMENT OF AGRICULTURAL ECONOMICS
AND EXTENSION SERVICES
FACULTY OF AGRICULTURE
UNIVERSITY OF BENIN
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A PROJECT SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES, FACULTY OF AGRICULTURE, UNIVERSITY OF BENIN IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF B. AGRIC (OPTION; AGRICULTURAL ECONOMICS AND EXTENSION SERVICES)

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CERTIFICATION

This is to certify that this research work titled, **"profitability analysis of oil palm fresh fruit bunch production in Uhunmwonde Local Government Area, Edo State, Nigeria"** was carried out by **Oluebubechukwu Jessica MEMEH (Miss)** with Matriculation Number **AGR1700036** in the Department of Agricultural Economics and Extension Services, Faculty of Agriculture, University of Benin, and that the research project was approved as adequate in scope and quantity for the partial fulfillment of the award of bachelor of Agriculture (B.Agric).

_____ _____

Prof. J. Ahmadu **Date**
(Project supervisor)

_____ _____

Dr. (Mrs.) M. J. Koyenikan **Date**
(Head of Department)

DEDICATION

This project work is dedicated to God Almighty for his abundant love, protection and provision throughout my stay in UNIBEN, also to my beloved parents Mr C. A. Memeh and Mrs. Susan O. Memeh

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ABSTRACT

The study analyzed the profitability of oil palm Fresh Fruit Bunch (FFB) production in Uhunmwonde Local Government Area, Edo State, Nigeria. The study specifically described the socio-economic characteristics of the respondents in the study area, estimated the inputs and output quantities of oil palm FFB production in the study area, estimated the costs and returns of oil palm FFB production and its profitability at different ages of the palms in the study area, examined the factors affecting profitability of oil palm FFB production in the study area and identified the constraints faced by respondents in the study area. A two-stage sampling procedure was adopted in selecting the respondents for the research. A Total 109 copies of questionnaire were sent to the field to collect primary data and 70 copies were retrieved and data collected were analyzed using descriptive statistics and quantitative techniques. Result study showed that the oil palm produces were mainly male (71.4%), with a mean age of about 48 years and formal educational background. Oil palm FFB was found to be most profitable at the age range of 9-18years with an estimated Net Farm Income of ₦881644.71 per hectare. and there was profit for palm younger than 8 years at the Gross Margin level with an estimated gross margin of ₦253619.18 but the net income was negative meaning a loss in the long run. The profitability declined at above 18 years, at all ages oil palm FFB production was profitable with an estimated Net Income of ₦392938.18 and a Return On Investment of 0.33. The major constraints faced by the oil palm farmers were difficulty in obtaining credit, lack of funds, lack of extension contact, inadequate land and lack of improved materials. Government/stakeholders should encouraged farmers to practice more of mechanized farming as it will help in reducing the cost of labour and increase productivity.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

The gap between demand and supply of food has continued to increase over the years and also for agricultural products (Agricultural Credit Guarantee Scheme Fund, 2005). Oil Palm, *Elaeis guinensis*, is placed in the *Arecaceae* family which contains about 225 genera with over 2600 species along with coconut and date palms cultivars. There are three naturally occurring forms of the fruit, termed dura, tenera and pisifera. The selection of dura female and pisifera male parents is carried out to obtain tenera offspring that produce large oil yield (Breure, 2003). It's characterized by the vertical trunk and feathery nature of leaves every year 20 – 25 new leaves called "frond" develop in continuous whole at the apex of the trunk (Al-Khayri *et al.,* 2019). The fruit bunches develop between the trunk and the base on the new fronds and the plant can reach 60 – 80ft in height in nature, but is rarely more than 20 or 30ft in cultivation. Although new plantation starts to bear fruit at 3 years, generally, the first commercial crop require between five and six years and continuous to produce for 25 – 30 years, or until the palm grow too high to be harvested.

Oil palm is generally believed to originate from West Africa (Jagustyn *et al*., 2013). It produces fruits in bunches which is known as fresh fruit bunch (FFB). The palm tree is known to produce more than 8 to 12 bunches per year, each weighing up to 13kg (Evbuomwan *et al*., 2013; Jasgustyn *et al*., 2013) and a bunch contains about 800 to 1000 fruits (Jagustyn *et al*., 2013).

Oil palm produces more oil per hectare of land than any other known oil crop (Evbuomwan *et al*., 2013; Ohimain *et al*., 2013). The main products of the industry are crude Oil palm and kernel. Its also produces oil, wine, kernel oil, kernel cake and other processed products.

Fresh Fruit Bunch (FFB) is an important component of the oil palm industry, as it is the raw material used to produce palm oil. The importance of FFB can be summarized as follows:

1. Agricultural commodity
2. Food and non-food uses
3. Nutritional value
4. High productivity

Fresh Fruit Bunch is an important component of the oil industry and plays a significant role in the global economy, food security, and rural development. The

production and profitability of fresh fruit plant is critical for the stability of the oil palm industry.

Palm oil is an important commodity in the Nigerian economy with reference to its role as a source of farm income and food requirement. In addition to providing direct and indirect employment for about 4 million people, palm oil and palm kernel oil together contribute around 70% of the country's national consumption requirement of vegetable oils (Olagunju, 2008; Nzeka, 2014). The Nigerian palm oil industry has witnessed a tremendous growth ever since despite its recent neglect. Its importance has permeated every facet of the economic sphere of the nation. Nigeria used to be the world's largest producer of palm fruit (*Elaeis guinensis*), before the crude oil boom era and now (Ibitoye *et al*., 2011). Today, Nigeria has conceded this feat to Malaysia and Indonesia which together can boast of 83% the world's total production of palm oil, while Nigeria can boast of only 1.7% of which is insufficient to meet its domestic consumption which stands at 2.7% (Adetola *et al*., 2016). Palm oil is world's second major vegetable oil, after soybean with world annual production of fresh fruit bunches approaching 100 million metric tons per year (Ada-Okunmgbowa *et al*., 2013). Ibekwe (2008) noted that oil palm is currently the second largest traded edible oil and accounts for about one quarter of the worlds' fats and oil supply. It is worthwhile to note however, that palm oil is not only used domestically (as edible oil) but is applied to a wide variety of uses including the manufacture of candles, soaps, margarine and several others. This accounts for the high demand on the product and the consequent

need to increase production. According to Ibitoye (2014), world production of palm oil had increased tremendously during the last 30 years as a result of rapid expansion of oil palm planting in Southeast Asian countries, spearheaded by Malaysia and Indonesia. He further reiterated that it is thus, by far, the most widely produced tropical oil and constitutes thirty percent (30%) of the total edible oil production worldwide. Production of oil palm in Nigeria has retrogressed compared to what was obtainable in time past. Nigeria which was the leading producer of palm oil in 1950s and early 1960s is now the third world's largest producer of palm oil (FAO, 2012). The cause of this decrease is traceable to the civil war of 1967 to 1970 and the general neglect of Agriculture upon the discovery of petroleum. Efforts geared towards raising production again have not been as successful as anticipated. Ibitoye (2014) reported that in Nigeria, 80% of production comes from dispersed small holders who harvest semi-wild plants and use manual processing technique. The estimate for oil palm plantation in Nigeria ranges from 169,000 (72,000ha of estate plantation and 97,000ha of small holder plantations) to 360,000 hectares of plantations (Arigor *et al.,* 2022). In economics, production is never regarded as complete until the product gets to the final consumer, thus the importance of marketing. Nwauwa (2012) reported that because of the increase in demand of palm oil, resulting from an increase in population and income growth relative to the low productivity of the oil palm sector, Nigeria has become a net importer of oil palm. This, undoubtedly, has negatively affected balance of trade and hence, the need to correct the anomaly. The nature of Agricultural

produce demands efficient marketing to avoid wastage or spoilage. Palm oil is no exception to this requirement. The fact that they are produced majorly in the rural areas, where there are challenges of low social infrastructure like good road network is a constraint. Their bulky nature and high perishability tendency also constitutes difficulty in marketing. According to Carrere (2010), low provisions of market information standard and quality control constitute constraint to palm oil marketing and profitability.

1.2 Statement of Problem

Production of oil palm in Nigeria has degenerated compared to what was obtainable in time past. Nigeria which was the leading producer of oil palm in 1950s and early 1960s is now the third world's largest producer of oil palm (FAO, 2012). The cause of this decrease is traceable to the civil war of 1967 to 1970 and the general neglect of Agriculture upon the discovery of petroleum. Efforts geared towards raising production again have not been as successful as anticipated. This, undoubtedly, has negatively affected balance of trade and hence, the need to correct the anomaly. The nature of Agricultural produce demands efficient marketing to avoid wastage or spoilage. Oil palm products are no exception to this requirement. The fact that they are produced majorly in the rural areas, where there are challenges of low social infrastructure like good road network, mechanization, availability of lands are major constraints faced in production. Their bulky nature and high perishability tendency also constitutes difficulty in marketing. The term ‘profitable’ indicates the tool that

enables the exploration of business operations relative to new values, adding more opportunities in relation to prevailing values in respect of sourcing of input factors, the production, the processing and the delivery of the end product (Energy Market Economic EME, 2018). Analysis based on production commences from the end market perception to define the products they desire and how the utmost value can be shared along the sequence as the actors work to produce those products. Despite the importance of oil palm as a major agricultural crops in Nigeria and the significance of fresh fruit bunch (FFB) production in the profitability of the oil palm industry, there's a lack of comprehensive information on the profitability of oil palm (FFB) production and the factors affecting it in Uhunmwonde L.G.A of Edo State. This study seeks to answer the following questions;

1. What are the socio economic characteristics of the respondents in the study area?
2. What are the inputs and output quantities of oil palm fresh fruit bunch production in the study area?
3. What are the costs and returns of oil palm production and its profitability in the study area?
4. What are the factors affecting profitability of oil palm (FFB) production in the study area?
5. What are the constraints faced by respondents in the study area?

1.3 Objectives of the study

The main objective of the study is to analyze the profitability of oil palm fresh fruit bunch (FFB) production in Uhunmwonde LGA Edo State. The specific objectives are to:

1. describe the socio-economic characteristics of the respondents in the study area;
2. estimate the inputs and output quantities of oil palm fresh fruit bunch production in the study area;
3. estimate the costs and returns of oil palm FFB production and its profitability at different ages of the palms in the study area;
4. examine the factors affecting profitability of oil palm (FFB) production in the study area; and
5. identify the constraints faced by respondents in the study area.

1.4 Justification of study

Oil palm is an important ingredient in the diet of a lot of people. It's also constitutes the largest source of edible oil, accounting for 38.5 million tonnes or 25% of the global edible oil and fat production (Omereji, 2005). The global demand for oil palm is growing. Thus, crop cultivation serves as a means of livelihood for many rural families, and the demands for domestic and industrial applications of Oil palm have continued to increase (Omereji, 2005). It is estimated that for every Nigerian household of five, about two liters of palm oil are consumed weekly for cooking (Ekine, and Onu, 2008). Oil palm is an essential multipurpose raw material for both

food and non-food industries (Armstrong, 2008). Oil palm production, whether at a small scale or industrial level, constitutes a major source of income and employment to a large proportion of the poor rural population in Nigeria, most importantly in the southwestern part of the country (Olagunju, 2008). Previous studies conducted in some parts of Nigeria have shown the economic contribution and indispensability of Oil palm production both to the rural and urban dwellers. There have been studies on the production of oil palm in many areas of the country, however, in Uhunmwonde Local Government Area, which is one of the oil palm producing area of the state, emphasis on the profitability of oil palm production is not enough, most especially in the light of the recent increment in the cost of production. This research, therefore aims at improving available materials on profitability analysis of oil palm production and in the long-run assist in enhancing our domestic food supply by refocusing our research towards oil palm production. This research also seeks to examine the profitability of fresh bunch oil palm production in Uhunmwonde Local Government Area of Edo State with a view of updating and validating existing body of literature on the subject. Also the outcome from this study will enable oil palm producers and any person aspiring to venture into oil palm production to have a better knowledge on the profitability of the business. The study will also serves as sources of relevant literature to state and local governments infers that an efficient, effective, sustained, and strong Oil palm sector in Nigeria as well as the dominant in Uhunmwonde Local Government Area of Edo State will accord the poor to be involved in the solution to poverty

challenge through the provision of gainful employment as well as a means of livelihood.

CHAPTER TWO

LITERATURE REVIEW

2.1 Oil palm fresh fruit production in Nigeria

Nigeria before the discovery of mineral oil was dependent on agricultural products for export, employment and supply of raw materials for industries. Crops such as groundnut produced in the Northern region, cocoa and rubber in the Western region and oil palm in the Eastern region contributed immensely to the country's GDP.

Nigeria is among the West African countries that are cited as the most probable place where the fruit was first domesticated in the 14th century. The crop is found predominantly in southern Nigeria especially in the Wet Rain Forests states (Rivers, Cross River, Akwa Ibom, Imo, Anambra, Ebonyi, Abia , Enugu, Edo and Delta) and Savanna Belt states (Ekiti, , Ondo, Ogun, Osun, and Oyo). It also exists in the wet parts of North Central Nigeria, in areas like Southern Kaduna, Kogi, Kwara, Benue, Niger, Plateau, Taraba and Nasarawa States as well as the Federal Capital Territory (Ayodele and Ehalomi, 2010). Nigeria oil palm production as early as 1900 was the main source of revenue and a dominant player in foreign exchange earnings. In the early and mid 1960's, Nigeria palm oil production accounted for 43% of the world production which has an average of 1.5 million tonnes of palm oil (FAO, 2007). Three decades after, world palm oil production rose to 14.1 million tones with Nigeria accounting for only 7% of the total production (Ekenta *et al.,* 2017).

Oil Palm production in Nigeria is based on three categories of oil plantation holding; small holding plantation, medium scale plantation and large scale plantation. Of these categories, small holder oil plantation controls oil palm cultivation in Nigeria covering about 1-5 hectares of farm and are often times characterized by mixed cropping obviously meant to maximize the usage of the land (Ayodele and Ehalomi, 2010). As reported by Vermeulen and Guad (2006), a large chunk of oil palm exists in the wild or semi-wild state, when this is added to those that were cultivated by smallholders, it shows that the small-holding control over 80% of the Nigeria palm oil production. As early as 1901, Nigeria dominated palm oil production the world earning excellent foreign exchange from exported oil products (Eshalomi, 2009).

Nigeria's ability to meet up with the global rise in demand was curtailed by the over-reliance on traditional production methods, excessive tapping of palm tree for palm wine, and the civil war between 1967 and 1970, which was fought in areas where palm oil production activities were high. The civil war led to the destruction of small holder palm plantations and wild and semi wild palm plantations. Within these periods, palm oil production and the produced tonnes could not meet the rising global demand and consumption. Between 1975 and 1995, production marginally increased from 640,000 tonnes to 898,000 tonnes (FMOARD, 2006; Opeke, 2005). According to FOAST (2022), Nigeria presently ranks third largest producer of oil palm after Indonesia and Malaysia who account for an annual production volume of 1.4 million metric tonnes.

2.2 Economic Importance of Oil Palm Production

Oil palm is a vegetable oil derived from the fruit of the palm tree, it is used for both food and non-food consumption. Total global production of palm oil is estimated at over 45 million tonnes, with Indonesia and Malaysia as the major world producers and exporters. The palm oil industry has experienced rapid growth in recent decades, and has become a significant contributor to the world market for vegetable oils (WG, 2011).

The importance of oil palm to the national economy of Nigeria cannot be over emphasized. It ranges from production of food for human consumption, employment, income to farmers and nation and raw materials for industries. Oil palm has been a major source of foreign exchange to Nigeria as well as source of revenue to major segment of the rural population of South East Nigeria (Onoh and Peter-Onoh, 2012).

The oil palm provides one of the leading vegetable oils produced globally, accounting for one-quarter of global consumption and approximately 60% of international trade in vegetable oils (World Bank, 2010). The oil extracted from these palms is included in several common products used all over the world such as margarine, baked goods and sweets, detergents and cosmetics (UNESCO, 2007). An estimated 74% of global palm oil usage is for food products and 24% is for industrial purposes (USDA, 2010). Since the 1990s, the area occupied by oil palm cultivation has expanded worldwide by around 43%, driven mainly by demand from India, China and the European Union (RSPO, 2011).

Oil palm is very useful for biodiesel all over the world. Oil palm is among the most productive and profitable of tropical crops for bio-fuel production. High-yielding oil palm varieties developed by breeding programmes can produce over 20 tonnes of fresh fruit bunches/ha/yr under ideal management, which is equivalent to 5 tonnes oil/ha/year (excluding the palm kernel oil) (FAO 2002). The oil forms 10% of the total dry biomass produced by the palm, but the 90% left might be a source of fibre and cellulosic material for second-generation bio-fuel production (Basiron, 2005). Production of biodiesel from oil palm has been increasing in recent years, particularly in Africa and Latin America (FAO, 2010b and Mitchell, 2011).

Socio-economic benefits of a sustainable oil palm plantation could include poverty alleviation and long-term employment opportunities. Profit sharing may provide a further incentive, attracting more workers to the palm oil sector, along with better living and working conditions (Albán and Cárdenas 2007). Depending on the role played by authorities and smallholder cooperatives, smallholders may benefit substantially from oil palm production in the world due to its higher returns to land and labour, compared to other commonly grown agricultural products (Rist *et al*, 2010). For instance, oil palm might be an alternative for farmers to invest in and benefit from the higher returns they offer, instead of destroying forest for cattle pasture (Butler, 2011).

In Nigeria, the oil palm tree is a useful crop that is relevant in all aspects of live with socioeconomic and socio-cultural values. According to Ibitoye *et al* (2011) oil palm is

a versatile tree crop with almost all parts having economic value and useful for everyday livelihood. The different parts of oil palm include: the fronds, leaves, trunk and roots. These parts give a wide range of products which are of benefit to mankind. The most important product of oil palm is the palm fruit, which is processed to obtain three commercial products. These include palm oil, palm kernel oil and palm kernel cake. The palm oil is rich in carotene and contains vitamin A. It is also used in the manufacture of soaps and other detergents (Agwu, 2006). The palm kernel oil is used in the manufacture of margarine, cooking fats, lubricants, pomade and a source of glycerin (Ajie, 2013). The residue obtained after the extraction of oil is called kernel cake, which is used in livestock feed production (Soyebo *et al*, 2005). The sludge from palm oil processing is used for making traditional soap and fertilizer. The empty bunch, fibre and shell that remain after oil extraction can be used for mulching, as manure and source of fuel.

According to Komolafe and Joy (1990), the leaves of oil palm are used for making brooms and roofing materials. The thicker leaf stalks are used for walls of village huts. The bark of the palm frond is peeled and woven into baskets while the trunk (main stem) can be split and used as supporting frames in buildings. The ever popular palm wine, which is has socioeconomic importance is obtained from the male inflorescence and is a rich source of yeast. The palm wine can be allowed to ferment and then distilled into a local gin. In some areas in Nigeria, the trade in palm wine competes greatly with that of oil palm (NIFOR, 2008). The leaflet of the oil palm are used for

making thatch for roofing houses while the rachises are used for fencing, reinforcing buildings and basket making. The mid-ribs of the leaflet are used in making brooms while the cabbage soft tissue around the apical bud serves as delicacy for eating. The fibre residue left after the oil has been extracted from the fruit provides fuel while the shell from the cracked palm nuts provides not only fuel but also serve as an aggregate for flooring houses (NIFOR, 2008).

2.3 Theoretical framework

In economic analysis, much is concerned with the technical and economic efficiencies or resource transformation and allocation (Coelli, 2006). Production and cost efficiencies are concerned with the relative performance of the process used in transforming inputs into outputs. The concept of efficiency goes back to the pioneering work of Farrell (1957) who distinguishes between three types of efficiencies: Technical efficiency (TE), Allocative or price efficiency (AE) and Economic efficiency (EE).

Technical efficiency in production is the physical ratio of product output to the factor input, the greater the ratio, the greater the magnitude of technical efficiency. Allocative efficiency is concerned with choosing optimal sets of inputs. A farm is allocatively efficient when production occurs at a point where the marginal value product is equal to the marginal factor cost (MVP=MFC). Economic efficiency is a situation where there are both technical and allocative efficiencies.

Efficiency is concerned with relative performance of the processes used in

transforming given inputs into outputs (Ohajianya and Onyenweaku, 2001). Production efficiency means the attainment of production goal without waste (Ajibefun and Daramola, 2003). An increase in efficiency would lead to an improvement in the welfare of farmers and consequently, a reduction in their poverty level and food security (Effiong, 2004). To increase the efficiency of the farm, owners require a good knowledge of the variation in the current level of efficiency in various cassava enterprises.

The term efficiency is often used synonymously with that of productivity, the most common measures of which relate output to some single input (Lund and Hill, 1979). According to (Lovell, 1993), the term efficiency refers to the comparison between the real or observed values of input(s) and output(s) with the optimal values of input(s) and maximal output(s) used in a particular production process. Efficiency is achieved by minimizing the resources required for producing a given output. Moreover, according to the optimal values, two types of efficiency can be distinguished as technical efficiency and allocative efficiency. Efficiency is considered as technical, if optimal values are defined in terms of the maximum level of output, given the level of input, in terms of the production frontier. In other words, technical efficiency is achieved by producing at the production frontier.

If the optimal values are based on the selection of the mix of inputs, such that a given level of output is produced at the lowest possible cost, given the respective input prices, then the term efficiency can be referred to allocative efficiency (Lovell, 1993).

The role of efficiency in increasing agricultural output has been widely recognized in both developed and the developing countries of the world (Trans *et al.,* 1993; Shehu and Mshelia, 2007; Giroh and Adebayo, 2009).

2.3.1 Theory of production

The theory of production is simply defined as the study of the production processes which has to do with the whole system of activities leading to the fabrication of material goods and services (Jason and Janet, 2021). In other words, it is the combine activities where by inputs are transformed into outputs. It also has to do with the principles that is applied in making wise production decisions. Production decisions are the decisions made in acquiring resources or inputs, organize production, the wise usage of these resources and also the distribution of the products obtained through the production activities. Production decisions also has to do with the management of the reserves of production resources.

Also, the theory of production has to do with the study of the of the production function which shows the relationship between input and output in the production process (Jorgenson and Samuels, 2014). The word "input and output" has a meaning geared in connection with a particular production. In an agricultural production process, the major factors of production which are labour, land, management and entrepreneur are constituents of the input (Genesca and Grifell, (2020). Hence, every farmer or any farm firm has a specific goal which include to maximize profit, to

optimize output, and minimize the cost of production and also to organize, control and allocate resources wisely throughout the production process.

2.3.2. Profitability Analysis

Profitability is referred to as the ability to earn profit from all the activities of an enterprise, businesses, organizations, companies or a firm. The word "ability" reflects the earning power of an enterprise to earn profit. Profit shows the how efficiently the management can earn its profit but making use of all the resources available in the market and also taking into account the amount of profit earned (Cooperate finance and Accounting, 2019). Profitability analysis is a component of an enterprise resource planning that gives the administrators the opportunity in forecasting the profitability of a proposal. Profitability analysis can anticipate sales and profit potential specific to aspects of the market. In order to perform a profitability analysis, all costs of an enterprise have to be allocated to output units as this process is referred to as costing. When the costs have been allocated, they can be deducted from the revenue per output unit (Cooperate finance and Accounting, 2019).

Profitability can be mathematically expressed as;

Profit = Revenue – Total Cost …….. (1)

Profitability in some business like the fresh fruit oil palm production exists because they are managed more efficiently than others. The reward for doing the job better is

usually called profit. The prospect of earning and maintaining profitability serves as the incentive for creativity and efficiency among farmers. Profitability stimulates farmers to venture into risky business and also drive them to develop ways of reducing cost and adopting new technologies always in an effort to satisfy consumer's interest (Osarenren, 2014).

Farmers, like other producers in the agricultural sector are rational, thus they would increase their supply if they are sure of making higher profit *ceteris paribus* (Emokaro *et al.*, 2009). Higher profit thus ensures the sustainability of the industry. Again, fresh fruit oil palm production, like any other farming endeavor is fraught with a lot of risks and uncertainties. To circumvent these, farmers try out several production methods in a bid to irk out reasonable earnings (Emokaro and Erhabor, 2014). The industry is one of the sub sectors of agriculture in Nigeria that has developed to the status of agribusiness with the primary aim of profit maximization as distinct from subsistence production (Nwajiuba and Nweke, 2016). While it is obvious that profit can be made a condition necessary for more producers to enter the business under a competitive enterprise environment is the issue that these farmers are largely untrained, and may not be able to estimate in measurable terms, their level of profitability. Another question is whether the farmers would be able to determine the specific factors that constitute production cost and how these factors affect overall farm profit (Emokaro and Erhabor, 2014).

Farmers therefore need to seek for means of increasing net returns by reducing

production costs, profit being a negative function of cost. This stems from the fact that farmers have little or no control over the forces of demand and prices for their products; they are virtually sentenced to be ‘’price takers’’ in an assumed pure competitive market (Emokaro and Erhabor, 2014).

Profit maximization is one of the important goals of farm business. Profit is generally described as the difference between total revenue (TR) and total cost (TC). The total revenue is the product of output sold and the unit price, while the total cost is divided into fixed and variable costs. According to Olukosi and Erhabor (2005), fixed costs are those costs incurred on fixed inputs which cannot be used up during one production process, on the other hand, variable cost are those costs associated with variable inputs and do change with changes in output level. Profit maximazation requires a firm to produce the maximum output given the level of inputs employed, use the right mix of inputs in the light of the relative price of each input and produce the right mix of outputs given the set of prices (Kumbhaker and Lovell, 2000).Profit maximization is one of the important goals of cassava farm firms. An estimate of the profitability of every farm enterprise is always based on cost-return analysis. This involves itemizing the costs and returns of production variables and using them in achieving the estimates as the return to one unit of resources used, the gross margin as well as the net farm income. Profit is generally defined as the difference between total revenue and total cost (Olukosi and Erhabor, 2005).

2.4. Methodological framework

2.4.1 Gross Margin Analysis

Gross margin is a very useful planning tool in a situation where fixed cost is a negligible portion of farming enterprise as in the case of subsistence agriculture. It is easily computed and represents the most relevant economic tool to draw the attention of the farmer to the problem of his farm. Gross margin analysis is the difference between the gross farm income and total variable cost (Olukosi and Erhabor, 2014).

Gross margin is a required income statement entry that reflects total revenue minus cost of goods sold. Gross margin is a company's profit before operating expenses, interest payments and taxes. It can be computed as follows:

GM=TR-TVC…….. (2)

Where:

GM = Gross Margin, TR=Total revenue, TVC= Total variable cost

2.4.2 Net Revenue Analysis

This is one of the simplest and oldest tools of analysis in farm management and production economics studies. Net Revenue is obtained by adjusting net cash revenue, total depreciation, net inventory changes and values of products consumed at home. Net Revenue is the only true measure of profit for the accounting period since it includes the above adjustment which could be quite large (Kay, 2018).

Net Profit has to do with the profits and losses incurred through the operations of the farm. A net profit statement sometimes called a farm profit and loss statement is a

summary of income and expenses that occurred during a specified accounting period. Net income shows the difference between total revenue and cost of production (Chris Murphy, 2021). The net farm profit is used to show levels of costs, returns and profit that accrue to farmers involved in production. (Olokosi and Ogungbile, 2001), have examined two important categories of cost involved in crop production and these include the fixed and variable cost.

Fixed cost (FC) refers to those costs that do not vary with the level of production while the Variable cost are those costs that vary with output. The total cost refers to the sum of total fixed cost (TFC) and total variable cost (TVC).

The Net Profit is computed as follows:

NR=GM-TFC…….. (3)

Where

NR = Net Revenue, GM= Gross Margin and TFC= Total Fixed Cost

2.4.3 Benefit Cost Ratio (BCR) is the technique for evaluating a project or investment by comparing the economic benefits with the economic costs. A BCR is the ratio of the benefits of a project proposal, expressed in monetary terms relative to cost. All benefits and costs should be expressed in discounted Present Value. The ratio used to measure both quantitative and qualitative factors, since sometimes benefits and cost cannot be measured exclusively in financial terms. The formula for calculating Benefit Cost Ratio is shown below:

Benefit- Cost Ratio = $$\frac{\sum_{i=1}^{n} \frac{Bt}{(1+r)n}}{\sum_{i=1}^{n} \frac{Ct}{(1+r)n}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where: Bt=Benefit in each year (naira), Ct=Cost of present value (naira), n= number of years, r= interest (discounted) rate.

The decision rule for BCR is that for any project to be economically viable, the ratio must be greater than unity. The discount rate used in calculating a project's worth is very crucial. Accept all projects with a BCR greater than one, when costs and benefits are discounted at the opportunity cost of capital.

2.4.4. Depreciation Method

All fixed assets except the value of land decreases with the passage of time. The value of these assets decreases each year. Such gradual reduction in the value of fixed assets for the purpose of earning revenue is called depreciation. Depreciation is simply the pattern by which the cost is allocated to each of the periods involved in the service of life that is the useful life of an asset (Aston, 2012).

Three main inputs are required to calculate depreciation:

• Useful life – This is the time period over which the organization considers the fixed asset to be productive. Beyond its useful life, the fixed asset is no longer cost-effective to continue the operation of the asset.

• Salvage value – After the useful life of the fixed asset, the company may consider selling it at a reduced amount.

• The cost of the asset.

2.4.5 Regression analysis

Regression analysis is a statistical process for estimating the relationship among variables. It includes many techniques for modeling and analyzing several variables, the focus is on the relationship between a dependent variable (often called the 'outcome variable') and one or more independent variables or predictors (often called 'predictors', 'covariates', or 'features'). More specifically, it helps one to understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the other independent variables are held fixed (Soto, 2013). Many techniques for carrying out regression analysis have been developed. The implicit form for the regression model is $Y= f (X_1, X_2, X_3, X_4, X_5, U)$…… (5)

Where; Y = profit of oil palm FFB production

X_1…… X_5 = independent variables

U = Error term

Explicitly the functional forms are expressed below

Linear function:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + U \text{ ……. (6)}$$

Some authors who had used the regression analysis include; Okpeke and Adaigho (2018), Obinaju and Asa (2015), Shuaibu, Yakubu, Hassan and Emmanuel (2020).

2.5 Constraints to Oil Palm Production in Nigeria

The problems of oil palm production are enormous and multi-faceted. Inadequate access to land, inadequate access to fund, inadequate access to improved technology and high cost of material inputs and labour, poor output market mechanism, poor extension services delivery and general poor characterization of the sector (Ibitoye *et al.,* 2011). These are seen as the immediate and direct factors that constrained fresh fruit oil palm production in Nigeria.

2.5.1 Inadequate Access to Land

Oil palm production is land extensive. Plantations' establishment requires land space both in the rural and urban areas. Inadequate access to land therefore is a major constraining factor in the oil palm sector. According to Enwelu *et al* (2013), the major challenge facing oil palm farmers in embarking on oil palm production project is land. The existing land tenure system and the present land policy are not favourable to young farmers who may be interested in investing in oil palm production. As a result of low plantation culture in Nigeria (partly owed to the land tenure system and also because of the geographical spread of oil palm producers), it would be useful to review the Land Use Act and modify it to serve as a catalyst for supporting the development of a plantation culture for oil palm production (Dada, 2017).

2.5.2 Inadequate Access to Fund

Finance is the driving force of any venture, investment and innovation. The agriculture sector in Nigeria has after the discovery of crude oil in the 1950's been relegated with regards to funding. Oil palm production is capital intensive and requires easy access to funding especially flexibility in the access to loan and credit facilities from bank and government institutions. According to Ekine and Onu (2008), inadequate funding is a major problem faced by palm oil processors hence most of them could not establish own processing mills. Further, Chukwu and Nwaiwu (2012) explained that lack of fund is a constraining factor to oil palm processing. Inadequate finance for the oil palm sector could be attributed to the fact that oil palm is a perennial crop with a long gestation period; lending institutions are unwilling to provide financial services to producers owed to the lack of collateral and the time lag for producing a harvest (Dada, 2007). To overcome this problem, government should through legislation provide appropriate policy for ensuring

2.5.3 Inadequate Access to Improved Technology

The agricultural transformation agenda of the Federal Government is geared towards import substitution and export promotion through commercial agriculture. Deviating from the rural subsistence low technology approach which has dominated the oil palm production in Nigeria to commercial agriculture requires the use of improved technology. He use of improved seedlings, agronomic and management practices, integrated pest management practices and the used of improved machineries for

production and processing are prerequisites to improved output in the sector. The present use local technology will not yield the expected result and achieve the desired transformation in the sector (Ekenta *et al.,* 2017).

2.5.4 High Cost of Material Inputs and Labour

The cost of material inputs needed for oil palm production is high. Inputs such as fertilizer, insecticides, herbicides, and fungicides are increasingly high and beyond the reach of the meagre earnings of small-scale producers that dominate the oil palm production in the country. Government at various times has announced input subsidy for farmers but most often the subsidies only exist in official white paper policy documents of the government and if implemented, do not reach the target farmers. Similar to this is the high cost of labour. Oil palm production in Nigeria is labour intensive owing to the fact that rural technology and unimproved implements are used. This therefore consumes a large chunk of the fund of the small holder farmer that could have been invested in other areas to improve production (Ekenta *et al.,* 2017).

2.5.5 Non-Government and Private Sector Participation

The transformation agenda will require government and private sectors' participation in financing project, programmes, innovations and investments in agriculture. The oil palm sector does not enjoy this advantage. The resources needed to improve oil palm production for economic growth is not within the reach of the meager resources of the rural oil palm producers. Most plantations and mills are owned by rural private

investment without government or private sector encouragement. This will result to low production output emanating from use of unimproved technology, poor management practices and low investment (Ekenta *et al.,* 2017).

The oil palm products such as red oil, palm kernel and palm kernel cake do not have a well define marketing method and procedure especially at the local level. This will give rise to poor pricing of the products which will in turn affect the profit margin of the rural producers. The incidence of this factor will discourage new entrants into the business especially the youth. A well defined market procedure, standardized pricing mechanism and good distribution network will be needed to encourage new entrants and foster uniform product marketing and pricing across the country *(*Ekenta *et al.,* 2017).

2.5.6 Poor Extension Services Delivery System

The extension systems serve as linkage between research stations and the intended consumers of the research innovations. The communication of improved technologies and practices, the education of the end users of the improved innovation are the primary roles of extension systems. In Nigeria, the extension service delivery system is marred by inefficiency. Inefficiency in the system is occasioned by inadequate resources to executives its functions. Inadequate personnel within the system, low budgetary allocation to the system, poor working condition and poor infrastructure are some of the factors bedeviling the extension system in Nigeria. As a result of these,

the rural oil palm producers who are small holder do not have the necessary information they need to improve their production (Ekenta *et al.,* 2017).

2.5.7 General Poor Characterization of the Sector

Comparing the Nigerian oil palm sector with other countries who are competitors in the global market will expose the poor characterization of the oil palm sector. For instance comparing Nigeria and Malaysia will give an insight to the aforementioned problem (Ekenta *et al.,* 2017).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Area

This study was carried out in Uhunmwonde Local Government Area (LGA), Edo State, Nigeria. The State is located geographically between longitude 6°4' East and 6°0' 40^{0}E' and latitude 5°44' North and 7° 34' North. It has a landmass of 17,802sqkm, a projected population of 4,777,000 by 2022 (National Population Commission, 2022; National Bureau of Statistics, 2022). It is divided into three senatorial zones which are Edo Central, Edo North and Edo South Senatorial Zones.

Uhunmwonde is one of the 18 LGAs in Edo State, with its administrative headquarters in Ehor, Geogrpahically, Uhunmwonde LGA is located between latitudes 6°14' and 6°47' North of the Equator and Longitude 5°36' and 6°6' East of the Greenwich. It is bounded in the North by Owan West LGA, by Esan and Igueben LGAs in the East, by Egor and Ovia North-East in the West, and in the South by Orhionmwon and Ikpoba-Okha LGAs. It has a land mass of 2,056.449 Km^2 with a projected population of 179,900 (National Population Commission, 2022; National Bureau of Statistics, 2022). There are two predominant seasons in the LGA which are the rainy season which spans from late March till early November, and dry season which spans from late November till early March. The LGA has a mean temperature of 277°C and an annual rainfall range of 1172mm and 2127mm. the relief of Uhunmwonde LGA is low lying,

situated within the Benin Lowlands. Agriculture is the predominant occupation of the people in this state. The major cash crops cultivated are rubber, cocoa, and oil palm. In addition, the state produces crops such as yams, cassava, rice, plantain, guinea-corn, and various types of fruits and vegetables (Initiative for Public Policy Analysis (IPPA) (2010).

3.2 Scope of the study

The study was limited to Uhunmwonde LGA of Edo State, Nigeria, with a focus on the production and profitability of oil palm fresh fruit bunch in the area. The study focused on the factors affecting the production and profitability of oil palm Fresh Fruit Bunch in Uhunmwonde LGA, including availability of fertile land, access to credit and financing, the cost of inputs such as seedlings and fertilizers, the price of FFB and palm oil, and the level technological innovation and expertise available to farmers.

3.3 Sampling Procedure and Sample Size

A two-stage sampling procedure was adopted in selecting the respondents for the research.

First stage: A purposive selection of 10 communities in the local government area as a result of the dominance of fresh fruit bunch production in the communities. The selection was Irigon, Aduhanhan, Okhuahe, Obagie, Ehor, Isi, Irhue, Okhuo, Igieduma and Okeze study (Table 3.1).

Second stage: A simple random sampling technique was used to select 25% of the listed fresh fruit bunch producers from each community in the Local Government Area, which gave a sample size of one hundred and nine (109) selected respondents for this study (Table 3.1).

Table 3.1: Sample frame and sample size

s/n	Number of community	No of respondents (Sample frame)	Total number of sampled respondents (sample size)
1	Obagie	15	4
2	Ehor	84	21
3	Isi	315	79
4	Irhue	10	3
5	Okhuo	13	4
6	Igieduma	10	3
7	Okeze	15	4
8	Okhuahe	15	4
9	Aduhanhan	20	5
10	Irigon	12	3
	Total	509	109

3.4 Data Collection

This study was based on data obtained from primary sources.

Primary data was used in this study.

A total of 109 questionnaires wàs sent to the field and 70 was retrieved back from the field through the use of questionnaire and interview schedule which was carried out on individual basis. The questionnaire was prepared in English language and the interview with the producers was done in English language as well, but interpretation to local language was done where the respondent did not understand English. The questionnaire contained both closed and open ended questions. The collected data covered information on input usage and output levels of oil palm producers and the socio-economic data of the households.

During the data collection exercise, direct observations of oil Palm FFB marketing and prices which provided important sources of information for the study was made.

3.5 Measurement of variables

The variables of this study include the socio-economic characteristics of the respondents and they were measured by asking the respondents to state the actual or exact information appropriate to them from the listed options below.

Output of farmers: was measured by the total weight of FFB produced in Kilograms (kg)

Fertilizers: was measured in Kilograms (kg)

Farm size: was measured in hectares (ha)

Farming experience: was measured in years

Seedlings: was measured in Naira (₦) as fixed and variable cost

Cost: was measured in Naira (₦) as total contributions from oil palm production

Constraints: this was measured on a 5-point Likert scale with very serious=5, serious = 4, moderately serious = 3, least serious = 2 not serious = 1. A mean of ≥ 3 will be considered as serious and < 3 is not serious.

3.7 Analytical Techniques

Objective 1: To describe the socio-economic characteristics of fresh fruit bunch producers in the study area. Simple descriptive statistics such as percentage, arithmetic mean as well as frequency distribution tables was employed to describe the socio-economic characteristic of the respondent in the study area.

Objective 2: Estimating the inputs and output quantities of the FFB production, descriptive statistics was used.

Objective 3: The costs and returns of the oil palm FFB production was analyzed using Gross Margin.

Gross margin is defined as the difference between total revenue and total variable cost. Mathematically it is usually expressed as;

GM = TR - TVC ----------(1)

Where

TR = Total Revenue

TVC = Total Variable cost

Total Revenue (TR) is the product of output of oil palm and the price of oil palm while the Total Variable Cost (TVC) is the aggregation of the costs of land preparation, planting materials, oil palm seeds, planting, weeding, mulching and harvesting.

Net farm income was used to measure the net income of farmers. The net farm income index is given by:

NFI=GM-TFC

Where:

NFI=Net farm income per hectare (₦)

GM=Gross Margin

TFC=Total fixed cost (rent on land and depreciated cost of hoes, cutlasses, wheel barrow, knapsack, head pan, files etc).

Return on Investment was used to measure the ratio between net income and cost. The return on investment is given by;

ROI = net income/ total cost

Objective 4:

The factors affecting the profitability of oil palm FFB production was determined using the production function analysis. The Ordinary Least Square multiple regression analysis was used to estimate the parameters of the production function model. The data was fitted using the linear, semi-log, and double log functional forms. The functional form with best fit was selected based on the level of significance of the independent variables, the number of significant variables, and the value of the coefficient of multiple determination (R2).

Model specification: The production function postulated for oil palm FFB production in the study area is implicitly represented by

$Y= f(X_1, X_2, X_3, X_4, X_5, X_6, .ei)$…….…. (2)

Where;

Y= Net profit (₦)

X_1=Total FFB produced per annum (mt)

X_2= Depreciation on asset (₦)

X_3= number of oil palm stands (ha)

X_4= Farm size (ha)

X_5= Ages of FFB produced

X_6= Labour cost (₦)

$Y= f (X_1, X_2, X_3, X_4, X_5, U)$…… (3)

Where; Y = profit of oil palm FFB production

X_1…… X_5 = independent variables

U = Error term

Explicitly the functional forms are expressed below

Linear function was used to estimate the regression:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + U \text{ …….(4)}$$

Objective 5: To identify the challenges faced by the oil palm fruit producers. A 5 point Likhert scale was used to rank the constraints (very serious (5), serious (4), moderately serious (3), lest serious (2), not serious(1) which was ticked according to the questions asked and the mean score was used as the bench mark. The mean score was calculated and any constraint with a score greater than or equal to 3.0 was considered serious.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of Respondents

4.1.1 Age

Table 4.1 showed that majority (49.9%) of the respondents aged above 45 years followed by 35.7 who age 36-45years while (below 25 and 26-35 years) were within the range of (7.2%) respectively. The mean age of the oil palm farmers was 47.63, showing they were still within a productive age of less than 60 years. This is showed that they would still be active in the business of farming. As noted by Nwaru, Onuoha, Iheke and Onyeachonam (2010), the mental capacity of an individual to cope with innovations decreases with advancing age.

4.1.2 Sex

Table 4.1 showed that about 71.4% of the respondents were male while only 28.6% were female. This implies that most of the oil palm farmers were male. This shows that males dominated the oil palm cultivation in the study area. This can be attributed to the tedious nature of oil palm cultivation The finding is in agreement with the study of Akinniran *et al.,* (2013) who reported that oil palm farmers are dominated by male mainly because of the stress attached to it which female cannot bear. Also, Edeoghon and Oria-Arebun (2011) stated that male dominated the oil palm sub-sector of the agricultural sector in Nigeria with over 70%.

4.1.3 Marital Status

On marital status (Table 4.1), it was observed that only 8.6% were single, 77.1% were married and very negligible proportions (14.3%) were divorcees. The result implies that majority of the respondents were married and this will have a positive effect on their work in that they can have a family labour which will complements their hired labour in their Oil palm production in the study area (Akinniran *et al.,* 2019).

4.1.4 Religion

As shown in table 4.1 majority (77.%) were Christian faithful while only (15.7%) practiced Islam but very few (7.2%) practiced African tradition religion. This implies that Christianity is the dominant form of religious belief system practiced by most of people in the study area. This may be as a result of the regional variation in the religion of the country while in the northern region is not so (Okoedo-Okojie, 2015)

4.1.5 Primary Occupation

The frequency distribution of respondents according to their primary occupation is presented in Table 4.1. The result reveals that many (51.4%) of the respondents were farmers while 22.9% of the respondents were traders. Also, only 15.7% were into civil servant and farming while 10% were into trading and farming. This indicates that majority of the respondents were into farming as their source of livelihood.

4.1.6 Level of Education

Table 4.1 also reveals that majority (44.3%) of the farmers had secondary education while 27.1% had primary education, 24.3% had tertiary education only 4.3% had no

formal education. The most of respondents had education, especially where majority had between primary and secondary education with substantial proportions having secondary education. With this forms of education, they are expected to adopt farming practices that could enhance productivity easily and possess ability to read labels on agrochemicals accurately for ease of applications. This results are in agreement with findings of Emokaro *et al.,* (2014) who reported that majority of palm oil farmers have basic education .

4.1.7 Farming experience

Table 4.1 also revealed that 45.6% had between 21-30years of experience, 21.5% had between 11-20 years, 21.5% had above 30 years while only 11.4% had between 1-10 years of experience in FFB oil palm production with a mean of 17.76. This means that respondents had relatively better years of experience in the cultivation of oil palm. Chilot (2004) posited that farmers with longer experience appear to be more informed and better able to evaluate the advantage of the technology.

Table 4.1: Socio-economic characteristics of respondents

Variable	Freq. n = 70	Perc.	Mean	Maximum	Minimum
Age (years)					
Below 25	5	7.2			
26-35	5	7.2	47.63`	25	70
36-45	25	35.7			
Above 45	35	49.9			
Sex					
Male	50	71.4	1.23	1	2
Female	20	28.6			
Marital status					
Single	6	8.6	2.15	2	1
Married	54	77.1			
Widowed	10	14.3			
Religion					
Christian	54	77.1	1.98	1	3
Muslim	11	15.7			
African tradition	5	7.1			
Primary Occupation					
Trader	16	22.9			
Farming	36	51.4	2.20	2	3
Trading and farming	7	10.0			
Civil servant and farming	11	15.7			
Level of education					
Non formal education	3	4.3			
Primary education	19	27.1			
Secondary education	31	44.3	3.17	3	1
Tertiary Education	17	24.3			
Membership of Association					
Yes	51	72.8	1.65	1	2
No	19	27.2			
Benefits of Association					
School fees	5	7.1			
House	6	8.6	3.33	4	3
Land	1	1.4			
Others	12	17.1			

Table 4.1 Cont'd

Variable	Freq. n = 70	Perc.	Mean	Maximum	Minimum
Farming Experience (Years)					
1-10	8	11.4			
11-20	15	21.5	17.76	40	1
21-30	32	45.6			
Above 30	15	21.5			

Source: Field survey, 2023

4.2 Production Characteristics of Oil Palm FFB production

4.2.1 Source of finance

Table 4.2 shows that the majority source of finance was personal savings (68.6%) while 17.1%, 8.6% and 5.8% indicated they sourced money from friends and family, cooperative and osusu and banks respectively for oil palm production. This indicates that majority relied on their personal savings venturing into the business. Onoja and Ogali (2015) also obtained similar results in a study conducted in Kogi State.

4.2.2 Cropping System

In terms of cropping system, about 52.9% of the respondents were into mixed cropping while 47.1% were into mono cropping. This implies that most FFB oil palm farmers in the study area still maintain mixed cropping as this supplement their income.

4.2.3 Mixed Cropping System

Also table 4.2 shows that in terms of mixed cropping system, about 25.7% of the respondents planted cassava and maize while 20% planted cassava, maize and pineapple. This implies that most FFB oil palm farmers in the study area still maintain mixed cropping system.

4.2.4: Total Oil Palm Farm Size (Ha)

Table 4.2 shows that 71.5% of the respondents had between 1-15 hectares of farm land, 17.1% had between 16-30 hectares of farm land while the remaining 11.4% of the

respondents had 31 hectares and above of farm land, with the mean farm size of 12.63 hectares. The result shows that all the respondents had varied farm size.

4.2.5: Method of land acquisition

Table 4.2 shows that 42.86% of the respondents acquired their farm land through inheritance, 5.71% of the respondents acquired their farm land through leasing, 15.71% of the respondents acquired their farming land through renting while 25.71% of the respondents acquired their farming land through purchasing only 1.44% of the respondents acquired their farm land was gifted. This is in agreement with the work of Akinniran et al (2019)., whose research showed that majority of the respondents acquired their farm land through inheritance.

4.2.6: Renting of farm land per annum

Table 4.2 shows that 45.46% of the respondents' cost of renting farm land range below 700,000, 36.36% of the respondents had between 700,000-1,000,000 while 18.18% of them had their range from 1,000,000and above .

4.2.7: Cost of purchase of farm land(ha)

Also, Table 4.2 shows that 33.33% of the respondents purchased their farm land range below 100,000, 55.56% of the respondents had between 1,000,000-3,000,000 while 11.11% of them had their range from 3,001,000and above .

4.2.8: Number of oil palm FFB harvested(ha).

11.43% of the respondents had between 600 - 1000 FFB harvested annually, 24.29% of respondents had between 1100 - 1500 FFB harvested annually, while 57.14% of

respondents had 1600 – 2000 FFB harvested annually. The average number harvested was 1736.44

4.2.9 Average weight of FFB per kilogram

0.8% of the respondents had between 5kg - 8kg of FFB, 69.2% of the respondents had between 10kg - 13kg of ffb, while 30.8% of the respondents had 13.5kg - 20kg of FFB, with an average weight of 11.92kg.

4.2.10 Price per bunch

Table 4.2 shows that majority 50% of the respondents sold their FFB between 800 - 1200 per bunch, while 27.2% of the respondents sold their FFB between 350 - 750 per bunch and 22.8% sold theirs FFB between 1250 - 1650 per bunch. The average price per bunch was 927.12.

4.2.11 Price per tonne

Table 4.2 also shows that majority 50% of the respondents sold their FFB between 54,000 – 75,000 per bunch/tonne, while 27.2% of the respondents sold their FFB between 75,100 – 96,000 per bunch/tonne and 22.8% sold theirs FFB between above 96,000 per bunch/tonne. The average price per tonne was 80583.58

4.2.12 Present age of FFB

Table 4.2 shows that majority 50% of the respondents had above 18 years of FFB while 28.57% had between 9-18 years while 21.43% had between 3-8 years FFB in their farms the average age was 19.13.

4.2.13 Age at which FFB commence fruiting

Table 4.2 shows that majority 75.7% of the respondents said their FFB commenced fruiting between 3-5years while 24.3% said their FFB commenced fruiting between 6-8 years.

4.2.14 Number of oil palm stand per hectare

Table 4.2 shows that majority 67.14% of the respondents had between 141-150 oil palm stand/hectares while 25.72% had between 151-160 oil palm stand per hectares, while the remaining 7.14% of the respondents had 130-140 oil palm stand per hectares, with the mean FFB stand per hectare being 147.23. The result shows that all the respondents had varied number of oil palm stands.

Table 4.2: Production Characteristics of Oil Palm FFB Production

Variables	Frequency	Percentage	Mean
Source of finance			
Personal savings	48	68.6	1.47
friends and family	12	17.1	
cooperative and osusu	6	8.6	
Banks	4	5.8	
Cropping system			
Monocropping	33	47.1	1.53
Mixed cropping	37	52.9	
Mixed cropping			
Cassava and maize	18	25.7	
Cassava, maize and pineapple	14	20	2
Farm size (Ha)			
1-15 hectares	50	71.5	
16-30 hectares	12	17.1	12.63
Above 30 hectares	8	11.4	
Method of land acquisition			
Purchased	18	25.71	
Rented	11	15.71	
Communal	6	8.57	4.42
Lease	4	5.71	
Inheritance	30	42.86	
Gift	1	1.44	
Cost of renting (ha)			
Below 70,000	5	45.46	
70,000-100,000	4	36.36	62189.59
Above 100,000	2	18.18	
Cost of purchase (ha)			
Below 100,000	6	33.33	
100,100-300,000	10	55.56	126154.66
Above 300,000	2	11.11	
Number of oil palm FFB harvested			
600-1000	8	11.43	
1100-1500	17	24.29	1726.44
1600-2000	40	57.14	
>2000	5	7.14	

Table 4.2 cont'd

Variables	Frequency	Percentage	Mean
Average weight of FFB per kilogram			
5kg-8kg	2	1.8	
9kg-12kg	37	53.2	11.92
13kg-16kg	27	38.8	
>16kg	4	6.2	
Membership of Association			
Yes	51	72.8	
No	19	27.2	1.62
Variables	Frequency	Percentage	Mean
Credit obtained (Amount)			
Below 200,000	11	15.7	
200,000-500,000	8	11.4	
501,000-800,000	6	8.6	324,167
Above 800,000	1	1.4	
% borrowed			
Below 3%	6	8.6	
3-5%	11	15.7	6
6-9%	0	0	
Above 10%	9	12.9	
Price per bunch			
350-750	19	27.2	
800-1200	35	50	927.12
1250-1650	16	22.8	
Price per tone			
54000-75000	35	50	
75100-96000	19	27.2	80583.58
>96000	16	22.8	
Present age of FFB			
3-8	15	21.43	
9-18	20	28.57	19.13
>18	35	50	
Age at which FFB commence fruiting			
3-5	53	75.7	4.54
6-8	17	24.3	
Above 8	0	0	
Number of stands/hectare			
130-140	5	7.14	
141-150	47	67.14	147.23
151-160	18	25.72	

Source: field survey, 2023

4.3 Input Quantity and Cost of FFB Production during establishment

Table 4.3 shows the inputs of FFB production in the study area. From the result the average mean per person per hectare shows the quantity and unit cost of various inputs used in FFB oil palm production during establishment. The results shows mean quantity and cost at all ages which were oil palm seedlings (147.229 and ₦396.48), fertilizer (66.20kg and ₦916.92), herbicides (19.06L and ₦77.672), fuel (289.67L and ₦77.672) and land (₦62189.59). This indicates that during establishment the major input used for their FFB farming at all ages was land. The results also showed mean quantity and cost at 3 – 8 years were oil palm seedlings (149.33 and ₦328.45), fertilizer (65.49kg and ₦552.529), herbicides (22.15L and ₦990.45), fuel (232.33L and ₦121.80) and land (₦140000). This indicates that during establishment the major input used for their FFB farming at 3-8years was land.

Results in Table 4.3 showed average mean quantity and cost at 9-18 years were oil palm seedlings (144.85 and ₦116.42), fertilizer (49.08kg and ₦207.83), herbicides (33.57L and ₦902.29), fuel (156.10L and ₦105.83) and land (₦103333.33). This indicates that during establishment the major input used for their FFB farming at 9-18years was herbicides. Table 4.3 results shows average mean quantity/cost at above 18 years were oil palm seedlings (157.44 and ₦293.99), fertilizer (53.87kg and ₦477.52), herbicides (15.97L and ₦990.45), fuel (248L and ₦68.10) and land (₦57500). This indicates that during establishment the major input used for their FFB farming at above 18 years was rent on land. From the results it can be deducted that land incurred the highest cost for inputs used during establishment in FFB production in the study area.

Table 4.3 Establishment inputs (ha/year)

	3-8 years		9-18 years		Above 18 years		At all ages	
Variables	**Mean Quantity**	**Mean cost (₦)**	**Mean Quantity**	**Mean Quantity**	**Mean cost (₦)**	**Mean cost (₦)**	**Mean Qunt**	**Mean cost (₦)**
Oil palm seedling (number)	149.33	328.45	144.85	147.229	254.02	116.42	157.44	293.99
Fertilizer	65.49kg	552.529	49.08kg	66.20kg	396.48	207.83	53.87kg	477.52
Herbicides	22.15L	990.45	33.57L	19.06L	916.92	902.29	15.97L	990.45
Fuel	232.33L	121.80	156.10L	289.67L	77.672	105.83	248L	68.10
Land (Ha)		140000			62189.59	103333.33		230000

4.4 Input Quantity and Cost of FFB Production for yearly maintenance

Table 4.4 shows the inputs of FFB production in the study area. From the result the average mean per person per hectare shows the quantity and unit cost of various inputs used in FFB oil palm production for yearly maintenance. The results shows mean quantity and cost at all ages were transportation (15 and ₦2068.44), fertilizer (15.62kg and ₦507.86) and herbicides (11.82L and ₦1200.99). This indicates that during yearly maintenance the major input used for their FFB farming at all ages was transportation. The results also showed mean quantity and cost at 3 – 8 years which were transportation (12 and ₦2845.42), fertilizer (20.22kg and ₦752.08) and herbicides (10.55L and ₦1037.96). This indicates that during yearly maintenance the major input used for their FFB farming at 3-8years was transportation.

Results in Table 4.4 showed average mean quantity and cost at 9-18 years were transportation (16/₦1469.64), fertilizer (15.94kg/₦387.28) and herbicides (12.05L/₦1409.15). This indicates that during yearly maintenance the major input used for their FFB farming at 9-18years was transportation. Table 4.4 results shows mean quantity and cost at above 18 years were transportation (18/₦1333.50), fertilizer (12.03kg/₦764.81) and herbicides (9.23L/₦732.36). This indicates that during yearly maintenance the major input used for their FFB farming at above 18 years was transportation. From the results it can be deducted that transportation incurred the highest cost for inputs used during yearly maintenance in FFB production in the study area.

Table 4.4 Inputs for yearly maintenance (ha/year)

	3-8 years		9-18 years		Above 18 years		At all ages	
Variables	**Mean Quantity**	**Mean cost (₦)**	**Mean Quantity**	**Mean Quantity**	**Mean cost (₦)**	**Mean cost (₦)**	**Mean Quantity**	**Mean cost (₦)**
Transportation	12 (persons)	2845.42	16 (persons)	15 (persons)	2068.44	1469.64	18 (persons)	1333.50
Fertilizer	20.22kg	752.08	15.94kg	15.62kg	507.86	387.28	12.03kg	764.81
Herbicides	10.55L	1037.96	12.05L	11.82L	1200.99	1409.15	9.23L	732.36

Source: Field survey, 2023

4.5 Labour inputs (Quantities and Cost) for maintenance and establishments (ha/year) at all ages

Table 4.5 shows the quantity and unit cost of labour inputs of FFB production for establishment and yearly maintenance in the study area. For yearly maintenance the results shows mean cost at all ages which were weed control (₦629.86), pest control (₦795.24) and harvesting (₦673.82). This indicates that during yearly maintenance pest control incurred the highest cost labour input used in FFB production at all ages. The results also showed mean cost at 3 – 8 years which were weed control (₦1438.78), pest control (₦921.20) and harvesting (₦860.08). This indicates that during yearly maintenance weed control incurred the highest cost for labour input used in FFB production at 3-8 years.

Results in Table 4.5 showed average mean cost at 9-18 years were weed control (₦148.78), pest control (₦857.58) and harvesting (₦1314.86). This indicates that during yearly maintenance harvesting incurred the highest cost for labour input used in FFB production at 9-18 years.

Table 4.4 results shows mean cost at above 18 years were weed control (₦531.59), pest control (₦686.43) and harvesting (₦111.12). This indicates that during yearly maintenance pest control incurred the highest cost for labour input used in FFB production above 18 years.

From the results it can be deducted that cost of labour inputs varied at different ages of FFB production in the study area.

Also, Table 4.5 revealed cost of labour inputs for establishment. The results shows mean cost at all ages which were land preparation (₦520.23), planting (₦520.23), mulching (₦269.08), pest control (₦783.57) and fertilizer application (₦454.73). This indicates that during establishment pest control incurred the highest cost of labour input used in FFB production at all ages. The results also showed mean cost at 3 – 8

years which were land preparation (₦745.00), planting (₦620.00), mulching (₦682.11), pest control (₦496.68) and fertilizer application (₦948.44).. This indicates that during establishment fertilizer application incurred the highest cost for labour input used in FFB production at 3-8 years.

Results in Table 4.5 showed average mean cost at 9-18 years were land preparation (₦409.80), planting (₦388.48), mulching (₦628.59), pest control (₦436.97) and fertilizer application (₦440.81). This indicates that during establishment mulching incurred the highest cost for labour input used in FFB production at 9-18 years.

Table 4.4 results shows mean cost at above 18 years were land preparation (₦325.68), planting (₦341.21), mulching (₦420.78), pest control (₦352.57) and fertilizer application (₦246.73). This indicates that during establishment mulching incurred the highest cost for labour input used in FFB production above 18 years.

From the results it can be deducted that cost of labour inputs varied at different ages of FFB production in the study area.

Table 4.5 Labour inputs (Quantities and Cost) for maintenance and establishments (ha/year) at all ages

Variables	3-8 years	9-18 year	Above 18years	All ages
Quantities of labour inputs (man days)				
Maintenance				
Weed control	22.59	28	22.8	31.28
Pest control	10.53	11.9	10.5	11.4
Harvesting	32	23.52	18.63	32.3
Establishment				
Land preparation	60	96.48	82.96	67.2
Planting	60	67	74.8	67.2
Mulching	15.6	21	22	22.4
Pest control	60	22.2	22.044	14.76
Fertilizer application	8.4	45.15	42.16	67.2
Cost of labour input (₦)				
Maintenance				
Weed control	1438.78	148.78	531.59	692.86
Pest control	921.20	857.58	686.43	795.24
Harvesting	860.08	1314.86	111.12	673.81
Establishment				
Land preparation	745.00	409.80	325.68	520.23
Planting	620.00	388.48	341.21	520.23
Mulching	682.11	628.59	420.78	269.08
Pest control	496.68	436.97	352.57	783.57
Fertilizer application	948.44	440.81	246.73	454.73

Source: Field survey, 2023

4.6 Output Quantity of FFB and selling price at Different Stages of Production

Table 4.6 shows the FFB harvested per hectare (bunches) and the selling price. Results shows at all ages the FFB harvested (Ha) and mean price was (1726.44 and ₦927.12), 3-8 years (1060.06 and ₦744.32), 9-18 years (1938.76 and ₦850.69) and above 18 years (1938.76 and ₦832.66). This indicates that at above 9 years the farmers harvested more FFB in the study area.

Table 4.6: Output (ha/year)

	3-8 years		9-18 years		Above 18 years		At all ages	
Variables	**Mean Quantity (Bunches)**	**Mean price (₦)**	**Mean Quantity (Bunches)**	**Mean Quantity (Bunches)**	**Mean price (₦)**	**Mean price (₦)**	**Mean Quantity (Bunches)**	**Mean price (₦)**
FFB harvested (Ha)	1060.06	744.32	1938.76	1726.44	927.12	850.69	1938.76	832.66

Source: Field survey, 2023

4.7: Profitability Analysis of Oil Palm Fresh fruit bunch production based on Their Age /hectare

The profitability analysis of FFB production is shown in Table 4.7. Several studies conducted by government and non-government research organizations show that a substantial number of palm trees are ageing or on the process of ageing, and therefore, there are higher chances that oil palm production is likely to decrease if adequate steps are not taken to replant these ageing trees in a timely manner. Oil palm trees potentially produce economically viable volumes of FFB. With a lifespan of more than 30 years, palm trees are likely to yield an amount FFB which is capable of incurring profit when cultivated commercially. Peak yielding period for a palm tree is between the age of 9-18, and in the subsequent period, yielding capacity gradually decline. It is estimated that currently a majority of total oil palm area is occupied by trees aged between 9-28+, while a significant 26 percent has crossed the pick yielding age. Government report shows that about 8 percent of the national crop area or palm trees in 365,000 hectares is currently 25-37 years old which is about 8 percent of the total crop area whereas a further 126,000 hectares of area has been predicted to be occupied by trees crossing peak yielding period. The increasing numbers of trees that are not suitable for the best harvest indicate an inevitable decline of national production in the future years. A long-term plan has been developed in order to replace old trees with new high yielding varieties (HYV) on an ongoing basis. The newly developed cloned varieties are also expected to fill the deficit of older trees. Delay in replanting older

cultivars will result in a bleak future of long-term deficit of having high yielding (Alam *et al.,* 2015).

The result shows that the income revenue for the farmers was ₦789020.82 for farm between 3 – 8 years. Table 4.5 shows ₦1649279.39 for 9 – 18 years. This indicate that the respondent in the study area tends to spend less compare the establishment period were they tend to spend more and ₦1384822.64 for farms older than 18 years of age. The results reveal a distinct increase in revenue as the palm trees mature. This suggests a positive correlation between tree age and revenue. Basiron (2007) suggested that one of the central factors influencing revenue is the maturity of the oil palm trees. Older trees produce larger and more FFB, resulting in higher revenue. Fairhurst and Hardter (2003) also opined that there is a substantial increase in FFB yield as the oil palm tree ages. The observed trend could also be attributed to the experience of the farmers. As the farmers stay longer in the business, they gain more valuable experience relating the various management practices like fertilization, pest control and irrigation, and all these can contribute significantly to FFB production.

The result also reveals that the purchase of fertilizer constituted the highest component of the total variable cost across all the age groups. The result interpretation highlights the significant role of fertilizer application costs in the overall variable cost components of oil palm fresh fruit bunch (FFB) production. It's also noteworthy that the purchase of fertilizer constitutes the highest portion of production cost across all

the age groups of oil palm trees: 3-8 years, 9-18 years, and above 18 years during establishment and maintenance.

The dominance of fertilizer costs in the variable cost components of oil palm FFB production is a critical finding that warrants further discussion. Fertilizer plays a pivotal role in enhancing oil palm productivity by providing essential nutrients. Its substantial presence in the total variable cost underscores its importance in ensuring healthy palm growth and FFB yield (Singh & Shukla, 2007). Also, the variation in fertilizer costs among different age groups of palm trees is significant. Younger trees (3-8 years) require relatively less fertilizer compared to older trees (9-18 and above 18 years). This cost difference can be attributed to the varying nutrient needs of palm trees at different growth stages. To maximize profitability, farmers need to carefully manage fertilizer application, especially for younger trees, to minimize costs while maintaining healthy growth. Practices like soil testing, precision application, and proper nutrient management can contribute to cost efficiency (Balasubramanian, 2016).

The gross margin and net farm income analysis show that oil palm trees between 3 – 8 years had ₦253619.18 and ₦-1422098.82; 9 – 18 years had ₦1311796.51 and ₦881644.71 ; and for those above 18 years had ₦1230167.34 and ₦392958.18 and at all ages had ₦1230167.38 and ₦392938.18. Several Nigerian authors have conducted research on the profitability of oil palm cultivation in the past. While specific studies may not directly mirror the age-based categorization in this analysis, they have generally acknowledged the positive correlation between palm tree age and

profitability. The study by Adewuyi and Alamu (2013) delves into the factors influencing smallholder oil palm production in Nigeria. While not categorizing profitability based on palm tree age, their work acknowledges that oil palm yields increase as the trees mature. This general consensus with the current study's findings is crucial in affirming the age-related profitability trend. Ogunniyi (2015) contributes to the discussion by analyzing the production efficiency in oil palm plantations in Nigeria. Although this study doesn't directly address age-based profitability, it underscores the significance of palm tree age in influencing oil palm production. Their work emphasizes that older trees tend to yield more FFB. The current study aligns with this notion and extends it to profitability analysis. Nwauwa (2011) focuses on sustainable oil palm production in Nigeria and highlights the importance of palm tree management practices. While not directly addressing profitability, the sustainability of oil palm cultivation is closely related to long-term profitability. Age-related profitability findings can be viewed in the context of sustainable practices, this implies than on every ₦1 spent on FFB oil palm production ₦0.64k losses during the 3-8 years of production while from 9-18 years every ₦1 spent on FFB oil palm production ₦1.15k is gained by each farmers, and > 18 years every N1 spent on FFB oil palm production N0.93 is gained by each farmers and at all ages of FFB production every N1 spent on FFB oil palm production N 0.33 is gained which means that oil palm production is profitable in the study are within age 9-18years.

Table 4.7: Profitability Analysis of Oil Palm fresh fruit bunch production based on Age per hectare per year

	3 – 8 years	9 – 18 years	Above 18 years	At all ages
Output (Revenue)	789,020.82	1,649,279.39	1,384,822.64	1,600617.053
Inputs (Costs) For Establishment				
Oil palm seedlings	49,048.15	16,863.64	46,285.71	37,399.11
Fertilizers	36185.12	10200.40	25723.77	26246.976
Herbicides	21938.43	30290.04	8097.50	17,476.495
Mulching	10640.99	30637.55	12120.20	21672.66
Land preparation	44700.15	10205.25	7207.50	9065.74
Planting	37200.17	13200.29	9254.20	11534.15
Pest control	7966.90	30925.44	20700.20	21764.063
Fertilizer application	29800.52	39537.09	27018.11	34944.10
Diesel (fuel)	28298.53	16520.63	16863.98	22,499.248
For maintenance				
Weed control	32502.00	30637.55	12120.20	21672.66
Pest control	9700.20	10205.25	7207.50	9065.74
Harvesting	27522.40	30925.44	20700.20	21764.063
Fertilizer	14802.61	6173.20	9200.67	7932.77
Herbicides	10950.46	16980.23	6759.64	14195.70
Transportation	34145.01	23514.21	24002.92	31,026.60
Land (rent)	140000	20666.67	57500	62189.59
Total Variable Cost (TVC)	**535401.6**	337482.9	310762	370449.7
Depreciated Fixed Cost (DFC)				
Cutlass	6936.37	8288.82	12848.67	9357.95
Hoe	8459.37	9610.27	8298.05	8789.23
spade/shovel	10367.52	8451.95	11116.81	9978.76
Axe	5520.6296	4959.0455	5200.5376	5226.44
Headpan	13756.41	7898.14	10393.29	10682.613
Files	14727.56	12909.05	13125.10	13,587.24
Wheelbarrow	16802.78	17331.91	14053.38	16062.69
Sprayer	4211.11	11692.09	7982.95	7962.05
motor bike	68,4328.58	92938.3118	145877.0000	307714.63

Table 4.7 cont'd

	3 – 8 years	9 – 18 years	Above 18 years	At all ages
Vehicle	257,693.12	134,723.67	109761.90	167392.91
extraction	627314.81	107348.50	64222.24	266295.18
machine				
Gallons	25,600.00	14,000.00	2938.571	14179.52
Total Fixed Cost	1,675,718.00	430,151.80	405,818.50	837229.2
	3 – 8 years	**9 – 18 years**	**Above 18 years**	**At all ages**
Total cost (FC+VC)	2211119.64	767634.68	716580.8	1207678.87
Gross Margin (GM = TR-TVC)	253619.18	1311796.51	1074060.34	1230167.38
Net Farm Income (NFI = GM-TFC)	-1422098.82	881644.71	668241.84	392938.18
ROI (Return on Investment)= NFI/TC	-0.64	1.15	0.93	0.33

Source: Field survey, 2023

4.8: Regression analysis factors affecting profitability of oil palm fresh fruit bunch production

This section examines the impact of certain production factors on the net profit. Table 4.8 shows the result of the regression analysis. The adjusted R is 0.998. The adjusted R-squared value of 0.998 in a regression analysis is a very high and strong indicator of the goodness of fit of the model. It suggests that the independent variables used in the regression analysis explain approximately 99.8% of the variation in the dependent variable, in this case, net profit in the context of FFB. An adjusted R-squared value of 0.998 indicates an exceptionally strong relationship between the chosen factors and net profit.

Table 4.8 provides valuable insights into the factors that significantly affect the net profit in the FFB. The result shows that total the revenue significantly affects net profit at $p<0.05$ and this is consistent with economic theory. Higher total revenue typically leads to greater net profit. This finding emphasizes the importance of revenue generation in enhancing profitability, and it aligns with the works of previous authors who have highlighted the direct relationship between revenue and profit in oil palm cultivation (Adewuyi & Alamu, 2013; Isiwu & Ijeoma, 2018).

The result shows that depreciation negatively affected the net profit (b = -0.989). The observation that depreciation has a negative impact on net profit is in line

with standard accounting principles. Depreciation represents the reduction in the value of assets over time and is considered an expense, which reduces profit. This finding underscores the need for prudent asset management to minimize depreciation costs (Ogunniyi, 2015).

It was observed that total number of oil palm trees had positive effect on the net profit as shown in the result. Although the number of oil palm trees had a positive effect on net profit, it was not significant. This suggests that while having more palm trees may contribute to higher profit, the relationship may not be strong enough to be statistically significant. Similar trends have been reported in previous studies, where the number of trees may positively influence profitability but is influenced by other factors (Adewuyi & Alamu, 2013).

The result also showed that the farm size had positive but not significant impact on the total net profit and similar result was also recorded for the age of the palm tree. The non-significant effects of farm size and the present age of palm trees on net profit indicate that while these factors may influence profitability, they may not be the primary determinants. Other variables, such as management practices and market dynamics, could be more influential in impacting profit. This finding resonates with research that emphasizes the multi-dimensional nature of oil palm profitability (Isiwu & Ijeoma, 2018).

Both depreciation and labour costs showed a negative impact on the net profit of the farmer. The negative impact of depreciation and labor costs on net profit is consistent with the principle of cost management. High labor costs can erode profit margins. These findings align with the works of researchers who have highlighted the importance of cost efficiency in oil palm cultivation (Santoso, *et al.,* 2015).

The findings in this study reinforce several established principles in the economics of oil palm cultivation. They demonstrate that factors such as depreciation and cost management play vital roles in determining net profit. While the number of oil palm trees, farm size, and palm tree age may have an influence, their significance varies, highlighting the complexity of factors influencing profitability. These results are in harmony with the works of previous authors, which collectively contribute to a comprehensive understanding of the economic aspects of oil palm production in Nigeria.

Table 4.8: Regression analysis of the profitability of FFB.

Variables	Coefficient	Standard error	t-value	Decision
Constant	-1028157.094	681162.438	-1.509	NS
Depreciation on asset	-.477	.214	-2.229	NS
Number of palm stands per ha	9.086	26.878	.338	NS
Farm size(ha)	22040.260	22389.565	-.984	NS
Ages of oil palm	26996.366	30662.069	.880	NS
Total FFB harvested (tons)	-1.406	6.338	.222	NS
Labour cost	-.005	.079	-.062	S

Source: Field survey, 2023 NS- Not Significant, S- Significant

4.9 Constraints to oil palm FFB production in the study area

The result in table 4.9 shows that among oil palm FFB farmers in the study area, the major constraints faced were difficulty in obtaining credit facility ($\overline{X}$= 4.67), lack of funds (X =4.61), high cost of processing (X =4.25), lack of improved planting materials (X =4.24), inadequate land (X = 4.07), inadequate modern equipment (X =4.03) lack of processing machines (X =3.94) high cost of labour (X =3.89), poor access to good road in transporting product (X - 3.83), lack of extension contact (X =3.77), lack of inputs (X =3.73), low storability (X =3.43), pest and diseases (X =3.41) poor yield (X =3.83), low adaptability (X = 3.20), poor marketing (X =3.07), poor branding (X =3.00) while poor product quality (X =2.94) and rate of seedling death (X = 2.89) showed the least problems faced in the study area. This shows that majority of the respondents in the study area faced difficulty in obtain8ing credit facility as their serious constraints. This is inline with Soyebo *et al.,* (2005) who reported that lack of land, funds and inadequate information about oil palm cultivation were their major problems confronting the farmers in his work on farmers growing trees crops in Imo state. Also Ihenacho *et al.,* (2020), stated that problems facing oil palm production were lack of adequate land space, inadequate storage facilities and inadequate finance which results in low production of oil palm in Imo state.

Table 4.9 Constraints to oil palm ffb production in the study area

	Mean	Std. Deviation	Rank
inadequate land	4.07	1.171	1
lack of fund	4.61	.490	1
difficulty in obtaining credit facility	4.67	.473	1
lack of improved planting materials	4.24	.842	1
lack of inputs	3.73	1.141	2
unfavourable climate change	3.04	1.345	2
inadequate modern equipment's	4.03	1.191	1
low storability	3.43	1.149	2
lack of processing machines	3.94	1.226	2
high cost of processing	4.25	1.035	1
high cost of labour	3.89	1.057	2
poor yield	3.23	1.169	2
poor marketing	3.07	1.243	2
pest and diseases	3.41	1.210	2
rate of seedling	2.89	1.346	3
lack of extension contact	3.77	1.406	2
low adaptability	3.20	1.325	2
poor access t good road in transporting product	3.83	1.274	2
poor branding	3.00	1.216	2
Poor product	2.94	1.141	3

Source: Field Survey, 2023

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

The study analyzed the profitability of oil palm fresh fruit bunch (FFB) production in Uhunmwonde Local Government Area, Edo State, Nigeria. The study specifically described the socio-economic characteristics of the respondents in the study area, estimated the inputs and output quantities of oil palm FFB production in the study area, estimated the costs and returns of oil palm FFB production and its profitability at different ages of the palms in the study area, examined the factors affecting profitability of oil palm FFB production in the study area and identified the constraints faced by respondents in the study area. A two-stage sampling procedure was adopted in selecting the respondents for the research. 109 copies of questionnaire were sent to the field to collect primary data and 70 copies were retrieved back and analyzed using descriptive statistics and quantitative techniques. The study showed that the oil palm produces were mainly male (71.4%), with a mean age of about 48 years and formal educational background. Oil palm FFB was found to be most profitable at the age range of 9-18years with an estimated net farm income of N881644.71 and there was profit for palm younger than 8 years at the gross margin level with an estimated gross margin of N253619.18 but the net income was negative meaning a loss in the long

run. The profitability decline at above 18 years, at all ages oil palm FFB production was profitable with an estimated net income of 392938.18 and a return on investment of 0.33. The adjusted R-squared value of 0.998 showed that the independent variables used in the regression analysis explained approximately 99.8% of the variation in the dependent variable, in this case, net profit in the context of FFB. The major constraints faced by the oil palm farmers were difficulty in obtaining credit, lack of funds, lack of extension contact, inadequate land and lack of improved materials.

5.2 Conclusion

The profitability of fresh fruit oil palm at different ages of production depended on various factors such as the yield, production costs, and the age of the palm. 3-8 years during this age, oil palm trees bears fruit, but the yield is relatively low. However, the profitability can still be ensured by optimizing production practices and reducing costs. At age 9-18 years the productivity of oil palm trees increased significantly during this stage, resulting in higher potential profitability and above 18 years the productivity of oil palm trees starts to decline during this age, and the profitability may decrease compared to 9-18 years.

To sustain profitability, farmers should focus on minimizing costs, improving efficiency in harvesting and processing operations, and implementing effective rejuvenation techniques such as replanting and proper replanting strategies.

5.3 Recommendation

Based on the findings in cause of the study and survey it is therefore recommended that

1. Government, stakeholders and private investors should encourage farmers to practice more of mechanized farming as it will help in reducing the cost of labour and increase productivity.
2. Government, stakeholders and private investors should grant access to credit facilities as this will boost their FFB production.
3. Government, stakeholders and private investors should encourage farmers to make contacts with the extension agents in order to gain more knowledge and skills to improve production.

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QUESTIONNAIRE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION SERVICES
FACULTY OF AGRICULTURE,
UNIVERSITY OF BENIN,
BENIN CITY, NIGERIA

Dear Respondent,

I am a final year student of the above named institution carrying out a research on the above project topic. **" PROFITABILITY ANALYSIS OF OIL PALM FRESH FRUIT BUNCH PRODUCTION IN UHUNMWONDE LGA, EDO STATE, NIGERIA."**. I wish to request for your timely co-operation by completing this interview guide and the information which would be obtained through this interview schedule will be treated in absolute confidence and for research only.

_____

_____

MEMEH JESSICA

Researcher

Thanks and God bless.

Instruction; Please tick or fill in the required information where appropriate.

A. SOCIO –ECONOMICS CHARACTERISTICS

1. Age (years): ……
2. Sex: a. Male ( ) b. Female ( )
3. Marital status: a. Single ( ) b. Married ( ) c.Divorced ( ) d. Widowed ( ) e. Separated ( )
4. Religion: a. Muslim ( ) b. Christian ( ) c. Traditional ( ) d. Others (specify).....
5. Primary occupation a. Trading( ) b. farming ( ) c. Civil servant ( ) d. others specify……
6. Level of education: a. Non formal education ( ) b. Primary education ( ) c. Secondary education ( ) d. OND/HND ( ) e. BSc ( ) f. others,specify ……..

7. Source of capital: a. Banks ( ) b.Cooperative society ( ) c. Government ( ) d. Others (specify)
8. Source of finance; a. Personal savings ( ) b. Friends and relations ( ) c. Cooperative and osusu ( ) d. Trade unions ( ) e. Banks ( )
9. If credit, indicate the source(s) amount borrowed and interest charged

Source	Amount borrowed (annual)	Interest charged
Cooperative		
Microfinance bank		
Osusu/trade union		
Friends/relations		
Banks		
Government		
Others please specify		

10. How long have you been in farming? ……
11. What is your cropping system? Monocropping ( ) Mixed Cropping ( )
12. If mixed cropping, please specify other crops grown_____
13. Do you belong to any association/society? Yes( ) No ( )
14. If yes, what is yours benefit? (a) school fees (b) House (c) land (d) car (e) others please specify…… ……..
15. If No, why don't you belong? ……

SECTION B: OIL PALM PRODUCTION

16. What is your total oil palm farm size? _____ hectares.
17. Method of land acquisition: Purchased ( ) Rented ( ) Communal ( ) Family land ( ) Government ( ) lease ( ) inheritance ( ) gift ( ) others ( ) specify_____
18. If rented, how much is the rent per annum? ₦_____
19. If purchased at what cost? ₦ _____
20. How long have you been cultivating oil palm on the land? _____
21. What is the total number of bunches of Oil palm FFB harvested from your farm land annually? ……..
22. Average weight per Fresh Fruit Bunch in kilograms?_____
    price per bunch? _____ price per tonne?_____

23. What is the present age of FFB oil palm (year)? _____
24. At what age did the FFB oil palm commenced fruiting (year)? _____
25. What are the number of oil palm stands in one hectare?_____
26. Cost of variable inputs used in Oil palm production per ha/per year

Inputs for farmers for yearly maintenance	**QUANTITY PER HECTARE**	**COST PER UNIT**
Rent on land		
Transportation		
Storage		
Fertilizers		
Herbicides		
Others please specify		
Establishment inputs		
Oil palm seedlings		
Fertilizer	(kilogram)	
Herbicides	(liters)	
Land (rent)		
Water		
Stacks		
Bags	(numbers)	
Water		
Fuel (Diesel)		
Others please specify		

SECTION C: LABOUR

27. Source of Labour: Individual ( ) Family ( ) Hired ( ) Both Family & Hired ( ) Community labour ( ) Others ( ) Please specify……

28. Cost of Labour for each Farm Operations in your farm per production cycle.

Labour inputs for yearly maintenance	**Number of hours per day**	**Number of days for each operation**	**No. of Workers per day**	**Please, specify no of children, adult male and adult female used per day**	**Cost per worker per day**	**Remarks**
Weed control						
Pest control						
Harvesting						
Others specify						
Labour operations during establishment						
Land Preparation						
Planting						
Mulching						
Pest control						
Fertilizer application						
Staking						
Transportation						
Others specify						

SECTION D: EQUIPMENT

29. Fixed input used:

ITEM	NUMBER	UNIT COST	Depreciation/ life span
Cutlasses			
Hoe			
Spade/shovel			
Axe			
Head pan			
Files			
Wheel barrow			
Sprayer			
Motor bike			
Vehicle			
Extraction machine			
Gallons			

SECTION E: CONSTRAINTS FACED IN OIL PALM PRODUCTION

Constraints	Very Serious	Serious	Undecided	Not very serious	Less serious
Inadequate Land					
Lack of Fund					
Difficulty in obtaining credit facilities					
Lack of improved planting materials					
Lack of inputs					
Unfavourable climate change					
Inadequate modern equipments					
Low storability					
Lack of processing Machines					
High cost of processing					
High cost of labour					
Poor yield					
Poor marketing					
Pest and disease attack					
Rate of seedling death					

Lack of extension contact					
Low adaptability					
Poor access to good road in transporting product					
Poor branding					
Poor product quality					