APSTRACT

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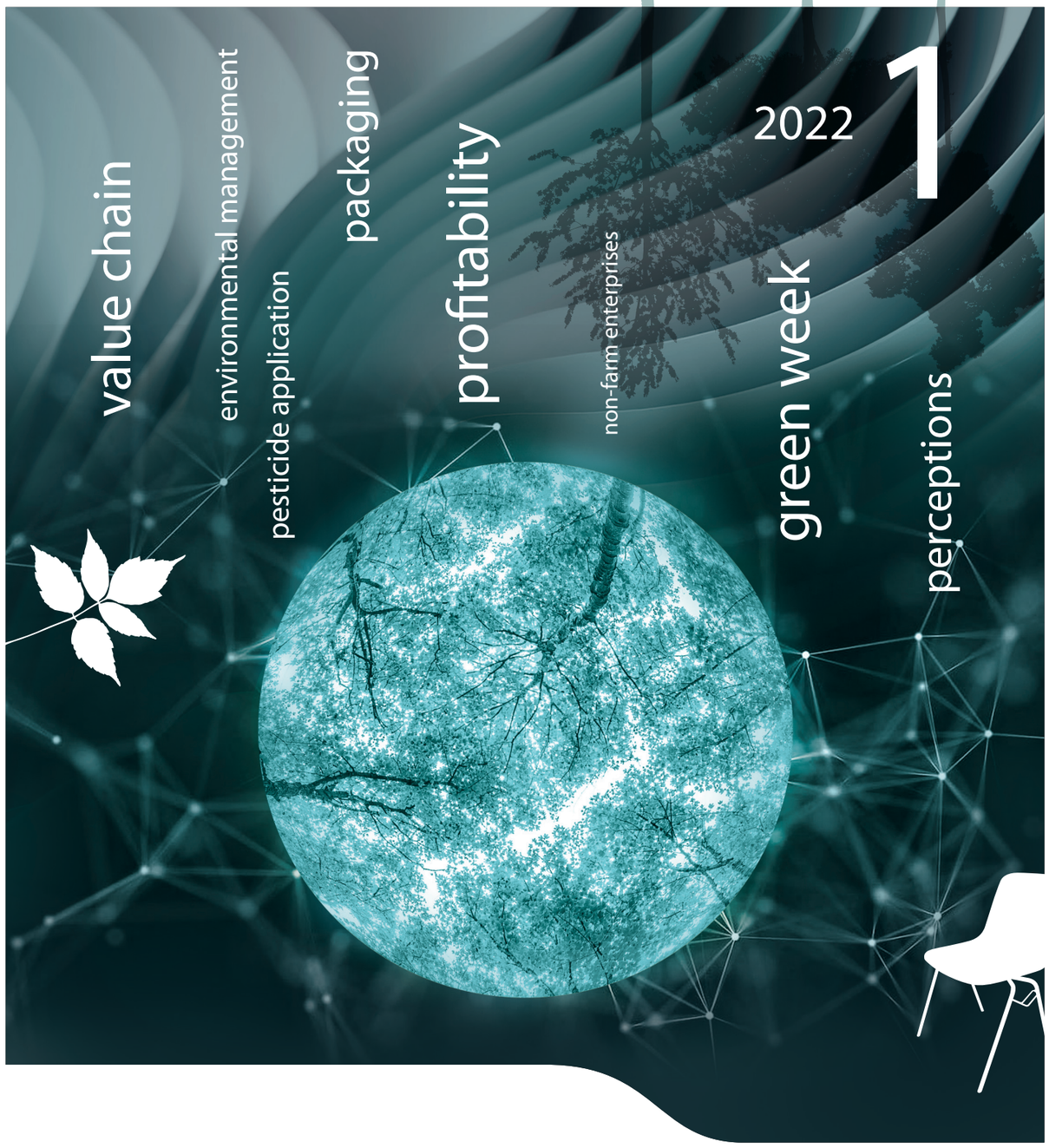

Applied Studies in Agribusiness and Commerce

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VALUE CHAIN ANALYSIS OF SESAME (SESAME INDICUM L.) IN SOUTH OMO ZONE, SOUTHERN ETHIOPIA

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Abstract: *Sesame is the main cash crop in Ethiopia and it is mainly produced in northern and southern part of the country especially South Omo Zone. In the zone sesame is highly produced, but it production is not known regionally and at a country level. So this study was aimed to research sesame value chain of the Zone. Simple descriptive statistics and value chain approach were employed for data analysis during this study. It attempts to deal with mapping and identifying sesame value chain actors and their roles, examines marketing channel, cost margin structure and assessing challenges and opportunities within the study area. The results of the study indicated that out 5589.3 quintals were supplied to markets for various actors and five alternative marketing channels were identified to transact the sesame product through intermediaries. The most important volume of sesame (4900.8 quintals) was marketed through channel V and the lowest volume in channel I. producers get the highest share in channel IV and the lowest in channel II. Barriers to entry traders into the market are that the capital requirement and therefore the wholesalers govern by volume transacted and internal control criteria within the market. Fertile land and high demand for the product were essential opportunity. Pests and disease, Low level of input utilization, Shortage of input supply and high price of inputs were the challenges of sesame production whereas lack of market information, price variability, delay of buyers, low bargaining power and poor product quality were the challenges sesame marketing.*

Keywords: *Sesame marketing, Value addition, Value chain and Value chain actors*

INTRODUCTION

Globally, the top five largest sesame producers are Myanmar, India, China, Sudan, Uganda and Ethiopia (Girmay, 2018). Evidence also indicated that Ethiopia ranked one of the 3rdhighest sesame producer country in Africa (Hagose, 2017). In terms of oilseed export potential, Ethiopia is the third world exporter of sesame seeds after India and Sudan (Temesgen et al, 2017). Among the main export commodity sesame is the second major export cash crop in Ethiopia, next to coffee (Abebe, 2016). But sesame marketing in Ethiopia in general and in South Omo Zone in particular is hampered by a variety of constraints (FAO for United Nations, 2015).

Ethiopia is among the top five producers of oilseeds within the world. Sesame is among one of the oilseeds that Ethiopia is understood for within the international market. Within the previous couple of years, sesame production and marketing have shown very significant growth. Between the years 1998 and 2005- 2006, the entire area of production and therefore the quantity of sesame produced has grown threefold. As a serious producer of sesame, Ethiopia stands fourth within the global sesame market following China, India, and Burma, respectively and national sesame production has quite doubled within the past 5 years. Ethiopia exports most of its products and is poised to become one among the highest two leading sesame-exporting countries within the world, with a rapidly growing export performance in recent years, destined for markets in middle east like China, Japan, Korea, Israel, and Turkey. Sesame is the major oilseed crop produced in terms of exports in Ethiopia, accounting for over 90% of the values of oil seeds exports (ATA, 2014).

In the Southern Ethiopia Nations and Nationalities Peoples Regional State, specifically, areas located within the gorges of Gibe, Gojeb and Omo rivers and Hot to warm submoist and rift valleys are identified areas for sesame cultivation in which the production of sesame in South Omo Zone is not known nationwide. (Herald newsletter, September 2004 E.C). This study is especially focused on the sesame marketing value chain analysis within the South Omo Zone within the Southern nation nationalities regional state in which there is the highest production in the region but not known nationwide. The product of sesame from the Zone collected by local

collectors and exported to the central market of Addis Ababa and mixed with the products from other parts of the country. So among the available marketing study approaches, the commodity approach is used thanks to its combination nature of both functional and institutional approaches.

Because the worth chain is beneficial for identifying and categorizing input used, key producers, market players, supporting organizations and final consumers of the produce. The worth chain also illustrates different market channels that a product takes before reaching the ultimate consumer. Therefore this study is aimed to identify and map different actors within the value chain of sesame and various activities they perform, to identify and map the major destinations of Sesame in South Omo Zone and to identify the main constraints and opportunities of sesame production and marketing within the area.

MATERIALS AND METHODS

Study area and data collection

The study was conducted in two potential sesame producing districts of South omo zone. The study areas were namely Salamago and Bena-Tsemay districts. Salamago district is comprised 37% midland altitude and 63% of the area is low land with annual temperature which ranges from 20 to 37.5°C. The average altitude of the district is 971 m and receives bimodal rainfall, in which the long rainy season is in the months of March to June, while the short rainy season occurs in the months of August to October (Alemayehu Mulugeta and Tezera Getahun, 2002).

Whereas Bena-Tsemay district is comprised (19%) Weynadega, (78%) kola and (3%) semi-arid with the mean annual temperature ranges between 17.6 °C and 27.5 °C. The altitude of the district ranges between 500m.a.s.l and 1558 m.a.s.l. and receives bi-modal rainfall distribution; the first peak, from mid-March to the end of April, is important for crop production, and the second peak, from mid-October to the beginning of November, is short and important only for pasture (Admasu et al., 2010). The two districts are the main potential producers of sesame in the Zone, in which their product is exported to Addis Ababa and then to foreign countries, but the product from the area is not differentiated and known at the national level.

Data type and source

Both Qualitative and quantitative data were collected from primary and secondary data sources in the study area. Primary data were collected from sesame producer farmers, traders, and processors. Whereas Secondary data were collected from the districts Agriculture and Natural Resource Management offices, Jinka Agricultural Research Center (JARC), Ethiopian Commodity Exchange (ECX) authority, nongovernmental organizations involved in sesame research in the study area as well as works of literature, reports, documents both from published & unpublished data sources.

Sampling procedures and Sample size

Multi-stage sampling techniques were employed to draw sample respondents. In the first stage, potential sesame producing districts were selected purposively from the Zone. In second stage, from each selected districts, two Kebeles were selected purposively supported sesame producing potential. Following to the present, sample size determination formula of Yamane (1967), which described below was wont to determine the sample size

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

Where, n = the sample size, N = total number of households, e = acceptable sampling error and therefore the value of 'e' is determined assuming 95% confidence level and it is e = 0.05. Sample size from each kebele was taken by using stratified sampling technique to the population size and eventually N = 126 sample respondents were selected using simple sampling method.

Method of data collection

Both formal and informal survey techniques were wont to implement this study. Regarding the formal survey, a structured questionnaire was developed and employed over the sampled households to gather data. On the opposite hand, some informal survey tools like FGD, KII were wont to generate data from the elders who know deeply the world during which he/she lives in it. In each Kebele, a complete of about 8-12 elder members participated in FGD during the survey time.

Methods of data analysis

The collected data were analyzed by simple descriptive data analysis methods. The descriptive methods such as mean, percentage, frequency and chain map were used. Analysis specifying the functions of each actor across sesame value chain described under the map. Economic parameters were used to analyze gross margins and producers share across the chain.

Marketing margin

Marketing margin of a given agricultural commodity is referred as the difference between purchase price and sale prices of the commodity through its marketing channel. Gross margin is calculated by dividing the gross income of the commodity or gross profit to the revenue earned from sales of the commodity. Then, multiply by 100 to give a percentage. The gross marketing margin (GMM) of sesame is given as:

$$\text{GMM} = \frac{\text{End buyer price - Seller price}}{\text{End buyer price}} \; x\; 100 \text{ - - - - - - - (1)}$$

The net marketing margin (NMM), which is the percentage of the final price earned by the intermediaries as their net income after their marketing costs are deducted, and is calculated as:

$$NMM = \frac{\text{Gross margin- Marketing costs}}{\text{End buyer price}} \; x\,100 \text{ - - - - - - - (2)}$$

The above equation tells us that a higher marketing margin along the chain diminishes the final producer's share and vice versa. This also provides information about welfare distribution among producers and marketing agents in the chain.

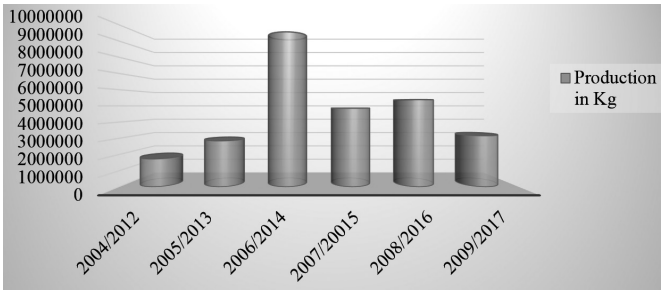
RESULTS AND DISCUSSION

Sesame production

In the year 2010/2011 cropping season, the total land under sesame production reaches 384,682 hectare and a total of 327,740.92 ton of benniseed has produced within the country (CSA, 2011). Despite, the production trends of sesame in 2011/2012 production year, its production and area under cultivation has declined by from 25.31% to 12.26%, compared to the preceding year. Accordingly, only 337,505.41 hectare of land has covered under sesame production and only about 2,447,833.59 quintal of output was produced, (CSA, 2012). This means not only the area under sesame cultivation and its production volume was decreased, but also the crop yield too decreased from 8.52 quintal/hectare in the year 2010/2011 to 7.25 quintal/hectare in the year 2011/2012, it declined by 14.9% (CSA, 2012).

Sesame is usually grown as a smallholder crop, and a serious aim was to extend yield or oil-content selectively within local cultivars within the context of sesame's place in local crop rotations. A serious drawback of local cultivars is that the mixture of colors in any seed sample, which reduces its commercial value. Selection within local sesame in Sudan showed that within a kind producing seed of 1 predominant color several strains might be isolated. These gave a highly variable yield, indicating that separation not only ensured the purity of seed color but by eliminating low yielding elements appreciably increased potential yield. Cultivation required for other crops like wheat, sorghum or similar small grains is suitable for sesame. Level lands are important to make sure even depth of planting, and lands could also be ridged to help drainage in areas where high-intensity storms are common. Seed quality is seldom a serious factor limiting yield and doesn't become important until the overall agriculture is raised. A serious agronomic factor-influencing yield is plant population, and for optimum yield, this must accurately be determined by trails with local cultivars and can differ if rain-grown or irrigated. Smallholder sesame is sown by hand and therefore the small seeds are often mixed with sand, soil or ash to extend the quantity and assist even distribution.

Figure 1: Production trend of sesame



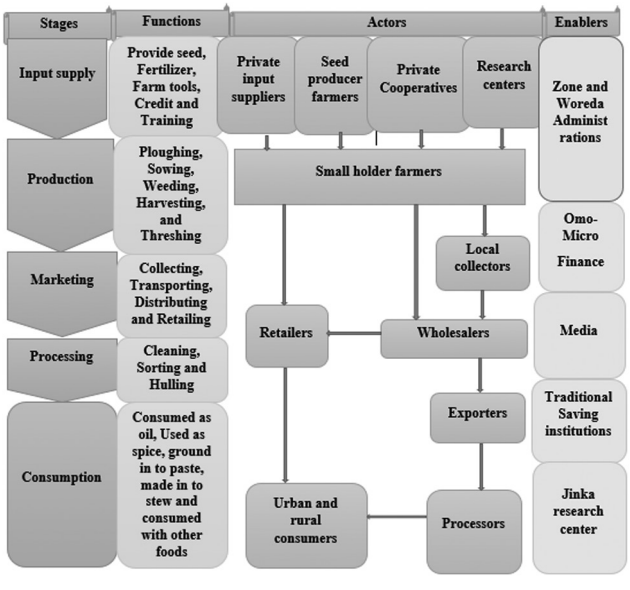
Source: Zonal agriculture and natural resource management office, 2020

The production of sesame in six consecutive years ranging from the year 2004/2012 up to 2009/2017 is shown in (Fig 1) above, supported this the quantity of sesame produced in 2004/2012 production year is 1733700 kg, which is that the lowest and within the years 2005/2013, 2006/2014, 2007/2015, 2008/2016 and 2009/2017 production years were 2845359 kg, 9564886 kg, 4855365 kg, 5391886 kg and 3163000 kg respectively. The very best amount of sesame was produced within the year 2006/2014 production year (unpublished Zonal agriculture and natural resource management office, 2020).

Sesame value chain map of the south omo zone

Value chain map is a potential starting point for the inclusion of actors in the chain such as; producers, traders, consumers, and other stakeholders in the chain (Lundy et al., 2014). Hence, value chain map used to start to present our results by mapping of the sesame value chain in the study area. The value chain map described in (Fig 2) cannot only applied to the study area but also be for the nation as a whole because sesame production, processing, and marketing situations are almost similar in all regions. The map involves functions undertaken by the actors and other service providers in the whole value chain.

Figure 2: map of the sesame value chain



Source: Survey data result, 2020

Main actors in sesame value chain

There are various actors in the sesame value chain. These include actors such as; producers, small traders (collecting middleman), Wholesalers/brokers, oil millers, retailers, local consumers, and exporters. They can be those that are directly involved in the value chain or indirect actors who provide financial or non-financial support services.

Input suppliers: - Input suppliers are those including private input suppliers, seed producers, primary cooperatives and research centers that supply essential agricultural inputs such as seed, fertilizers, farm tools, credit and training to the small scale farmers to increase the production and productivity of sesame.

Producers: - Producers are those small scale farmers who receive input from input suppliers, plow their farm properly, sow seed, weed their farm, harvest, thresh and sell their product to retailers, local collectors and wholesalers.

Local collators: - Are small scale trading individuals, who collect the product directly from small scale farmers and resell to wholesalers. They act as a middleman between producers and wholesalers who do not add value to the product. This includes farmer's cooperatives and unions who involved in sesame collection.

Wholesalers: - Wholesalers are larger suppliers who have better capacities in terms of finance and other facilities. They resell the sesame seeds to exporters and processors.

Retailers: - Retailers buy the final products produced from sesame like oil and distribute to the customers or final consumers. They are registered officially for a certain line of products.

Exporters: - Exporters are business professionals who prepare and manage the shipment of sesame products produced domestically to other countries. In most cases, an exporter work with the buyer to process the order, then schedules the shipment and ensures that all the relevant paperwork associated with the process is properly filled.

Processors: - processors are those who participate in the Cleaning, Sorting, Hulling and extraction of Oil and other by-products from sesame.

Consumers: -consumers are the final or end-users of the sesame product in the form of Oil.

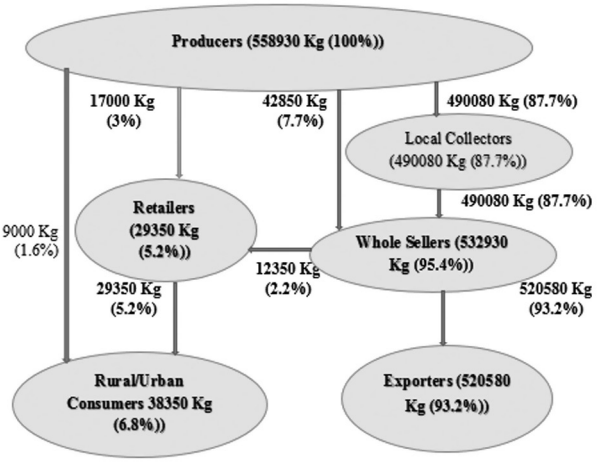
Sesame market channel

In the study area 5 alternative frequently transacted marketing channels were identified. The identified market channels were:

Channel I Producers ⟶ Consumers (90 quintals)
Channel II Producers ⟶ Retailers ⟶ Consumers (170 quintals)
Channel III Producers ⟶ Wholesalers ⟶ Retailers ⟶ Consumers (123.5 quintals)
Channel IV Producers ⟶ Wholesalers ⟶ Exporters (428.5 quintals)
Channel V Producers ⟶ Local collectors ⟶ Wholesalers ⟶ Exporters (4900.8 quintals)

Regarding channel comparison using volume of transaction from farmers' hand through traders as shown above, channel V carried the most important volume 4900.8 quintals thanks to the high capacity of local collectors directly purchased from farmers and passes through whole sellers' intermediaries to exporters. The littlest volume of sesame was skilled channel I about 90 quintals. This was thanks to the tiny capacity of consumers in rural village markets purchased smaller quantity for consumption. Farmers sold 428.5 quintals of sesame to their wholesalers and 170 quintals passes through retailers to consumers and 123.5 quintals passes through retailers' intermediaries to consumers.

Figure 3: Map of the sesame market chain



Survey data result, 2020

Marketing costs and margin

Market channel comparisons in margin distribution were mad among major value chain actors. Consistent with Mendoza (1995) computing the entire Gross Marketing Margin (TGMM) is usually associated with the ultimate price paid by the top buyer and expressed as a percentage.

Table 2: Marketing costs and margins analysis at different marketing channels

Marketing margin analysis	Sesame marketing channels			
	Channel II	Channel III	Channel IV	Channel V
Producers price	2140	2600	3210	2720
Traders Price	3026	3445	3852	3625
Gross margin	886	845	642	905
Marketing cost	45	85	105	115
Net market margin	841	760	537	790
Producers share	70.72%	75.5%	83.33%	75.03%

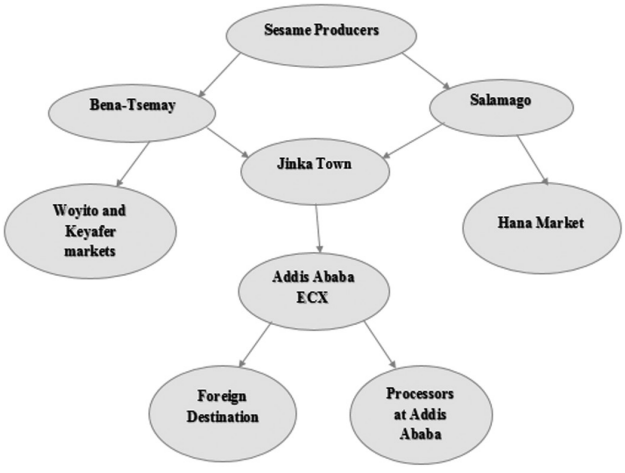
Source: Survey data result, 2020

Marketing costs and margins were calculated for the channels through which sesame were passes. The producers share in channel II, III, IV and V were 70.72%, 75.5%, 83.33% and 75.03% respectively. Producers get the highest share in channel IV which is 83.33% and the lowest share in channel II which is 70.72%. This means the involvement of intermarries between producers and wholesalers or exporters lower the share of producers, so the producer sells their product through the right channel from which they get the highest share. This means producers sell their produce to whole sellers, then directly from whole sellers to exporters.

Marketing destinations of sesame

Farmers in Ethiopia mainly produce sesame for the export market (Alemu and W.Meijerink, 2010). Salamago and Benatsemay districts are the main sesame producing areas in South Omo Zone (Fig 4).

Figure 4: Market Destinations of Sesame in South Omo Zone



Source: Survey data result, 2020

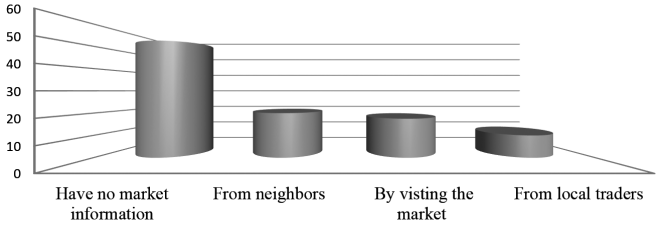
At the point of production sesame were collected by local collectors and transported to Jinka town, then traders transport from Jinka to Addis Ababa ECX warehouse. Currently, the main Ethiopian sesame imported countries are China which is the largest import market for Ethiopia's sesame followed by Israel, Turkey and Jordan in 2011, respectively (Ethiopia Revenue and Custom Authority, 2012), and some of the sesame seed processed at Addis Ababa in domestic industries. At the point of production small amount of sesame were also sold at local markets to consumers, who locally consume in different forms.

ACCESS TO MARKET INFORMATION AND OTHER SERVICES

Access to market information

Market information is crucial for agricultural products marketing. So reducing information gap and uncertainties that exist in the agricultural sector is very important. It's required by producers in their planning of production and way of marketing the product.

Figure 5: farmers access to market information



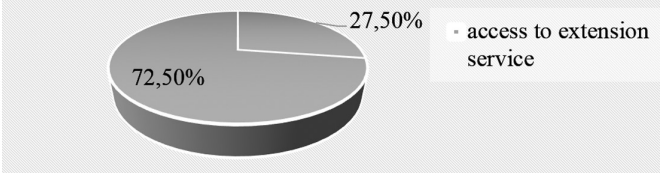
Source: Survey data result, 2020

Out of the total respondents, 52.5% do not have market information, while 20%, 17.5% and 10% of the sample respondents get market information from their neighbors, by visiting the market, and from local traders respectively. As indicated the majority of sample respondents in the study area have no market information. This has resulted in the low bargaining position of farmers due to lack of adequate market information. Sesame is the main export commodity that requires the dissemination of regular market information on regular bases.

Access to extension service

Access to agricultural extension services is expected to have a direct influence on the production and marketing behavior of the farmers. The higher farmers have access to extension service, the more likely that they adopt new technology and innovation.

Figure 6: farmers access to extension service



Source: Survey data result, 2020

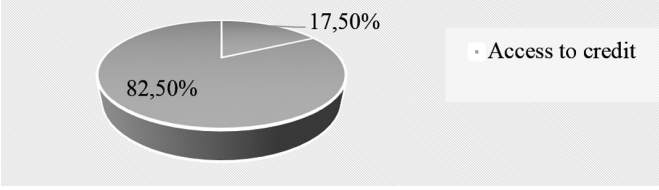
The result of this study indicates that out of the total respondents of sesame producing sample households, about 27.5 % of sesame producers had access to extension services provided by development agents of the kebele. The remaining 72.5% of sesame producing sample households responded that they did not receive any extension services from development agents.

Access to credit

Access to credit is one way of improving smallholder farmer's production and productivity. Farmers' ability to purchase inputs such as improved seed and fertilizer is tied with access to credit. Farmers having access to credit service can minimize their financial constraints and buy inputs more readily than those with no access to credit. Thus, it is expected that access to credit increases the production of crops in general and sesame in particular. Farmers access to credit from for-

mal institutions (banks, MFI, and cooperatives) and informal sources (Iqub, trader friends, relatives, and money lenders). Governmental and non-governmental institutions also provide credit to farmers.

Figure 7: farmers access to credit service



Source: Survey data result, 2020

Figure 7 above shows that only 17.5% of sesame producing farmers reported that they had access to credit while the remaining majority (82.5% of sesame producing sample respondents) reported that they have no access to credit to buy input that can be used for production like improved seeds and fertilizer. According to the sample respondent's response, access to credit is influenced by a lack of awareness creation and a negative attitude of farmers for credit access.

Transportation and access road

Ethiopia has a good main road infrastructure, although with 21 to 31 km/ 100,000 ha the road density is quite low considering the African average of 50 km/ 100,000 hectare (Winands, 2007). However, in the study area a little investment is made to improve further the road infrastructures.

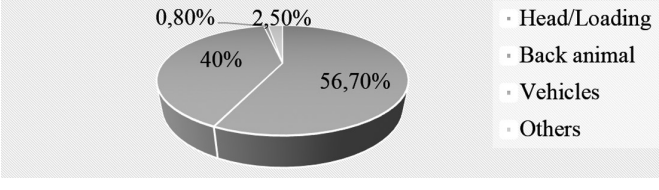
Table 3: Access road

Variables	Mean	Std. Dev
Distance to main road (in hours)	2.28	2.69
Distance of your residence to the nearest market (in hours)	2.50	2.93
Distance of your residence to the nearest development center (in hours)	2.67	2.95

Source: Survey data result, 2020

The mean distance in hours from the producing area to the main road, to the nearest market, to the nearest development center is 2.28 hours, 2.50 hours and 2.67 hours respectively with corresponding standard deviation 2.69 hours, 2.93 hours, and 2.95 hours respectively.

Figure 8: Means of sesame transportation



Source: Survey data result, 2020

The mean distance in hours from the producing area to the main road, to the nearest market, to the nearest development According to the survey 56.7% of total sample respond that the transport of sesame from the producing area to the nearest market and woreda market of the zone, is mainly done by head/loading, 40% respond that they transport by pack animal whereas 0.8% by vehicle and 2.5% by others

Barriers to entry

The commonly known barriers to entry in the market in the study area are lack of capital, licensing and lack of access to road. From the respondents of sesame traders, trading license is the main important factor to enter in to trading of sesame. The traders residing in the town have grain trade license whereas the farmer traders, who reside in rural markets had no grain trade license. According to the survey result 77.5% of the sample traders indicated that lack of capital is one of the major constraints to enter trading. Lack of access to credit has been the single most constraint in startup. More over the remaining 22.5% of traders said that lack of access to road is the main problem, which needs series attention.

MAJOR CHALLENGES AND OPPORTUNITIES IN SESAME PRODUCTION AND MARKETING

Major challenges in sesame production and marketing

The major challenges in sesame production and marketing are identified as follows in the study area. Pests and disease during production, Drought, and Shortage of rainfall, Low productivity, Flood, Lack of improved seed or Low level of input utilization, Shortage of input supply, High price of inputs, Unexpected rain during harvest, Buyers come only during harvest, The need for cash during harvest, Price declines later, Fear of weight loss if stored, Fear of color change if stored, Thefts, Storage Pests, High postharvest loss, Lack of information on quality standard, weed problem, price fluctuation, Lack of loan service, Lack of updated market information, Insufficient or limited rural roads and transports, Limited modern market centers and Insufficient postharvest technologies, are the major problems faced by producer households in sesame production and marketing in the study area. Besides this, Lack of advanced value addition technologies and Lack of awareness and skill of value auditing activities are some of the problems related to sesame value addition

Major opportunities in sesame production and marketing

In the study area the better Opportunities for producers were; Availability of fertile land, less usage of chemical fertilizer, Low cost of production, Suitability of the environment, High demand for the product for traders or local collectors were Availability of the production and Better supply and

Market potential for domestic and export. Sesame is the most important oil seed export crop in Ethiopia and its contribution to foreign exchange earnings in the country has been increasing over the years. High demand for the product, Market potential for exports are better opportunities for sesame Exporters and High demand for processed products and Employments, High demand for quality oil is better opportunities for sesame Processor.

CONCLUSION AND RECOMMENDATION

Conclusion

Results from value chain analysis approach showed that input suppliers, sesame producers, local collectors, retailers, wholesalers, processors and consumers were the main sesame value chain actors identified in the study area. These actors play their significant roles in the value chain. Producers in the study area have different alternative marketing channels, but disproportional flow of costs and benefits was observed. Among alternative marketing channels the producers share is highest in channel IV which is 83.33 % and lowest in channel II which is 70.72% respectively. In channel IV producers sell their produce directly to exporter but in channel II there is the interference of local collectors that lowers the producers share.

On the other hand the highest volume of product were pass through channel V which is 490.08 quintals when producers sell their product to local collectors, local collectors collect the product and sell it to wholesalers then wholesalers sell to exporters and the lowest volume pass through channel I when producers directly sell to consumers. The market destinations of sesame is local collector collect from farm gate and transport to woreda cities, then from woreda cities to zonal city Jinka, the from Jinka to Addis Ababa, then finally they mixed with the products that game other places in Ethiopia and export to foreign countries. The problem here is the zone is potentially known in sesame production, but nationally not known do to mixing up of the product with products from other at Addis Ababa. The main barrier to entry traders into the market is the capital requirement and the wholesalers govern by volume transacted and quality control criteria in the market. Production and marketing opportunities were identified include conducive environment, fertile land and reduce use of chemical fertilizers as well as presence of potential sesame producers and suppliers in the study area, High demand for the product and Market potential for exports were the basic opportunity for traders business in the value chain. Pests and disease during production, Shortage of rainfall, low productivity, Low level of improved input utilization, Shortage of input supply and high price of inputs were the main challenges of producers and suppliers whereas lack of market information, price variability, delay of buyers, low bargaining power, weight loss and poor product quality were the main challenges sesame marketing.

Recommendation

Basing on the research findings the following recommendations were forwarded to improve the sesame value addition in the study area.

- In the study area there is no enough and timely supply of improved agricultural inputs, due to this sesame producer's use improve technologies under recommended rate. So the government and other relevant stakeholders should give more emphasis to the availability and use of improved seeds, fertilizer and other yield enhancing technologies, improved post-harvest practices and handling, options access to credit, possibilities to consolidate land for technology use and economics of scale, and further support sesame value chain. Such information may be included in state extension programs for dissemination to all stakeholders in the sesame seed value chain.
- As the production sites are agro-pastoral and pastoral area and there are no weather roads in the area the producers and traders experience transportation problems. So the expansion of weather road infrastructure to reduce transport costs, to attract private investment in the area and to facilitate the supply of labor as the production system is highly labor-intensive.
- As it is stated previously the study area are the main potential sesame producers in the Zone as well as in the region because trader transport it to the central markets and mix the product with that of other areas and in the study area there is no storage facilities. Due to this strengthening the currently started sesame marketing at district level market centers through the provision of the warehouses in the major producing areas, establishing an efficient supply chain that can benefit most to producers, Establishing branch ECX at regional level and create public awareness through different media and providing training producer to sell directly to the ECX.
- Producers sell their product at low price because traders come to farm gate and buy the product at the farm gate level and also producers do not get the central markets price information. Based on this the provision of updated and timely market information to the farmers will enable them to increase the bargaining power, value chain development intervention practitioners in sesame producing area should take in to account the main value chain actors in the study area while devising initiative strategies and awareness creation between producers to sell their product through a right channel in which they get the highest share.

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THE ROLE OF THE GREEN WEEK IN THE MBA CURRICULUM

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Abstract: *The purpose of the paper is to demonstrate the potential of experiential learning in fulfilling the role of higher education institutions in teaching and promoting an MBA education. The educational achievements of the Green Week of the MBA in Agribusiness and Commerce (AgriMBA) are highlighted and challenges and areas in need of improvement are discussed.*
Curriculum serves as the foundation of teaching students. While progress has been made in MBA curriculum, including economics, informatics, finance, marketing, and management, integrating these knowledge areas into experiential learning should be a key component of an MBA education. The AgriMBA provides such an integration of knowledge areas within an experiential learning environment of the Green Week. The Green Week has included 343 students representing 21 countries, six continents, and 11 universities, involved 34 case studies, and hosted by six universities during the 17 years it has been held.
Although most MBA programs include case studies in their curriculum, the Green Week is unique in providing "live", real-time case studies, where students representing multiple universities and countries come together to present their recommendations to business executives. This intensive, experiential learning opportunity exhibits how students from different cultural backgrounds are able to quickly form functional teams, apply curriculum knowledge areas, and effectively achieve this ambitious goal.

Keywords: *Interactive case study, experiential learning, integrated curriculum, cross-culture, international agribusiness MBA*
(JEL CODE: A23)

INTRODUCTION

Curriculum serves as the foundation of teaching students. For teaching business students, general knowledge areas may include economics, finance, marketing, organizational behavior, social responsibility (sustainability, diversity, and ethical behavior and approaches to management), and other specified areas depending on emphasis areas (AACSB INTERNATIONAL, 2018, pp. 35-36). Technology agility is also an essential element of a business education. It includes decision making processes that include integration of current technologies and application of statistical tools and technics, data analytics, and information technology across the curriculum. Beyond decision making processes, technology agility includes analysis, solution development, and the ability to effectively communicate the results to clientele. A general business program at the master's level should also have learning experiences, such as managing in a diverse global context and integrating knowledge areas, in addition to teaching the general knowledge areas (AACSB INTERNATIONAL, 2018). Finally, a specialized MBA should include learning experiences to understand the specified discipline from multiple perspectives, apply specialized knowledge in a diverse global context, and conduct high-quality research.

The curriculum of the MBA in Agribusiness and Commerce (AgriMBA) emulates the curriculum content recommendations of the AACSB International (2018). The curriculum serves as the foundation of the AgriMBA and includes required modules on general economics and law, accounting and finance, marketing and trade, and management as well as the thesis module (AgriMBA, 2016). In addition, two rural related elective modules are included in the curriculum. For example, agribusiness and rural tourism are two potential elective modules. Informatics is to be included and applied within the various modules of the AgriMBA and is the technology agility component called for by the AACBS International (2018). Likewise, the required modules and elective modules of the AgriMBA are analogous to the general and specialized business knowledge areas of the AACSB International. Moreover, the required thesis module achieves the learning experience to conduct high-quality research as part of a specialized MBA.

The objective of this paper is to demonstrate how the Green Week in the AgriMBA curriculum fulfills the goal of a specialized MBA to include learning experiences to understand agribusiness from multiple perspectives and to apply specialized knowledge in a diverse global context. The Green

Week provides for an international, cross-cultural, teamwork and experiential learning opportunity for students that is highly relevant in today's education and business environments.

METHODS

Many MBA programs organize, offer, and present curriculum in a silo approach with individual, stand-alone courses or modules, such as accounting, finance, and marketing, and relatively little exposure to a global perspective (NAVARRO, 2008). These programs often lack multidisciplinary integration together with experiential learning methods that better reflect the real-world business environment, where teams integrate different skills to solve complex problems. Case studies, including those of the respected Harvard Business School, are an initial attempt to provide a real-world business environment for MBA students. However, the prepared case study is static and not particularly timely to current issues. Instead, a better way to teach is to extend the conventional case study to include experiential learning (YIN, 1989; CORCORAN et al., 2004), also known as learning by doing (KOWALSKI, 1994). The extension of the case study to experiential learning can be further extended to include action research (McNIFF and WHITEHEAD, 2003). In a teaching environment, this requires the active involvement of all participants—students, instructors, and the management of the company included in the case study.

This paper in itself is a case study on how to integrate knowledge areas, i.e., create a multidisciplinary learning environment, that includes a multicultural global perspective, experiential learning, active research, and teamwork.

GREEN WEEK EVOLUTION AND CONTRIBUTIONS

The Green Week of the AgriMBA began as an international component of the agribusiness module of the AgriMBA at the Czech University of Life Sciences Prague (CULS). AgriMBA programs are offered at other universities in addition to CULS, have a similar structure, and are accredited by the general board of the International Network for the AgriMBA (HEIJMAN, 2009; BIELIK, 2016; DALTON et al., 2017).[1] All modules of the MBA require, in addition to local instructors during the course of the module, an international instructor for a short period of the module, typically toward the end of the module. For example, an international instructor with expertise in economics would provide lectures for two days toward the end of the economics module. An international instructor from another country in itself provides an international dimension to the MBA and serves as a check on the quality of the particular module.

The agribusiness module is typically the last module in the AgriMBA prior to the thesis, which allows the agribusiness module to be a multidisciplinary module that calls upon the integration of knowledge areas already presented, such as marketing, management, finance, economics, and informatics. The international instructor likewise has the opportunity to have the students apply these knowledge areas in an integrated case study over a short, intense time of four days, i.e., a study week. Like many MBA programs, the case study was a typical static case study, although the case study was augmented with lectures related to the knowledge areas of marketing, strategic management, and finance and in-class demonstrations as appropriate for the particular case study.

The study week evolved after several years to where early career staff from the Warsaw University of Life Sciences (WULS) were invited to participate in the study week in 2005 (Table 1). WULS is the first university to have the AgriMBA and, therefore, had a similar structure as the AgriMBA at CULS and this presented the opportunity for the staff at WULS to see if they would include a study week as part of their curriculum. Supplemental lectures on knowledge areas continued as in earlier years, although the static case study was no longer used. Instead, the study week incorporated a "live" case study with a local business that included discussions with the company's management. In 2007, the WULS invited CULS students to join AgriMBA students in Warsaw to have the first joint study week. The next year in 2008, the CULS hosted students from WULS and the National University of Life and Environmental Sciences of Ukraine in addition to CULS students. At the beginning of the study week, multinational teams were formed creating a dynamic, cross-cultural learning environment for the students. This same year the case study expanded from one to two case studies allowing for diverse applications of the MBA curriculum. This resulted in an integrated study week or Green Week.

Table 1: History of International MBA in Agribusiness and Commerce Green Week

Year	Host	Number of				Company focus
		Participants	Countries[g]	Cases	Company visits	
2002	CULS[a]	6	1	2	0	Brewery; Wet corn milling
2003	CULS	10	1	2	0	Brewery; Meat processing and products
2004	CULS	12	1	2	0	Brewery; Meat processing and products
2005	CULS	11	2	1	1	Brewery
2006	CULS	12	1	1	1	Brewery
2007	WULS[b]	18	2	2	1	Meat processing and products

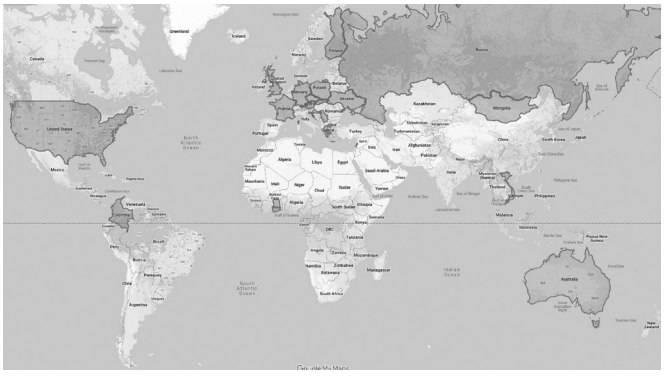
[1]For more information on the history, structure, and operation of the International Network for the AgriMBA, see https://www.ica-agrimba.eu/. The International Network for the AgriMBA is a standing committee of ICA (Association for European Life Science Universities, 2021).

2008	CULS	33	3	2	2	General crop, livestock, and dairy farm; Equine breeding & historical rural tourism
2009	WULS	38	6	3	3	Auto dealership relocation and body repair expansion; Seed business with retail garden centers; Brewery
2010	NUBiP[c]	35	4	2	2	Import and wholesale agricultural products, inputs, & services; Large industrial farm with biogas plant
2011	SUA[d]	41	7	2	2	Natural biscuit manufacturer; Traditional bakery with delivery services
2012	CULS	25	7	3	3	University vineyard and wine, tropical agriculture, and dairy research farms
2013	WULS	23	4	4	4	Biogas plant; Large sugar company sustainability; Game meat production & sales; Forest preservation
2014	SUA	25	3	2	2	General agricultural production trade cooperative farm; Organic food wholesale and supply
2015	UZ[e]	13	3	1	1	Agricultural production & tourism
2016	WULS	16	5	3	3	Meat processing and retail; Laboratory testing; Apple cooperative
2017	SUA	12	4	1	1	Agricultural production trade cooperative farm
2019	MULS[f]	13	1	1	1	Dairy farm with distribution

[a]Czech University of Life Sciences Prague (CZU), Czech Republic; [b]Warsaw University of Life Sciences (SGGW), Poland; [c]National University of Life and Environmental Sciences of Ukraine (NUBiP), Kiev; [d]Slovak University of Agriculture in Nitra; [e]University of Zagreb, Croatia; [f]Mongolian University of Life Sciences, Ulaanbaatar, Mongolia; [g]Participant nationalities varied by year, but 21 nationalities have been represented in the Green Week and have included Australia, Austria, Columbia, Croatia, Czech Republic, Finland, France, Germany, Ghana, Greece, Kosovo, Lebanon, Malta, Mongolia, Poland, Russia, Scotland, Slovakia, Ukraine, United States, and Vietnam. Source: Author

The Green Week continued to be offered annually with the host university changing each year (Table 1). For the 17 times the Green Week has been held, there have been 343 student participants representing 21 countries and six continents (Figure 1). The average number of countries represented per Green Week was more than three without including the instructors. The number of students have varied from as few as seven to as many as 41 and the number of universities represented were anywhere from one to six. This diversity of nationalities, regions, and universities allowed for a cross-cultural environment where students could learn from the different perspectives, experiences, and business environments that the multinational teams brought to the case studies. The students were exposed to these differences and this in itself was an extremely valuable learning experience.

Figure 1: Nationalities of Green Week participants, 2002-2019[a]



[a]Nations include Australia, Austria, Columbia, Croatia, Czech Republic, Finland, France, Germany, Ghana, Greece, Kosovo, Lebanon, Malta, Mongolia, Poland, Russia, Scotland, Slovakia, Ukraine, United States, and Vietnam. Source: Author

The case studies of the Green Week were varied in number and in type. On average, two cases were presented to the students during the Green Week. Although individual students only worked on one case study, they were exposed to the other cases and learned from the students working on the other cases. The case study companies most frequently represented breweries and farm businesses with seven cases each, followed by five meat processing and products company cases. The farm production businesses were relatively large and included crop, livestock, and dairy production, but also included biogas, concrete, and other production activities. The cases included agro and rural tourism, university research farms, organic food production and distribution (AHRENDSEN et al., 2016), an association that promoted apples with a protected geographical indicator (AHRENDSEN and MAJEWSKI, 2017), and a sustainability report for a large sugar corporation (SULKOWSKI et al., 2020) among others.

It is important to note that a case study company did not necessarily need to be an agribusiness company (corporation) even though most were agribusiness companies. There have been extremely interesting and successful case study companies, or maybe it is better to say organizations, that were not an agribusiness or a corporation. For example, the 2012 case studies involved three research farms of the CULS. The cases were extremely interesting and pushed the students to think well beyond the profit maximization or wealth accumulation objectives typically taught to business students and to think about social objectives of publically supported research and outreach. Also of great interest to students and instructors was the financial investment case study of Carolina Toyota Car Company, where students analyzed a potential relocation and expansion of its operations in Warsaw, Poland. This was clearly not an agribusiness, but it presented an important application of a competency all MBA students need.

The case studies drew on different competencies of MBA students. The issue of a particular case could be branding, sales, marketing, production, human resources, financing, or investment. Frequently there would be more than one issue, although it was critically important the students focus only on one issue given the limited time to work on the case. By focusing on one issue, students could have sufficient time to conduct analysis, provide insight, and prepare a report and presentation to the management of the case study company. This is an ambitious goal to have individuals from different cultural backgrounds and native languages to quickly form teams, identify a leader, arrive at a key issue, and efficiently and effectively deliver to the company's management the team's recommendations on the opportunities for improvement based on their analysis of the case study.

The Green Week usually lasts four days and examples of the activities undertaken during a typical Green Week are found in Ahrendsen et al. (2016) and Sulkowski et al. (2020). Sulkowski et al. include a schematic representation of the action research cycle that occurs during the Green Week. The action research cycle is comprised of theorizing, planning, action, and evaluation phases. During the first two days, overviews of the cases are presented, relevant coursework is highlighted, teams are formed, supporting information is provided, and companies are visited (theorizing phase). These two days allow the students to understand the situation and put together a plan of action for attacking the case study (planning phase). On the third day, students begin to take action on the case study. They collect data, complete analysis, and draft a report and prepare a presentation for other students, instructors, and company management (action phase). The outcomes of the various case studies are presented on the fourth day and evaluations occur (evaluation phase). Although there has been guidance and feedback to the students from the instructors during the first three days, the final feedback among the participants is shared after the presentations. This is the opportunity for reflection. Students complete different assessments of their teammates, other teams' presentations, instructors, and the Green Week in total. Instructors assess individual student contributions and team presentations and reports.

The four days of the Green Week are filled with learning opportunities. Besides the learning that takes place with the case study from the cross-cultural environment of the multinational Green Week, this cross-cultural environment extends to coffee breaks, lunch, evening dinner, and excursions, where both hosts and visitors share their food, drink, music, and other customs. Moreover, the students are able to take their experiences learned from the Green Week and apply them to their respective businesses in the future.

The instructors and companies, in addition to the students, learn from the case study. The instructors are able to build relationships with students and companies from multiple countries. By taking advantage of this networking opportunity, instructors are able to incorporate their learned experiences into their research and other courses of instruction. The companies can use the recommendations presented by the students as a starting point for making changes to their businesses. It would be heroic to assume the work of MBA students over the course of only four days would provide the level of in-depth analysis to change the business. However, the students' insights, ideas, initial analysis, and recommendations can serve as a basis for companies to adjust their business for its overall improvement.

CHALLENGES AND IMPROVEMENT

The accomplishments realized from the Green Week do not come without the significant efforts and contributions of instructors, companies, and especially the host university AgriMBA director and staff. The host university director is in the best position to identify and recruit a collaborating company. It is critically important to identify a company with management that will be encouraging and receptive of student questions, input, and recommendations. Once such a company is identified, the other contributions by the company will likely occur. For example, it is also important for the company to provide information in advance of the Green Week so that students are knowledgeable about the company and prepared to "hit-the-ground-running" when they begin the Green Week. Students will learn the most and have a better experience from the case if they visit the company, hear from the management, interact with management during a session of questions and answers, and have the management available for follow-up questions during the remainder of the Green Week. The collaborating company and students should both be prepared with clear advance instructions and precautionary advice on what is expected, what are appropriate boundaries, and how to encourage a mutually respectful and constructive approach from case initiation through conclusion as well as possible follow-up after the Green Week. Although the setting of student expectations is the responsibility of the guest instructor, all company interactions typically falls upon the host university director and staff. However, as was already noted, these interactions with the company should lead to benefit the host university, director, and staff in the future.

The host university director and staff also have the challenge to coordinate and budget for the Green Week in addition to the case study company selection. This involves inviting a guest instructor and students from other universities offering the AgriMBA to participate in the Green Week. These invitations should be made well in advance of the Green Week. The most success at achieving significant numbers of visiting and engaging students occurred when the directors at other universities set the expectation (or perhaps required) that their AgriMBA students would participate in the Green Week. University instructors are not the only people that are busy. Students are busy too, and the expectations should be that they clear their schedules well in advance to participate in the Green Week.

Once the host university director is successful at attracting visiting students, there is the coordination of receiving students, identifying accommodations, meal catering, transportation, and workspace for students and instructors during the Green Week. All of these items incur expenses that are to be budgeted and paid by participating students or borne by the host university. The expense will be greater for visiting students than host students because of the necessity of additional travel and accommodations by the visitors. However, the best experience

for both visiting and host students has been when all students stayed at the same accommodations or, at least, when the host students have been available to serve as "hosts" to the visiting students during the evenings to allow for the continued cultural exchange of customs.

There have been Green Weeks when there were fewer than the necessary number of students participate. However, creative ways have been used to expand the number of participants in these instances. Some examples have included inviting students from other master programs participate, such as master programs in economics and rural development, or even crop science and animal science could be particularly relevant given the case study. These students from other programs add to the multidisciplinarity of the Green Week and to the recommendations presented to company management that are often needed in complex, real-world problems. As was mentioned, instructors early in their career have found the Green Week to be particularly helpful in their development. Ph.D. students and non-government organization employees have also participated in the Green Week and found the experiential learning of the case study to be useful in their programs.

DISCUSSION

An MBA should integrate knowledge areas into experiential learning and should be a key component of an MBA education. The Green Week of the MBA in Agribusiness and Commerce provides such an integration of knowledge areas within an experiential learning environment. Although most MBA programs include case studies in their curriculum, the Green Week may be unique in providing "live", integrative, interactive, real-time case studies, where students representing multiple universities and countries come together to present their recommendations to business executives. This intensive, experiential learning opportunity exhibits how students from different cultural backgrounds are able to quickly form functional teams, apply curriculum knowledge areas, and effectively achieve this ambitious goal.

There are limitations to what can be learned and accomplished during the brief four days of the Green Week. However, the life-long experiences learned by students over these four days are perhaps the greatest they will ever have for any four-day period of their lives. The challenge is how to motivate and convey to students just how much of an exceptional experience they will have if they make the commitment to actively participate in a Green Week.

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THE EFFECT OF WORKING CAPITAL ON PROFITABILITY OF POULTRY EGG ENTERPRISE IN OSUN STATE, NIGERIA

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Abstract: *This study investigated the effect of working capital on the profitability of poultry egg enterprise. Primary data were collected from 180 poultry egg farmers using two-stage sampling technique. Data were collected on the socio-economic characteristics such as age, gender, educational qualification, farming experience and flock size owned, quantities of inputs and outputs. Descriptive statistics, farm budgetary technique and ordinary least square model were used to analyze the data collected. The results from descriptive statistics show mean values of 42 years, 9 years and 5 persons for age, years of experience and household size, respectively. Majority of poultry egg farmers (52.2%) used their personal savings to fund their businesses while, some had access to loan from co-operative societies (37.2%), from SEAP microfinance (6.7%) and from banks (3.9%). Poultry egg producers invested their working capital on feeds (64.8%), rearing of poultry birds from day old chicks to point of lay (14.8%), account receivables (13.6%), drugs & vaccines (2.4%) and variable overheads (4.4%). A total cost of ₦5,494,927.04k was incurred by the poultry egg producers. Cost of feed accounted for 71.89% of the total cost of production. A total revenue of ₦9,388,555.60k and the net returns of ₦3,893,628.56k were realized. The net farm income per bird from the enterprise was ₦1,698.05k while the gross margin per bird was ₦1,795.32. The ordinary least squares regression estimates revealed that inventory, account receivable, operating cycle and flock size have significant effect on the profitability of poultry egg enterprises. The study concluded that poultry egg enterprise is profitable and working capital has a significant effect on the profitability of poultry egg enterprise. In light of the findings, the study recommended the expansion of the poultry flock size as well as reduction in the number of days of inventories, account receivables and operating cycle in order to increase the profitability of poultry egg enterprise.*

Keywords: *Working capital, Profitability, Poultry egg enterprise, Osun State*

INTRODUCTION

Poultry is the largest and the most reared livestock in Nigeria either for subsistence or commercial purpose (Umunna et al., 2012). The importance of the poultry enterprises lies chiefly in the raising of domesticated birds such as fowls, turkeys, duck, geese and guinea fowl purposely for meat, egg and other products (Umunna et al., 2012). Excess released from such products is exported for foreign exchange, generating employment either directly or indirectly and revenue (Adebayo and Adeola, 2005). The poultry egg enterprise, apart from providing employment and livelihood to thousands of Nigerians, also provide high quality and nutritious food. However, the usefulness of any food for body building depends on the amount of protein, it contains. Whereas, the nutritional status of many Nigerians is characterized by low calorie and protein intakes. Furthermore, Nigerians' greatest problem is inadequate animal protein in their diets (Iyangbe and Orewa, 2009). Adepoju (2008) reported that the average per capita protein intake in Nigeria was 51.7g of which only 6.8g came from animal sources. However, poultry eggs play a valuable role in bridging the protein gap (Aromolaran et al., 2013). Afolami et al. (2011) noted that, in comparison with other livestock products, poultry eggs are considered to be more palatable, having lower level of cholesterol and high protein value with excellent quality. Eggs out-rank other livestock products such as chicken, beef and mutton in terms of protein quality; one egg gives about 6g of protein and egg-white protein has a biological value of 100, the highest biological value of any single protein (Food and Agriculture Organization, 2005; Layman and Rodriguez, 2009). Egg shell is also a good source of calcium. This asserts the fact that eggs play a significant role in solving the problems of food insecurity and malnutrition in the country (Achoja, 2012). Tijani et al. (2006) reported a number of other uses of eggs, apart from nutritional benefits; they are used in confectionary bakery products, ice creams, cosmetics, among others.

In line with the increase in the awareness of eggs' roles in the human body, population, education level, and the purchasing power of individuals, there is growing demand for eggs (Candra et al., 2015). In recent years, the demand for eggs has increased significantly (Heise et al., 2015). Whereas, the production in the country is still very insufficient, as reflected by the wide interval between supply and demand of the products (Ohajinya et al., 2013). Local demand for poultry eggs in Nigeria stands at 1.5 million tonnes, while the supply capacity is between 700,000 and 1 million tonnes. This trend is very likely to continue over the next few decades. Exploring into this opportunity, this will no doubt reduce some measure of economic burden from the large unemployed population. This is ascribed to the fact that egg production is an important economic enterprise offering more rapid and efficient returns than many other agricultural productions. Economic return that is, profitability is one of the main determinants of any agricultural production, egg production inclusive (Hossen, 2010). Profitability connotes ability to make profit from all business activities of an organization, company, firm, or an enterprise. It shows how efficiently the management is, in combining market inputs at his disposal. Usually, average cost per unit of production decreases as the economic scale increases. Economies of scale result from spreading fixed costs over a large number of units of production. Fixed cost per unit declines as the number of units produced increases which will result in total cost per unit declining. However, high cost of inputs is a major challenge in poultry industry because feeds purchase, for example consumed as much as 70% of the cost of production which has led to a large reduction in the number of poultry egg enterprise especially the small-scale ones who could not withstand production of eggs at high cost (Adebiyi, 2000; Ashagidigbi et al., 2012).

In light of the above, one of the major factors that has forced most poultry egg enterprise especially, small-scale poultry farms to close down their operation is low capital base. Akanni (2007) and Ovwigho et al. (2009) stated that small scale poultry farmers complain of limited access to funds, which is often linked with their low level of farm income and insufficient collateral securities, for the procurement of poultry equipment and materials which include feeds, drugs and vaccines, cages and feed troughs, and also funds needed to pay workers' salaries. Therefore, in Nigeria, poultry egg enterprise requires additional financing apart from owned investment fund (Akpan et al., 2013). Personal savings and cooperative societies have been the major source of finance in poultry egg enterprise which is usually small and not sufficient to enlarge production (Adetiloye, 2012). Nevertheless, working capital could be an important instrument for increasing agricultural production. Working capital is the portion of an enterprise's total capital which is employed in short term operations i.e., current assets. A typical list of these assets in order of liquidity includes cash in hand and at bank, short term investments, payment in advance, account receivables, raw materials inventory, inventory of goods in process and finished goods inventory. The management of all these current assets assumes greater importance because the total sum of investment in current assets forms over half of an enterprise's total assets and it could have a significant effect on firm's profitability and liquidity. Profitability and liquidity, the two desired goals of financial management are directly affected by working capital. While excess working capital can have adverse effect on profitability, inadequate working capital can hold up production and sales of well managed firms. Working capital is a very important asset for production firms whose assets are mostly composed of current assets. It constitutes a major source of capital for small and medium sized firms because they have limited access to external finance (Akinlo, 2012). Working capital assists small firms to fund its activities from spontaneous financing in the form of trade credit which is a cheap source of finance and ensure profitability of the business.

However, most researches on working capital have focused on large firms in the developed economies (Akinlo, 2012). Whereas, the importance of working capital is critical when it refers to small and medium firms in developing economies. These firms are faced with many problems including low investment, low sales and lack of resources. They lack the opportunity of getting benefits of financial market to source for finance. Financial institutions are not willing to give credit to small firms as they are considered to be very risky and not profitable. In solving the problems identified above, firms in developing countries have to rely on proper management of their working capital. Unfortunately, despite the importance of working capital for firms especially for developing countries like Nigeria, studies have not been focused on the subject matter. On the other hand, many studies (Adepoju, 2008; Olasunkanmi 2008; Taru et al., 2010; Ike and Ugwumba, 2011; Tanko and Aji, 2011; Tijjani, et al., 2012; Mahama et al., 2013; Olufemi and Adeolu; 2013; Ohajianya et al., 2013; Anang et al., 2013; Emokaro and Emokpae, 2014; Tanko and Aji, 2014; Tanko et al., 2014; Kehinde, 2021) on poultry egg enterprise have largely focused on economic analysis, efficiency of resource-use and many other related studies.

Yet, no known study has been published on the effect of working capital on profitability of poultry egg enterprise in Nigeria. The dearth of literature on this subject matter creates a big gap that needs to be filled. It is expedient to inquire into the relationship between working capital and profitability of poultry egg enterprise, taking cognizance of the firm's characteristics of high investment in variable inputs (feeds) and limited access to finance. Consequently, this study analyzes the effect of working capital on profitability of poultry enterprise in Osun State, Nigeria. Specifically, it describes the socio-economic characteristics of poultry egg producers; identifies the sources and uses of working capital in poultry egg enterprises; and analyses the effect of working capital on profitability of poultry enterprises. This study will no doubt contribute significantly to knowledge in the area of working capital management and will shed light on the relationship between working capital and profitability in poultry egg enterprise. This study will be useful for formulating policies and promoting investment leading to an increase in egg production and thereby bridging the gap between the demand and supply of eggs in the province. Information from this study will also be useful to farmers or micro entrepreneurs to establish and/or manage their poultry egg enterprises more

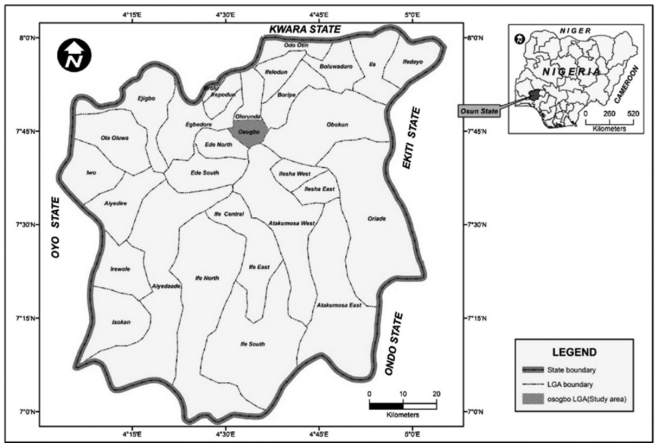
efficiently and may lead to earning higher profits. The rest of the paper is organized as follows. Next section describes the data and the methods. Section three presents and discusses the empirical findings, while the last section concludes.

MATERIALS AND METHODS

Area of the study

The study was conducted in Osun State. Osun State is an inland State in South Western Nigeria with State capital in Osogbo. It is bounded in the north by Kwara State, in the north east by Ekiti State, south east by Ondo State, in the South by Ogun State and in the west by Oyo State. Osun State has three agricultural zones namely; Ife-Ijesha zone (Rain Forest), Iwo zone (Savanna) and Osogbo zone (Derived savanna). There are thirty Local Governments Areas in Osun State. Osun State has area of 9,251km2, population of 3,416,959 (2006 census) and population density of 379/km2. The primary occupation of people in Osun state is farming. However, poultry production dominates the livestock production in the area.

Figure 1: Map of Osun State



Sampling procedure

A two-stage sampling technique was used for the study. At the first stage, six cities from the three agricultural zones in the State were purposively selected based on the predominance of poultry farmers in the cities. The cities are Ile-Ife, Ilesha, Osogbo, Iwo, Ila and Ejigbo. A list of poultry egg farmers in the six cities was obtained from Poultry Association of Nigeria (PAN) Osun State chapter. The second stage involved simple random selection of thirty poultry egg farmers from each of the six cities. A total of 180 poultry egg farmers were selected. Primary data were collected using a pre-tested and well-structured questionnaire. Data were collected on socio-economic characteristics of the respondents such as age, gender, educational qualification, farming experience and flock size; quantities of inputs and outputs, sources of working capital, account receivables and accounts payable.

Table 1: Sampling procedure for the study

State	Cities	Poultry egg farmers	
		Proportion used	Number of registered farmers
Osun	Ile-Ife	30	79
	Ilesha	30	78
	Osogbo	30	89
	Iwo	30	98
	Ila	30	75
	Ejigbo	30	87
Total	**6**	**180**	**506**

Analytical technique

The study employed descriptive statistics, farm budgetary technique, and ordinary least squares regression model to analyze the data collected.

Descriptive statistics

Descriptive statistics (such as frequency and percentage) was used to summarize the data. Firstly, it was used to describe the socio-economic characteristics of poultry egg producers. Secondly, it was used to identify the sources and uses of working capital in poultry egg enterprises.

Farm budgetary techniques

A farm budgetary technique was employed to estimate the profitability of poultry egg enterprises, the various types of inputs used and their costs implication using enterprise

budget analysis. The costs were divided into variable costs and fixed costs. The variable costs include the cost of labour, day old chicks, veterinary services, transport, feeding, rent charges on land and general management of birds. Fixed costs include depreciation on fixed assets, (e.g. building, battery cage, water tank, motor vehicle, etc.); this was charged using straight- line method.

Gross Margin,

$$GM = \sum p_i q_i - \sum r_i x_i \quad (1)$$

Where;
pi = average price of eggs and spent layers (₦)
qi = average quantity of eggs sold and spent layers
ri = average price of variable inputs (₦)
xi = average quantity of inputs used
Subsequently, a net return was obtained from gross margin.
Net returns = GM- TFC
Where, TFC= Total Fixed cost
The profitability ratios employed to measure the economic performance of the poultry egg enterprise are: Benefit-Cost ratio; Rate of return on investment; Operating expenses ratio and Profitability index.
Benefit-Cost ratio (BCR) is measured as:
BCR= Total Revenue/Total Cost
The Rate of return on investment (ROI) is measured as:
ROI= Net Farm Income/Total Cost
The Operating Expenses ratio (OER) is measured as:
OER= Total Operating Expenses (Total Variable Cost)/ Total Revenue.
The Profitability index (PI) is measured as:
PI= Net Farm Income/Total Revenue.

Ordinary least squares regression model

The effect of working capital on profitability of poultry egg enterprises was determined using ordinary least squares regression model. Profitability is directly related to exogenous variables that describe the social and economic environments in which enterprises make decisions. OLS models the exogenous relationship between working capital and profitability. The model was chosen based on the premise that the error term (ei) is normally distributed, and as a result, its estimator is normally distributed, linear, and unbiased.

The model was implicitly specified thus:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_i \quad (2)$$

Where;
Y = Profitability (₦)
The explanatory variables are: X1= Inventory Turnover Period (inventories/cost of sales multiplied by 365days); X2= Account Receivables period (Account receivables/sales multiplied by 365days); X3= Account payable period (Account payables/cost of sales multiplied by 365days); X4= Operating cycle (Inventory Turnover Period +Account receivable period); X5=Flock size (Number of poultry birds); ei= Error term.

In the model, different functional forms such as simple linear, semi-logarithmic and double-logarithmic were explored. However, simple linear functional form was selected as the lead equation based on econometric criteria (T-test, F-statistics, and R2), number of significant variables and the a *priori* expectation of the signs of the coefficients.

Simple Linear form

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_i \quad (3)$$

Semi-logarithmic form

$$Y = \text{Log}\beta_0 + \beta_1 \text{Log}X_1 + \beta_2 \text{Log}X_2 + \beta_3 \text{Log}X_3 + \beta_4 \text{Log}X_4 + \beta_5 \text{Log}X_5 + \varepsilon_i \quad (4)$$

Double-logarithmic form

$$\text{Log}Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \varepsilon_i \quad (5)$$

Description of variables

Profitability is measured as net farm income. Net Farm Income (NFI) is the difference between total revenue and total cost. It is derived from budgetary analysis. The number of days of inventory is calculated as (inventory/cost of sales) x365. This variable reflects the average number of days of stock held by the poultry egg enterprise. Longer storage time represents a greater investment in inventory for a particular level of operations. Inventory turnover period is expected to have a negative relationship with profitability (Akinlo, 2012; Deloof, 2003). Profitability declines as the number of days of inventory increases. The number of days account receivable is calculated as (account receivable/Sales) x365. This variable represents the average number of days, a poultry egg enterprise takes to collect payment from its customers. The higher the value, the higher the investment in account receivable. Account receivable period is expected to have negative relationship with profitability (Pandey 2004, Adeniji, 2011; Akinlo, 2012). Profitability declines as the number of days of account receivable increases. The number of days account payable reflect the average time, it takes firms to pay its suppliers. This is calculated as (account payable/cost of sales) x365. The higher the value, the longer firms take to settle their payment commitments to their suppliers. This variable is calculated as the number of days account receivable plus the number of days of inventory. Accounts payable period is expected to have negative relationship with profitability. This is because the longer the number of days of account payable, profitability decreases because of the increased interest and removal of discount. The longer the operating cycle, the greater the net investment in current assets. This is measured as the mean number of laying birds per production cycle on the farm. Operating cycle is expected to have a negative relationship with profitability. The shorter the operating cycle, the higher the profitability. Flock size is expected to have a positive relationship. Larger number of birds will result in higher revenue from sales of eggs produced and spent layers which increases profitability.

Table 2: A prior expectation

Variables	Units	Expected signs
Inventory turnover period	The number of days of inventory	-
Account receivable period	The number of days of account receivable	-
Accounts payable period	The number of days of account payable	-
Operating cycle	The operating cycle	-
Flock size	The number of birds	+

RESULTS AND DISCUSSION

Socio-economic characteristicsof poultry egg producers

The socio-economic characteristics of poultry egg producers are presented in Table 3. According to Adegbite et al. (2014), age of the poultry egg producers may influence the vigour, versatility and adoption of innovations among farmers which has implication on their productivity. The mean age of the poultry egg producers is approximately 42 years. This implies that they were within the active age bracket and economically productive. These are particularly young people who could afford to venture into poultry business known to be characterized by risks such as disease, fire outbreak and burglary (Akanni, 2007; Olagunju, 2007). Furthermore, it is an indication that poultry business is attractive and poultry production will be sustained as these young farmers will remain in business for a long time (Nmadu et al., 2014). This finding agrees with the findings of Akpan et al., (2013) and Afolabi et al., (2013). Most of poultry egg farmers (86.7%) are male. This implies that in the study area, poultry egg producers are dominated by men which can be attributed to the rigorous and stressful nature of poultry enterprise, which the females might not be able to cope with. Although in some cases, the input of the proprietor is not based on gender but on co-ordination and direction. At the same time, the gender of the producers is foreseen to influence the performance of the enterprises because some of their input is managerial as well as physical. Furthermore, the dominance of males in poultry business may not be unconnected to the huge sum of money needed to start the business which is often difficult for women to raise, especially in Africa. Marital status of a farmer is important for the availability of family labour for farming activities. About 87.8% of the respondents are married. This implies that majority of poultry egg producers are married which is a strong indication that most of them are in business to assist in their family upkeep. It also has implication on the household size and amount of family labour that will be available for farm work as reported by Adegbite et al., 2014. The result also agreed with the findings of Ohajianya et al. (2013).

Household size is the total number of people living together in a house, feeding from the same pot and pulling resources to achieve the same objective. It represents human capital endowment of the farmer as it reflects potential family labour supply. Onubuogu et al., (2013) described household as people who live under one roof and who made or are subject to others making for them joint financial decisions. The average household size in the area of study is 5 persons. This implies that poultry egg producers in the study area have a large household size. Large household size reduces the cost of hired labour, encourages availability of labour and expansion of poultry egg production. The findings support the result of Esiobu et al. (2014). Farmers with formal education have a great ability to adopt new technology and make rational decisions. Majority (78.3%) of poultry egg farmers have formal education which indicates that literate farmers are involved in poultry egg production in the area of study. This could be due to the fact that success and efficiency in poultry egg production like any other livestock production enterprise, requires some level of educational attainment by the producers. Education would afford poultry egg producers the opportunity to understand and adopt modern farm practices thereby enhancing profitability. These findings agree with the results of Akanni (2007), Olagunju (2011) and Adegbite et al. (2014). Proficiency and skill acquisition usually grow with years of experience. It is therefore expected that longer years of experience afford producers better skill and knowledge of production. The average years of experience of poultry egg producers in the study area is 9 years. This suggest that majority of poultry egg producers in the area are not new in the business. Experienced farmers are likely to make better decisions to enhance productivity and income. Expectedly, the more the number of years of experience in poultry keeping, the better the ability to manage poultry business well. Cases of disease attack, fire outbreaks, poor feed quality and pilferage could be better handled by experienced poultry farmer. Also, farmers with more years of experience would be more efficient and expected to run a profitable enterprise. The findings agree with Afolabi et al. (2013).

The mean flock size is 2,293 birds. This result implies that poultry egg enterprise is dominated by medium scale farms based on the classification of Omotosho and Ladele (1988) as adopted in this work. The prevailing production systems in poultry egg production in Nigeria are cage and deep litter systems. Findings from Table 3 shows that cage system is commonly used in the study area as it has the larger percentage (80.6%). This may be due to the fact that they are easy to manage and also reduces the number of cracked eggs. The cage can be battery cage, locally fabricated cage or wood cage. Extension activities involve the dissemination of information to the poultry farmers within the State, within a short time which will help to adopt new technology and improve productivity. About 46% of the respondents are visited by the extension agents within the last production cycle. With the extension visit, poultry farmers will have access to adequate and regular information from the research institutes and solution to any developed problems. About 47% of Poultry egg farmers belong to co-operative societies. This implies that majority

of poultry egg farmers does not belong to co-operative society in the area of study. Poultry farmers should be encouraged to belong to a co-operative society to enable them benefit from membership's access to loans and non-financial benefits.

Table 3: Socio-economic characteristics of poultry egg producers

Variables	Poultry egg farmers
Male (%)	87
Age (years)	42.25(±11.46)
Married (%)	88
Household size (#)	5.03 (±2.14)
Formal education (%)	78
Years of farming experience	9.10(±7.14)
Flock Size (birds)	2293 (±596)
Cage system (%)	80.6
Extension contact (%)	46
Cooperative membership (%)	47

Source: Field Survey, 2015

The Sources and uses of Working Capital in Poultry Egg Enterprise

Table 4, shows the sources of working capital of poultry egg producers in the study area. Findings revealed that majority (52.2%) of poultry egg farmers sourced their working capital from owner's equity (personal savings). While, 37.2% from Cooperative Societies, 6.7% from Microfinance (SEAP Microfinance) and 3.9% from Banks. This finding agrees with Akanni (2007), Olagunju and Babatunde (2011) who both reported that 61% and 55% of poultry egg farmers sourced finance from their personal savings. However, internal sourcing of finance from owner's equity (personal savings) is constrained as most poultry farm operators had a weak financial base. Also, limited collateral securities made it difficult to obtain loans from banks. Additional sources of fund are therefore required for the poultry egg producers to sustainably solidify their financial base with assured increase in output level.

Table 4: Sources of working capital for poultry egg enterprise

Source	Frequency	Percentage
Personal Savings	94	52.2
Cooperative Society	67	37.2
Microfinance	12	6.7
Bank	7	3.9
Total	**180**	**100**

Source: Field Survey, 2015

Working capital in poultry egg enterprise is used to fund current assets used in poultry egg production. Working capital investments in poultry egg enterprise starts from the first day of the production cycle. Day old chicks are raised to point of lay between 18 to 20 weeks of the production cycle when the farm generates no revenue and solely rely on working capital daily. After this period, investment in feeds is most significant as the birds must be adequately fed for optimum egg production from 20 weeks to 72 weeks of the production cycle. Table 5 shows the uses of working capital by poultry egg producers in the study area. The result revealed that poultry egg producers invested their working capital on feeds (64.8%), rearing of poultry birds from day old chicks to point of lay (14.8%), account receivables (13.6%), drugs & vaccines (2.4%) and variable overheads (4.4%).

Table 5: Uses of Working capital in Poultry egg enterprise

Working capital Investment	Value (₦)	Percentage
Rearing of day-old chicks to point of lay	902,760.38	14.8
Feeds	3,950,458.62	64.8
Drugs and Vaccines	145,438.00	2.4
Variable Overheads	268,219.00	4.4
Account Receivable	825,000.00	13.6
Total	6,091,876.00	100

Source: Field Survey, 2015

Profitability of Poultry egg enterprise

The costs and returns to poultry egg enterprise is presented in Table 6. It was found that about 95.94% of the total cost of production was incurred on the variable inputs. The cost of feeds accounts for 71.89%. This agrees with Akanni (2007), Olagunju and Babatunde (2011) who affirmed that poultry egg enterprise is characterized with high investment in variable inputs and feeds having the largest proportion. This implies that a huge amount of money is spent on feeds in the business. The cost of the laying birds which was the cost of raising the birds from day old chick to point of lay accounted for 16.43% of the total cost of production. The period of raising day old chicks to point of lay usually take a period of between 18-20 weeks. The cost of medication and services accounted for 4.19% of the total cost of production. The mean value of the total variable cost and total fixed cost were ₦5,271,876.00k and ₦223,051.04k respectively while the mean value of total cost was ₦5,494,927.04k. The mean value of total revenue was ₦9,388,555.60k. Revenue from sales of eggs was 87.3% of the total revenue while the net income was ₦3,893,628.56k which was measured by subtracting total cost from total revenue. The net farm income per bird from the enterprise was ₦1,698.05k while the gross margin per bird was ₦1,795.32k. A profitability measure which also an attempt to estimate the future outcome of the enterprise in both

quantitative and financial term was carried out. Profitability index which gives a value of 0.41 indicating that from every ₦1 generated, a net income of ₦0.41 is earned. The rate of return on investment gave 0.71 which implies that from every ₦1 invested in the enterprise, a net income of ₦0.71 is realized. The operating expenses ratio which value was 0.56 shows that from every ₦1 generated from the enterprise, ₦0.56 is invested as a running cost into the business. Also, the benefit-cost ratio of 1.71 implies that from every ₦1 invested on poultry egg enterprise, ₦1.71 is realized. All these performance measures affirm that poultry egg enterprise is a profitable venture. This finding agrees with the result of Kehinde (2021).

Table 6: Profitability of Poultry Egg Enterprise

S/n	Item	Value (₦)	Percentage
1. Variable Costs:			
i	Cost of laying birds	902,760.38	16.43
ii	Feed cost	3,950,458.62	71.89
iii	Medication and services	230,438.00	4.19
iv	Casual labour	80,146.00	1.46
v	Water	45,073.00	0.82
vi	Fuel/electricity	45,000.00	0.81
vii	Repairs	18,000.00	0.33
A	Total variable cost (TVC)	5,271,876.00	95.94
2. Fixed cost			
I	Depreciation charges	80,051.04	1.45
ii	Rent	82,000.00	1.49
iii	Permanent labour	61,000.00	1.11
B	Total Fixed Cost (TFC)	223,051.04	4.06
C	Total Cost=(TVC+TFC)	5,494,927.04	
3. Revenue			
i	Sales of Eggs	8,196,209.04	87.3
ii	Sales of Spent Layers	1,192,346.56	12.7
d	Total Revenue (TR)	9,388,555.60	
e	Gross Margin =TR-TVC	4,116,679.60	
f	Net Farm Income =TR-TC	3,893,628.56	
g	Gross Margin/bird	1,795.32	
h	Net income/bird	1,698.05	
i	Benefit Cost ratio=d/c	1.71	
j	Rate of return on investme nt=f/c	0.71	
k	Operating expenses ratio=a/d	0.56	
l	Profitability index=f/d	0.41	

Source: Field Survey, 2015

The effect of working capital on profitability of poultry egg enterprise

The effect of working capital on profitability of poultry egg enterprise was analyzed using ordinary least square regression model (Table 7). The Three functional forms of the specified model which are; linear, semi-logarithmic and double-logarithmic were explored. The lead equation was chosen on the basis of correct sign of the explanatory variables, the significance of the model's coefficient and the value of the coefficient of R2. The net farm income obtained from the budgetary analysis is the dependent variable for the model. The components of Cash conversion cycle which is a measure of working capital were specified in the model to explain the effect of working capital on profitability of poultry egg enterprise. The components include inventory holding period, accounts receivable period and accounts payable period. However, data collected from the study revealed that account payables are not obtained in poultry egg enterprise hence was omitted in the regression analysis. This implies that poultry egg farmers do not have access to credit purchases. This further revealed that poultry egg farmers do not have access to the cheapest source of financing working capital (Spontaneous financing).

Results from the OLS model shows that the linear function produces the best fit. The linear function gave the highest coefficient of multiple determination (R2) and the signs of the explanatory variables agreed with the theoretical and econometric expectations. The adjusted R2 indicates how much of the dependent variable, profitability can be explained by the independent variables. The result shows that 94% of the variation in the dependent variable can be explained by the independent variables. From the Table, inventory, operating cycle and poultry flock size significantly influenced profitability of poultry egg enterprises. The number of days of inventories is negatively related to profitability of poultry egg enterprises and is significant. This implies that the lower the number of days inventories, the higher the profitability. Profitability can be increased by reducing the number of days inventories in the poultry egg enterprise. The number of days of account receivable is significant but negatively related to profitability of poultry egg enterprises. This implies that the lower the number of days account receivable, the higher the profitability. Profitability can be increased by reducing the number of days account receiv-

able in poultry egg enterprise. Operating cycle is found to be significant and negatively related to profitability. This implies that lower number of days the business converts inventory and receivables to cash, the higher the profitability. Poultry flock size is significant and positively related to profitability. This implies that the higher the flock size, the higher the profitability of the poultry egg enterprise.

Table 7. The effect of working capital on profitability of poultry egg enterprise

Variables	Linear	Semi-log	Double-log
Constant	609.980 ***(9.649)	6.422***(6.743)	3.637***(2.949)
Inventory	-46.271***(-5.971)	0.011***(-2.598)	0.933***(6.113)
Account receivable	-0.113***(-3.154)	0.087(0.100)	0.031***(4.873)
Operating cycle	-4.812***(-3.166)	-0.021***(-2.853)	-0.876***(-5.104)
Poultry flock size	0.816***(7.783)	0.384***(4.029)	0.465***(9.719)
Adjusted R-squared	0.945	0.934	0.825
F-Statistic	1039.11	852.54	211.61

*Note: ***p < .01, ** p < .05, * p < .10.*
Values in parenthesis are t-ratios.
Source: Data Analysis, 2015

CONCLUSION

This study investigated the effect of working capital on profitability of poultry egg enterprise in Osun State, Nigeria. Primary data were collected from a total of one hundred and eighty respondents using two-stage sampling technique. Data collected were analysed using descriptive statistics, farm budgetary technique and OLS model. The study revealed that majority of the poultry egg producers are male, literate, married and within the active age group. Poultry egg enterprise is profitable and majority operated on medium scale. Majority of the poultry egg farmers used their personal savings to fund their business and do not belong to co-operative society. Poultry egg producers invested their funds in feeds, rearing of day-old chicks to point of lay, account receivables, variable overheads, drugs and vaccines. Budgetary analysis revealed that variable inputs constituted over 95% of the total cost of production. Feed is identified as the highest among variable inputs. The net farm income per bird was ₦1, 698.05k which imply that poultry egg enterprise is profitable. The profitability index was ₦0.41, rate of return on investment was ₦0.71, operating expenses ratio was ₦0.56 while the benefit-cost ratio was ₦1.71. From the OLS model, inventory, account receivable, and operating cycle had significant but negative relationship with profitability of poultry egg enterprises. While flock size had significant and positive relationship with profitability of poultry egg enterprises in the study area. Based on the findings from the study, it was concluded that the components of working capital had a significant effect on the profitability of poultry egg enterprise. Based on this conclusion and observations made during the study, we recommended that poultry egg producers should reduce the number of days of inventories, operating cycle and account receivables for optimum profitability of the poultry egg enterprise. Also, poultry egg enterprises should expand their flock size to maximize profitability. Lastly, the producers should consider joining co-operative societies to enable them access fund easily.

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POULTRY SECTOR ANALYSIS IN ALBANIA

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Abstract: *Meat production, in specific poultry meat is a very important product for protein and nutrition values for many consumers. With the urbanization of the population people's diet is shifting towards meat overall, including processed poultry. This has increased the challenges of quality and control over the meat products. (RAIHAN AND MAHMUD, 2018) In general, poultry remains a problematic sector in Albania, with the most common issue being the quality and not the European Union standards and regulations. This paper analysis the egg and poultry products livestock and productions, importing and exporting trends on poultry products, and the potential of development of this sector in the single market of European Union by improving the sector. This study gives an overview in poultry subsector related to livestock and production, international trades, and their market trends. It highlights the supply chain in poultry that can be helpful for poultry businesses and government. It also provides valuable information regarding the impact of quality issues in international market, also the structure of the market for poultry is conducted. Also, the imports and exports on poultry subsector trends and comparison was conducted. The study also consisted of calculations of index number CPI, which indicates the changes in consumer purchasing power.*

Keywords: *Poultry, Albania, livestock, import and exports, EU market*
(JEL CODE: D1)

INTRODUCTION

The meat value chain is the most important value chain in Agriculture of Albania. With poultry being the fastest growing sector in the world with the largest consumption. Just like in the global market, this trend is also found in Albania. The main factor is the Albanian rising incomes of costumers, shifting their diet into meat products. Albanian females consume more chicken while Albanian males consume all type of meats. Younger generation tends to consume more poultry than the older generation. Customers buy poultry meat, based on appearance and texture. (GOGA, 2019)

The subsector itself, is facing lots of challenges related to quality and control issues. The potential market for poultry in Albania is the local market and international market. Nowadays, the poultry production in Albania has been focused on the local markets. One of the factors is the costs of transportation to the local markets are less than in international markets. The consumer behaviour toward poultry consumption is also similar with EU consumer behaviour related to poultry production. (DEVINE, 2003)

METHODOLOGY AND MATERIAL

This study consists of choices when mix methods of qualitative and quantitative analysis. The quantitative. For analysing the Livestock and live meat poultry production, secondary data was collected from INSTAT (Albanian Institute of Statistics). The data type was quantitative data and descriptive analysis was conducted. For importing and exporting, secondary data was used taken by FAOSTAT (for import and export of poultry products) and UNSTAT COMTRADE (for animal meat import). The data was analysis by mixed between descriptive analysis and trend analysis. (FREUND AND WILSON, 2003) Data gathered from other countries or regions were used for comparative analysis purposes. This study allows us to have a better understanding of poultry subsector value chain of Albania. Regarding the market structure of Albanian poultry sector and Control and quality issues in relation with EU, content analysis was used to analyse the qualitative data. Also, the Value chain of poultry was analysis with content analysis when a lot of qualitative data was gathered.

Index numbers

Data was collected from INSTAT (National Institute of Albania) and STATISTA (GDP/income per capita). The data time interval is from 2012 to 2021. Consumer Price Index for meat group based on 2012 chosen as the base year for comparison. The method used is Laspeyres with based year. (BOSKIN et al, 1998)

(1) (CPI study year / CPI base year) *100

(2) Deflation = (Income per capita / CPI base year) *100

Limitation in the paper

This paper as every paper has its limitations. The main issue is lack of statistical availability for meat processing in Albania. Also, there is no data related to processors, trading process, slaughtering, and leftovers.

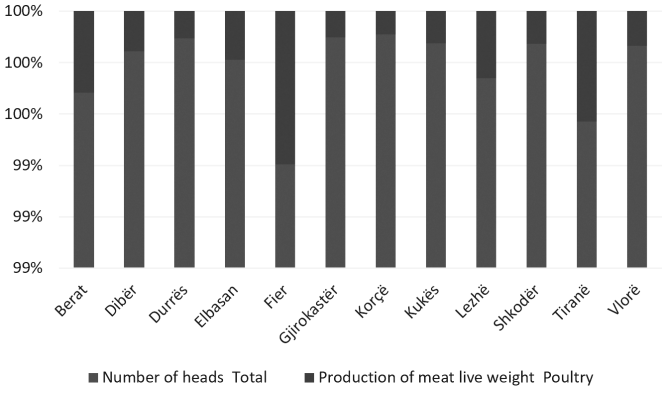
POULTRY PRODUCTION IN ALBANIA

Poultry sector in Albania is characterised by small scale production and large-scale production: the poultry enterprises. Small scale are typically family farms in the backyard, also the intensive family poultry farms. Usually, the poultry livestock they grow are chickens, turkeys, ducks, geese, and pigeons. On the other hand, poultry enterprises are specialized in egg production and meat production. From which is mostly Chicken and Turkeys, common breeder is broilers.

Poultry production by regions

According of INSTAT statistics, poultry subsector had decreased in 2020 with 7.907.000 heads in comparison with 2019, with 8.179.000 heads. The total production of live meat in 2020 was 21.049 tonnes. The total poultry livestock units are 49.000 in 2020. Compared to other meat sectors, poultry sector dominates for number of livestock, followed by sheep/goats.

Chart 1: Number of heads and meat production for poultry in Albania



Source: INSAT, 2020, own edit.

But when it comes to the production the total production of live meat in 2020 was 21.049 tonnes. (INSTAT, 2020) The total poultry livestock units are 49.000 in 2020. Where Fier Region, is doing better in numbers than other regions in Albania related to the number of livestock and production for poultry, with the highest livestock units 22.000. On the other hand, the capital Tirana, has larger total livestock compared to Fier region but the production of live meat is significantly lower than Fier region. Berat and Tirana with 6000 livestock unit, Tirana shows production of meat live weight compared to Berat. (INSTAT, 2020)

Egg production by regions

Turkey chickens are common meat in Albania, according to INSTAT report for 2020, turkeys' number of heads was 5001217. While poultry production was 21000 tonnes. 861018 were the total egg production. From the Table 5, we can see that Durres region is the leader in egg production with 272500 million pieces, followed by Shkoder region with 99806 eggs. The regions who have the least contribution in egg production are Gjirokaster and Kukes region.

Table 1: Egg production

Prefecture	Million/pieces
Total of eggs	861.018
Berat	71.887
Dibër	35.130
Durrës	272.500
Elbasan	74.922
Fier	91.598
Gjirokastër	13.829
Korçë	39.394
Kukës	11.716
Lezhë	24.115
Shkodër	99.806
Tiranë	66.004
Vlorë	60.116

Source: INSTAT (2020), own edit

Exporting and importing trends for poultry in Albania

Imports for animal meet for 2000-2016, according to UNSTAT, for beef meat we can see a high increase from 2000 to 2005, and then decreasing trend in 2010. Also, in 2014 dramatically decreases for importing beef meat and followed by an increase in 2015. Decreasing again in 2016. Imports for pork meat, we can a different trend rather than the beef one. In the table 1, we can see from 2000 to 2005, the imports doubled for pork meat, then again 2010 we see the same trend, reaching 11.401 ton. Then in 2014, the pork meat imports decreased dramatically to 5.020 ton. These fluctuations continue for years 2015 and 2016. In relation to the chicken imports, we can see that it has similarities with pork import trends, we can see an increase trend for 2000, 2005 and 2010.

And then for years 2014, 2015 and 2016 the imports remain stable, with slightly increasing trend. We can see that the imports expenditures for beef, pork and chicken in 2016 is better than the years before.

Table 2: Import of main types of meat

Year	Beef (HS 0201 and 0202)		Pork (HS0203)		Chicken (HS0207)	
	Imports (000 $)	Imports (ton)	Imports (000 $)	Imports (ton)	Imports (000 $)	Imports (ton)
2000	1,195	1,250	6,475	8,444	6,475	8,444
2005	6,800	5,669	12,600	11,401	12,600	11,401
2010	5,796	2,558	19,943	10,352	19,943	10,352
2014	1,598	692	9,738	5,020	9,738	5,020
2015	2,205	1,029	10,932	5,847	10,932	5,847
2016	1,787	997	9,776	5,781	9,776	5,781

Source: UNSTAT (2018), SKRELI AND IMAMI, 2019

Table 3: Supply of poultry meat (000 ton)

Category	2005	2010	2015	2016
Production	4.4	17	17.3	19.7
Import	18.4	20.0	21.4	24.2
Export	:	:	:	0.003
Supply	22.8	37	38.7	43.9
Import/supply	80.7%	54.1%	55.3%	55.1%
Export/production	:	:	:	0.02%

Source: INSTAT (2018) for production, UNSTAT (2018) for trade, SKRELI AND IMAMI, 2019

The production for supply of poultry meat has an increasing trend, from 2005 to 2016. The supply come only from Import activities, more than 55,1 %. While for export/ production is very low 0.02%.

RESULTS AND RECOMMENDATIONS

Poultry overall, is an important product in the Albanian consumer's diet. The poultry production goes for domestic markets. In comparison with beef and pork, Albanians prefer the chicken meat consumption, this is also shown in the table 2. A large quantity of poultry products Albania is imported. The imports come from Greece, Brazil, US, and Germany in relation with poultry meat in table 3. Albania has no power in exporting poultry meat to other countries. The factors like: quality issues, high cost of production, cheaper poultry products by other countries, issues with supply chain in relation with storage facilities, freezing, controlling etc. Also, the data in Chart 1, shows problems in productivity levels. Albania is characterised by a domination small-scale and family farming, making it difficult for commercial poultry. In a general look on the market, Albania has a big potential in neighbouring countries as target markets for exporting. But to compete with other countries Albania must be more efficient in processed products, relatively with poultry products. This limitation comes from low productivity in agriculture and agro-processing industries, also there is lack of facilities for processing products, and the last is high costs and low quality. These limitations, exists more in meat production than in crop production. (LLAZO, 2013) With the globalization happening in Albania, the consumption is shifting towards protein and nutritional food with meat origin. This is putting pressure for globalization of poultry sector in Albania, with better specializations in production methods, hygiene standards, quality standards and supply chain. (MANNING AND BAINES, 2004)

As shown in Table 4. Albanian imports poultry are mostly from: Greece, Brazil, US, and Germany. With the highest percentage US, this is explained of good relations and trust of customers between US and Albania. As seen the highest value is in December with 2.494.000 euro, this is because of festive months in Albania during this month. As expected, imports of Greece are relatively high, this is because Greece can easily trade and have a market in Albania since the distance for trading is low, since they are neighbours. Brazil the second biggest importer of Albania for poultry meat, the cheap prices, and affordable prices that Brazil chickens make them a big importer in poultry meat. Germany, imports less than Greece, Brazil, and US, with half of the market compared to countries mentioned above. The importing price is less than 1 euro.

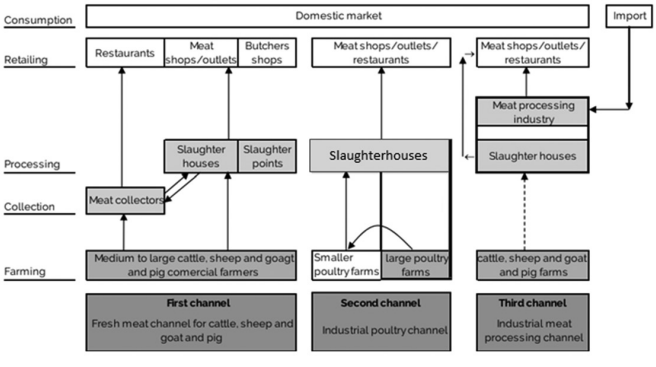
Table 4. Import of poultry meat 2017

Poultry meat	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Quantity (ton)	1,835	1,940	2,126	1,616	2,253	1,849	2,297	2,086	1,816	1,955	2,314	2,750
Value(000Euro)	1,368	1,585	1,730	1,411	1,846	1,453	2,079	1,862	1,462	1,862	2,191	2,494
Price (Euro/kg)	0.75	0.82	0.81	0.87	0.82	0.79	0.90	0.89	0.80	0.95	0.95	0.91
Import structure by countries												
Greece	11%	30%	32%	26%	18%	20%	17%	21%	21%	17%	18%	18%
Brazil	14%	20%	18%	27%	12%	10%	26%	27%	13%	26%	24%	18%
US	38%	12%	15%	8%	18%	19%	10%	13%	12%	18%	12%	20%
Germany	8%	9%	6%	9%	11%	11%	15%	17%	15%	9%	13%	9%

Source: EUROSTAT (2018), SKRELI AND IMAMI, 2019

Figure 2 represents the overall meat value chain map. It consists in three channels: fresh meet channel, industry poultry channel and industrial meat processing channel. The Value chain for Poultry channel is overall short, it starts with farmers which may be small poultry farms and large poultry farms. The collection takes place for both farms and they end up in slaughterhouses. Slaughterhouses process represent some serious risks for overall customer health. The bad hygiene can contaminate the food. For example, Salmonella spp. in slaughters environment. The poultry product with linkage of slaughterhouses becomes a supply for meat shops, outlets, and restaurants. Con-

Figure 2. Meat value chain map



Source: SKRELI AND IMAMI, 2019

sumption is the domestic market. Also, the import plays a role in all channels. (JAHELEZI AND BIJO, 2014) European Union, based on IPARD II, has budget meat production industries, so they can be competitive in the single market of EU.

Table 5 gives the consumers price index for meat group production. Prices have increased by 0.3% from2012 to 2013, increasing in 2014 with 1% and in 2015 remaining the same as 2014. Prices decreased from 2015 to 2016 0.1, with slightly increase in 2017 by 0.7%. From 2018 to 2021 we see an increasing patten, with the highest in 2021 with 5.2% increase for meat groups. The income in 2021 after deflation with 2012, decreased to 6056.6. From years 2013 to 2021 we see increasing trend of income per capita.

Table. 5: Consumer Price Index for meat group

Year	Average CPI Meat (CPI)	CPI (2012)	Income per capita	Deflation
2012	96,2	100	4248,92	4248,92
2013	97,1	100,952328	4422,67	4380,948984
2014	97,2	101,028313	4584,92	4538,252545
2015	97,3	101,083956	3974,79	3932,167042
2016	96,4	100,128359	4124,41	4119,122736
2017	96,9	100,718633	4525,89	4493,597534
2018	97,8	101,63811	5257,71	5172,971023
2019	98,2	102,072705	5345,06	5236,522315
2020	99,7	103,615561	5268,24	5084,410052
2020	101,3	105,252575	6374,79	6056,659426

Source: INSTAT (2020), STATISTA (2012-2021), own calculations

Agriculture production price index for poultry has increase in 2018 with 4.5, showing the same trend in 2019 with 4.9% increase. And 2020 had the highest increase with 5.2 % increase. Related to eggs for the agricultural product price index we see a fluctuation in trends, where in 2018 it has decreased with 2.5, it increased with 2.4 in 2019 and again it decreased with 1.9%.

Table. 6: Agricultural Product Price Index for poultry and eggs

Years	Agricultural Product Price Index	
2015 (Base Year)	Poultry	Eggs
2015	100	100
2018	104,5	97,5
2019	104,9	102,4
2020	105,2	101,9

Source: INSTAT (2020), own calculations.

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PERCEPTIONS, PROFITABILITY AND DETERMINANTS OF GRANULATED CASSAVA PACKAGING IN KUMASI METROPOLIS, GHANA

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Abstract: *Packaging does not only protect a product but also provides directions for using the product, as well as relevant information about its content and nutritional value. This study was undertaken to assess Granulated Cassava (Gari) sellers' perception, profitability and determinants of packaging in Ashanti Region. The study area was purposively selected because of the active participation and contribution of marketing activities. A structured questionnaire was administered in the form of interview to obtain primary data from the respondents. Data were analyzed using binary and multinomial logit regression model and Garret ranking technique. The results showed that there is 5% difference in the gross margin with packing of Gari, which is also statistically significant at 1%. Years of education, legal requirement, and durability of the packaging material and cost of packaging material were the significant factors that influence sellers' choice of packaging. Lack of technical know-how, cost of capital equipment and lack of knowledge on packaging equipment and/or material were the most limiting constraints affecting Gari packaging. The study recommends that investors should invest in the Gari packaging business since it has a relatively higher rate of returns as compared to the unpackaged one.*

Keywords: *Gari, Gari Packaging, Gari Sellers, Granulated Cassava, Perception, Profitability*

INTRODUCTION

In this contemporary time, advertisers compete with each other to promote their position in the market, increase efficiency and attract customers' attention. Packaging is one of the most critical factors or components in the value addition chain of activities in the food or agro-processing industry. A good package sometimes gives a company more promotional effect than it could possibly afford with advertising creating a brand loyalty. It also gives directions for using the product, as well as relevant information about its contents, nutritional value and potential hazard(s). An adequate packaging helps to reduce malnutrition, removes local surpluses and helps to attract the consumer's attention (Anin, 2008).

As it is the first point of interaction with consumers, a lot of manufacturers, retailers and small business marketing geniuses are focusing on how they can improve their product packaging in order to lure more shoppers to buy their product. This has become the focus of many designers, to bring out the best packaging which seeks to protect products through their distribution channels and to communicate the product benefit to its target group. This can increase the chances of converting the sheer packaging interest to actual sales which in return will improve the performance of the business (Bix, 2003).

The production, storage and marketing of Gari is still mainly carried out by local farmers, processors and foodstuff traders, while only a few highly mechanised processing plan market their products in consumer packaged forms (Oyeniran, 1980). Gari is still being packaged, transported and stored in woven sacks with attendant fluctuations in climatic conditions and sometimes it is being sold in the market in bowls with exposed surfaces thus increasing its susceptibility to environmental contaminations (Ogiehor & Ikenebomeh, 2006).

According to the Food and Drugs Board Legislative Instrument (LI) 1541, packaging is a mandatory requirement necessary for the sale of products by every business. Packaging has thus far been demonstrated to be a difference maker; it could make or break a brand or a business entity. Effective and efficient packaging of food and beverage products have been advocated as a means of developing new food products that impact positively on marketability and product quality (Mante, 2005). Studies have indicated that product packaging encompasses; the physical aspect of the container, the design,

the shape, the color, the labeling and the material used (Ampuero & Vila, 2006). Considering the cumbersome nature of production process, the need to have the finished products to cities where large buyers live, the importance of Gari in dietary intake and the need to meet the increasing international demand, the evaluation and identification of adequate packaging materials that will keep the overall quality of Gari during distribution and at the point of consumption becomes imperative (Ogiehor & Ikenebomeh, 2006).

For many consumer non-durables and durables, packaging may have direct function in terms of product satisfaction, customer trial and repetitive purchase. With regards to product satisfaction and repeat repurchase, packaging is useful due to the fact that packages poorly designed may discourage repurchase (Bloch, 2005). Consumers who are frustrated by packages that cannot be easily opened or labels that cannot be read without magnification may opt for brands that have considered the "human condition" in their package design (Bix, 2003). As a result of this, companies focus on product packaging, considering the graphics, color and appropriate packaging materials to increase their market share or business performance. According to Ghani & Kamal (2010), packaging plays a key role in product display as much impulse buying occurs as a result of product display. Thus packaging is an effective tool and as market mix has a strong potential to engage consumers. This is because consumers draw information about the product and its attributes from the package's aesthetic and graphic design (Moskowitz et al., 2009). Manufacturers may use packaging design to initiate expectations in the consumer about a product. These expectations may come from packaging design cues such as colors, words, symbols, materials, shapes and images which may in one way or the other carry a semiotic influence (Durgee, 2003).

Product Packaging possesses the potential to determine the success within a given market. It's certainly not the only determinant of business success but it sure plays a pivotal role. Packaging is not merely a production concern but also a marketing concern (Dunoo, 2016). A good package sometimes gives a company more promotional effect than it could possibly afford with advertising creating a brand loyalty. There is a strong and broad demand for packaged products in sub –Sahara Africa and this has a growing potential market population projected to double from 1.2 billion in 2015 to 2.4 billion by 2050 (Food and Agriculture Organization, 2012). In addition to the large local market for Gari there is huge opportunity with a much higher profit potential in exporting this product to Africans living in the US and Europe. However, there are strict guidelines concerning foods exporting to these countries (Jwuoha, 2013).

Despite the policies formulated and implemented by the Government of Ghana through the Ministry of Food and Agriculture and Ministry of Trade and Industry with regards to Gari packaging, the producers of Gari still use inappropriate storage and packaging methods for the product like hessian bags and transparent plastic polyethylene sheets (Oyelade et al., 2001). A cursory observation of made in Ghana Gari reveals that many sellers give little or no attention to the packaging of their Gari (Dunoo, 2015). Poor or inadequate Gari packaging constitutes a major constraint to investors as well as manufacturers. Although some of the locally made Gari are considered to be of high quality and unique to the country, they are not accepted as good packaged products to reap the full benefits of the product, especially outside the local market (Institute of Packaging Ghana (IOPG) Situational Analysis Report, 2014). This is a worrying trend with disastrous consequences. On November 1st 2015, the Government of Ghana placed a ban on light plastic materials with less than 20 microns (one millionth of a metre in term of density) such as the ones used in packaging Gari, sugar and porridge. This formed part of the government's effort in addressing the sanitation challenges the country is grappling with (www.myjoyonline.com).

According to the World Health Organization (WHO), one in every ten people falls ill from consuming contaminated food every year as a result of inappropriate packaging although local statistics are unavailable because of low reporting of condition at hospitals (myjoyonline.com). Most Gari produced in Ghana lack the good qualities a packaged product should possess. The container is either not appropriate for the product, or the illustration is not able to display the required information concerning the product, or the layout is overcrowded. As a result, there have been an increasing incident of waste disposal problems because of the non-biodegradable nature of the packaging material used (Sailaja & Chanda, 2001). The poor packaging has also impeded the export of this commodity to the EU and other markets. As a key element in the marketing mix, the benefits derived from Gari packaging could be immense if serious attention is given to it. It is therefore imperative to undertake this study to assess sellers' perception, profitability and determinants of Gari packaging. The following were the research questions; What are the forms and extent of packaging on Gari? What are the cost and returns involved in the packaging of Gari? What is the seller's perception on Gari packaging? What are the determinants and choice of Gari packaging? What are the constraints of Gari packaging?

RESEARCH METHODOLOGY

Kumasi Metropolis was chosen as the study area because the area contains a fairly large number of Gari sellers. The research design adopted was survey design, which involves the collection of qualitative and quantitative data that was quantitatively analyzed using descriptive and inferential statistics. This research design was employed in the study with the aim of assessing sellers' perception, profitability and determinants of Gari packaging.

This study employed the multistage sampling technique to obtain the primary data. The 3 Sub-metros were selected purposively in the first stage because they are amongst the high and middle income suburbs noted in Gari production and consumption. Furthermore, the respondents were selected from each market using snowball sampling technique because the respondents for the study were difficult to locate and questionnaire was distributed to hundred and twenty-two (122) Gari sellers in Kumasi metropolis making the total sample size for the study 122 respondents. Data on the socio-economic characteristics of the Gari sellers was coded, summarized using descriptive statistics such as means, charts, frequency distribution table and percent-

ages generated using the SPSS, STATA and Microsoft Excel. Income statement approach was used to analyze the cost and returns of the Gari selling business. The perception index was used to analyze seller's perception on Gari packaging. The factors that influence sellers' decision to package as well as choice of packaging were estimated using the binary and multinomial logit regression model. The various constraints of Gari packaging were ranked using the Garret ranking technique.

Profitability Analysis

Profitability is ability of a company to use its resources to generate revenues in excess of its expenses. In other words, this is a company's capability of generating profits from its operations. It is the primary goal of all business ventures and without it the business will not survive in the long run. Profitability is measured with income and expenses. Income is money generated from the activities of the business whereas expenses are the cost of resources used up or consumed by the activities of the business. Profitability actually looks at the relationship between the revenues/ incomes and expenses to see how well a company is performing and the future potential growth a company might have.

Although profit and profitability are used interchangeably, they are not the same since there are some distinct differences between the two. Profit is an absolute number determined by the amount of income or revenue above and beyond the costs or expenses a company incurs. It is calculated as total revenue less total expenses and appears on a company's income statement or trading profit or loss accounts. No matter the size or scope of the business or the industry in which it operates, a company's objective is always to make a profit. Profitability on the other hand is closely related to profit, but it is used to determine the scope of a company's profit in relation to the input employed. This is to say that profitability is a measurement of efficiency and ultimately its success or failure. It is therefore a relative figure and not an absolute figure like the profit. Profitability can therefore be said to be the ability of a business to produce a return on an investment based on its resources in comparison with an alternative investment. This means that although a company can realize a profit, this does not necessarily mean that the company is profitable.

Profitability is one of the four building blocks for analyzing financial statements and company performance as a whole. The other three are efficiency, solvency, and market prospects. There are many different ways for analyzing the profitability of a venture. The four common ones are Gross margin analysis, Net margin analysis, Operating margin and Return on assets. The first way of analyzing profitability is considered in this study.

The estimation of the profit margin percentage for packaged and unpackaged Gari, was formulated as follows:

$$Gross\ Margin = \frac{\text{Gross Profit}}{\text{Sales}}\ x\ 100\%$$

Where;
Gross profit= Total revenue – Total variable cost
Sales= Unit sold * Unit price
Total Variable Cost = Total Quantity of Output * Variable Cost Per Unit of Output

(Source: https://www.thebalancemb.com)

Empirical specification of the binary logit regression model

The binary logistic model was employed in analyzing the factors that determine sellers' decision to package since the observation falls into two categories (decision to package or not to packaged) of dichotomous dependent variable. The empirical specification of the binary logistic model for ascertaining the factors that determines sellers' decision to package a product is outlined below.

$$Yi = \beta o+\beta 1SEi+\beta 2EDUi+ \beta 3QTYPi + \beta 4LRi + \beta 5PSi+ \beta 6SLi + \beta 7DUi + \beta 8PMi + \varepsilon i$$

Yi denotes seller's decision to package Gari as the dependent variable, β1 to β8 represents the various coefficients of the independent variables to be estimated while βo and εi represents the constant and the error term respectively. Table 3.1 presents the variables used in the regression model, their definitions, measurements and a-priori expectations.

Description of variables

Table 1: Description of variables

Variable	Definition/Meaning	Measurement
βo	Constant	
εi	Error Terms	
β1- β7	Coefficients	
Dependent variable		
Yi	Sellers decision to package	
Independent variables		
Variables	**Measurement**	**A-prior sign**
Experience (SEi)	Years of selling Gari	+/-
Education (EDUi)	Number of years in formal education	+
Quantity purchased (QTYPi)	Kg	+/-
Legal requirement (LRi)	1 = yes, 0 = otherwise	+/-
Product safety (PSi)	1 = yes, 0 = otherwise	+/-
Shelf life (SLi)	1 = yes, 0 = otherwise	+/-
Durability of packaging material (SLi)	1 = yes, 0 = otherwise	+
Packaging material cost	GH₵	+

Source: Field Survey, 2021

Description of independent variables and a-priori expectations

Several factors were considered as variables in determining the seller's decision to package or not to package Gari. These variables have their expectation and influence on sellers' decision to package or not to package. Basically, the study expects some variables to have a positive influence and others to have a negative influence on sellers' decision to package or not.

Years of selling experience: Years of selling experience of the respondent was expected to affect the sellers' decision to package negatively. This means that the higher the number of years of selling experience, the more likely respondent would not package. This is because, the more years of the sellers' experience to sell without packaging the more likely he/she will be convinced not to package with an idea of not adding any further additional cost.

Education: The education of the respondent was expected to influence their decision to package positively. This is where collection of data focused on the number of years in formal education implying the higher the number of years in formal education, the more likely the person would package his/her Gari. This is because people with higher number of years in formal education were expected to have more knowledge on the benefits of packaging Gari.

Quantity purchased: Quantity purchased is also another variable which was expected to influence the sellers' decision to package negatively. This is because people with higher quantity of purchase incur high variable cost which in returns discouraged them from adding further cost of packaging.

Legal requirement: Another variable was legal requirement. Legal requirement was expected to influence their decision positively or negatively. More specifically, the study recorded the legal requirement as a dummy variable where 1 represented yes (if the seller considers) and 0 represented no (otherwise).

Product safety: Another variable was product safety. Product safety was expected to influence their decision positively or negatively more specifically, the study recorded the product safety as a dummy variable where 1 represented yes (if the seller considers) and 0 represented no (otherwise).

Shelf life: Another variable was product shelf life. Shelf life was expected to influence their decision negatively or positively, the study recorded the product shelf life as a dummy variable where 1 represented yes (if the seller considers) and 0 represented no (otherwise).

Durability of the packaging material: The expected influence of this variable was positive. This is because the durability of the packaging material has positive influence on controlling product wastage during distribution since quality packaging material would directly control product leakage. The study recorded the durability of the packaging material as a dummy variable where 1 represented yes (if the seller considers) and 0 represented no (otherwise).

Cost of packaging material: Another variable with positive or negative expectation on seller's decision to package. This is because a cedi increase in the cost of packaging material will directly affect the variable cost, selling price of the product which in returns will have an impact on their sales or revenue level.

Garrett ranking technique

To find out the constraints associated with Gari packaging in Kumasi Metropolis, the Garrett ranking was used (Sedaghat, 2011). The Gari sellers were asked to rank the constraints given on the questionnaire in the order of severity to their business. Where one (1) means most severe, two (2) means more severe, three (3) means severe in a descending manner. The order of merit assigned by the Gari sellers was converted into ranks using the following formula;

$$\textit{Percentage position of each rank} = \frac{100(Rij-0.5)}{Nj}$$

Where;
Rij = denotes the rank given for the ith factor by jth individual
Nj = donates the number of factors ranked by the jth individual

For each constraint, the response was summed together and divided by the total number of Gari sellers for whom scores were assigned to. These mean scores for all the constraints were arranged in descending order, ranks were given and the most limiting constraints were identified.

RESULTS AND DISCUSSION

Socio economic characteristics of Gari sellers

Table 2: Socio economic characteristics of Gari sellers

Variables	Category	Frequency	Percentage (%)
Age	20 – 30	29	23.7
	31 – 40	50	41.0
	41 – 50	28	23.0
	51 – 60	12	9.8
	61 – 70	3	2.5
Sex	Male	25	20.5
	Female	97	79.5
Marital status	Single	41	33.6
	Married	71	58.2
	Divorced	6	4.9
	Widowed	4	3.3
Educational level	Primary	16	13.1
	Middle school	44	36.1
	Senior high	50	41.0
	Tertiary	12	9.8
Religion	Christianity	92	75.4
	Islam	16	13.1
	Traditionalist	3	2.5
	Others	11	9.0
Ethnic affiliation	Akan	67	54.9
	Ga	16	13.1
	Ewe	10	8.2
		29	23.8

Source: Field Survey, 2021

The minimum age of the respondents is twenty (20) years, the maximum age is sixty-three (63) years and the average age of the respondents in the study area is thirty-eight (38) years. This clearly indicates that there are more matured people who are involved in the Gari business. This means that Gari business is dominated by people in the economically active population bracket age group of 20 to 65 years in the study

area. This is consistent with observations made by Boateng et al., (2013) that economically active age group in Ghana is between 14 and 66 years.

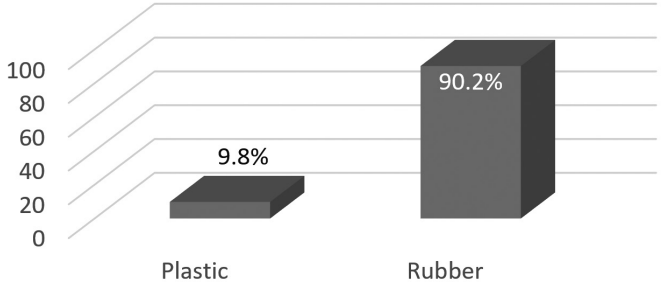
It was found that Gari selling as a business in the Kumasi Metropolis is female dominated. This is because, out of the hundred and twenty-two (122) respondents interviewed, ninety-seven were females, representing 79.5% of the total sample whereas 25 males are into the Gari business representing 20.5%. This gender composition of the study is consistent with the national figures, where 50.48% of the population constitutes females while 49.52% is male (FAO, 2012) and also the active role of women in the cassava industry and their predominance in the processing and marketing than their male counterparts who dominate in the production of cassava roots. (Adegeye et al., 1999)

Majority of the respondents (92) were Christians representing 75.4% of the sample, this is in conformance with the 2010 census which shows Christianity as the largest religion in Ghana with approximately 71.2% of the population being members of various Christian denominations and Kumasi being the second largest town dominated by Christians (Ghana, The Fact Book, 2014).

It was realized that majority of Gari sellers which represents 58.2% of the population are married and 34% are single. The educational level of Gari sellers was categorized into five groups; primary, middle school, secondary, tertiary and no formal education. Sixteen (16), forty-four (44), fifty (50) and Gari sellers had primary, middle school, secondary education. The corresponding percentages are 13.1%, 36.1%, and 41.0%. Sellers with different educational backgrounds go into Gari business with the least category being those with primary education. This implies that most Gari sellers are literates, thus, they are able to read about new technologies that can improve Gari packaging. Gari sellers within the study area belong to various ethnic groups. The ethnic groups were categorized into four (4) groups namely; Akan, Ga, Ewe and others. From the data collected, majority (55%) of the Gari sellers within Kumasi Metropolis are Akans.

Form and extent of Gari packaging

Figure 1: Forms of Gari packaging

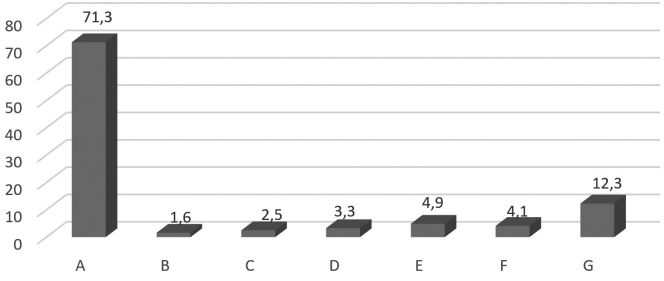


Source: Field Survey, 2021

It was found that out of the 122 respondents, 12 sellers representing 9.8% used plastic whiles the remaining 110 sellers representing 90.2% used rubber as a form of packaging material.

Extent of Gari packaging

Figure 2: Extent of Gari packaging



Source: Field Survey, 2021

The extent of Gari packaging was categorized into seven (7) different groups as follows:

A = Only container/packaging material (e.g. rubber, plastic)

B = Container and name of manufacturer

C = Container, name of manufacturer and product composition

D = Container, name of manufacturer, product composition and location of business

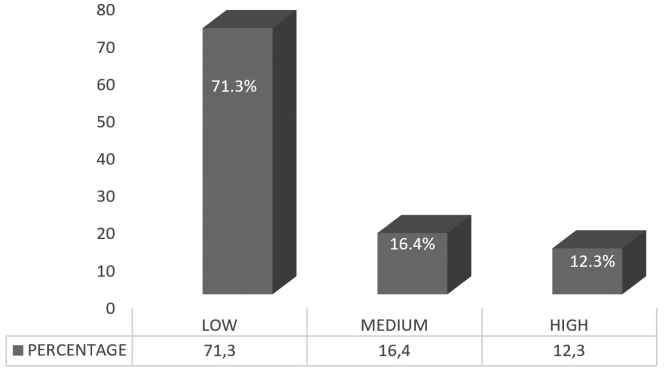
E = Container, name of manufacturer, product composition, location and nutritional benefit

F = Container, name of manufacturer, product composition, location, nutritional benefits and expiry date

G = Container, name of manufacturer, product composition, location, nutritional benefits, expiry date, barcode and mode of usage and storage

From the Figure 2, it was found that majority (71.3%) of the Gari sellers in Kumasi Metropolis use only container (packaging material) without any further proper identification with only container or packaging material whiles the least extent was category (B) with only two (2) respondents representing (1.6%).

Figure 3: Choice of Gari packaging



Source: Field Survey, 2021

The extent of Gari packaging was further categorized into three (3) different levels to ascertain the factors that influenced sellers' choice of packaging Gari (Figure 4.3). The lower level represents only container/packaging material (e.g.

rubber, plastic), the medium level represents container, name of manufacturer, product composition, location and nutritional benefit and the higher level represents container, name of manufacturer, product composition, location, nutritional benefits, expiry date, barcode and mode of usage and storage. The lower level with packaging material without any additional information constituted 71.3% of the total sample. The medium level with additional information like name of manufacturer, product composition, location and nutritional benefit had 20 respondents representing 16.4% of the total sample and the remaining 15 respondents of the sample who were able to package their Gari to meet the required standard set by law backing product packaging constituted 12.3% of the sample.

Costs and returns analysis on Gari packaging

Variable cost items in Gari packaging

The cost and returns analysis shows the cost incurred and revenue generated by Gari sellers who are into selling of packaged and unpackaged Gari in one production cycle (monthly) in the study area. Data on the cost and return items of the individual sellers were collected and categorized into packaged and unpackaged. Hence, analysis was made on the kilogram scale basis to know the respective average costs and returns for each scale of production that sellers were operating. The total cost of Gari selling consists of fixed and variable costs. But this study seeks to consider only variable cost items in Gari selling to avoid bias representation of information. This is because, during our field interviews it was found out fixed cost items in the Gari selling are not specifically assigned to only Gari selling but other ventures as well. The revenue generated was obtained from sales from the product (Gari). This was calculated by multiplying the unit price by the number of kilograms/ Gari produced per production cycle (mothly).

Variable cost is cost which vary as the size and/or level of output of an activity varies, which is also known as direct cost such as raw product (Gari), cost of packaging material, labour, transportation, labeling. The costs of inputs for each scale of production are shown below in the Table 3.

Table 3: Variable cost per production cycle of Gari packaging

VARIABLES	MIN	MAX	MEAN	STD. DEV.
PACKAGED				
Raw Gari (Raw material)	360	3120	1658.28	26.21
Quantity purchased/ packaged (bag)	2	12	7.46	2.56
Purchasing cost	180	260	222.29	23.65
Selling price (2kg)	10	18	14.26	1.92
Cost of packaging material	12	25	17.39	3.37
Labour (production cycle)	10	300	64.74	63.10
Transportation	10	35	18.78	5.48
Labeling	.20	1	0.54	0.28
UNPACKAGED				
Raw Gari	360	7500	1886.90	25.19
Quantity purchased (bag)	2	30	8.89	4.76
Purchasing cost (bag)	180	250	210	20.44
Selling price (2kg)	8.00	12	9.70	0.75
Rubber	1.50	5.0	2.85	0.69
Labour (loading & offloading)	3.0	30	13.00	8.06
Transportation	10	60	23.84	8.06

Source: Field Survey, 2021

Returns on production

Average output per production

The average output per production cycle was calculated by summing all quantities purchased and dividing it by the number of respondents.

Average return per cycle of Gari production

The average return was calculated by multiplying the average quantity of output purchased by the average price per kg of Gari.

Income statement

The income statement presents a summary of the average cost and returns to Gari packaging in the production cycle. It reveals the gross income, total variable cost, as well as their margins. Profitability is the primary goal for most business ventures. Without profit, the business will not survive in the long-run. Consequently, measuring current and past profitability and projecting future profitability is very important (Hofstrand, 2006).

Table 4: Cost and returns for packaged and unpackaged Gari sellers

Particulars	Packaged	Unpackaged
	GH₵	GH₵
Income (A)	3513.93	2847.55
Less Variable Cost		
Raw Gari	1858.28	1866.9
Packaging material (Rubber)	129.73	25.34
Labour	64.74	13
Transportation	18.78	23.84
Labeling	132.94	0
Total Variable Cost (B)	2204.47	1929.08
Gross margin (A-B)	1309.46	918.47
Gross Margin percent of Income [(A-B)/A]*100	37%	32%

Source: Field Survey, 2021

For the packaged and unpackaged Gari, packaged Gari had average total variable cost of GH₵ 2204.47 as compared to the average total variable cost of 1929.08 for unpackaged Gari which represents 100% of the total cost for both ventures since the study considers only variable cost. The raw Gari accounted for the high value of the variable cost representing about 84% and 97% of the average total variable costs for the packaged and unpackaged Gari respectively. With regards to the above percentages, it can be concluded that, raw material (Gari) cost constitutes the majority of the variable cost items for both packaged and unpackaged Gari business in the study area.

Table 5: T-test to compare the means of profit of packaged and unpackaged Gari

Variable	Packaged	Unpackaged	Mean difference	P value	t-value
Profit	1509.46	918.47	590.87	0.000	5.52

Significant at 1%
Source: Field Survey, 2021

The T-test was run to show whether there is a significant difference between the means of the profit of packaged and unpackaged Gari. Our null hypothesis was that there is a significant difference between the means of profit of packaged and unpackaged Gari. Thus, from the results in Table 5, there is much evidence to accept the null hypothesis as the difference was significant at 1%.

Sellers' perception on Gari Packaging

Table 6: Sellers' Perception on Gari Packaging

Perception statements	Strongly Agree (2)	Agree (1)	Neutral (0)	Disagree (-1)	Strongly Disagree (-2)	Mean Score
The success of foreign made products as compared to their locally made counterparts is as a result of their good packaging	30(24.6)	37(30.3)	47(38.5)		1(0.8)	0.72
The element of packaging material like colour, shape, material used, typography influences consumer product choice the most	29(23.8)	41(33.6)	36(29.5)	(-1)	2(1.6)	0.66
The quality of the product in the long run is influenced by the durability of the packaging material used	7(5.7)	22(18.0)	56(45.9)	21(17.2)	16(13.1)	-.14
The safety of a product is determined by its packaging material	45(36.9)	46(37.7)	24(19.7)	6(4.9)	1(0.1)	1.05
Packaging increases the shelf life of a product	47(38.5)	43(35.2)	27(22.1)	3(3.3)	1(0.8)	1.11
Packaging material perception index						**0.68**
The extent of locally packaged products impress consumers most	32(26.2)	28(23.0)	42(34.4)	19(15.6)	1(0.8)	0.58
The extent of packaging influences the purchasing decision of consumers	33(27.0)	44(36.1)	35(28.7)	7(5.7)	3(2.5)	0.80
Consumers perception on packaging determines the extent of a seller's decision to package	19(15.6)	26(21.3)	46(37.7)	24(19.7)	7(5.7)	0.21
Seller's perception index on consumers purchasing decision						**0.53**
Packaging directly influences the sales of a product	36(29.5)	39(32.0)	29(23.8)	14(11.5)	4(3.3)	0.73
Packaging is the driving tool for high patronage of locally made products	33(27.0)	33(27.0)	27(22.1)	18(14.8)	11(9.0)	0.48
Locally made products are not patronized as a result of its poor packaging nature	29(23.8)	39(32.0)	30(24.6)	19(15.6)	5(4.1)	0.56
Ignorance of packaging importance has a direct effect on low patronage of locally made products	24(19.7)	30(24.6)	54(44.3)	14(11.5)	0(0)	0.52
Packaging has a direct relationship with profit	64(52.5)	35(28.7)	20(16.4)	3(2.5)	0(0)	1.31
Perception index on sales						**0.72**
Product price is determined by its packaging	76(62.3)	40(32.8)	6(4.9)	0(0)	0(0)	1.57
Materials for packaging has a direct relationship with the high price of the product	29(23.8)	61(50.0)	26(21.3)	3(2.5)	3(2.5)	0.90
Perception index on price						**1.23**
Product packaging is basically done because it is a legal requirement	46(37.7)	24(19.7)	24(19.7)	20(16.4)	8(6.6)	0.65

Packaging is a tool for product differentiation	56(45.9)	34(27.9)	27(22.1)	4(3.3)	1(0.8)	1.15
Product packaging solely displays the content of the product	10(8.2)	29(23.8)	40(32.8)	29(23.8)	14(11.5)	-.07
Numerous packaging constraints has a direct influence on poor packaging of locally made products	39(32.0)	45(36.9)	20(16.4)	17(13.9)	1(0.8)	0.85
Perception index on the other statements (legal requirement, product differentiation, product display, constraints)						**0.64**
TOTAL PERCEPTION INDEX						**0.76**

Source: Field Survey, 2021

The Gari sellers were asked to give their perception about some statements relating to the packaging of Gari for business success based on five main perception statement categories: packaging material, seller's perception on consumers purchasing decision, perception on sales, perception on price and others. Gari sellers' responses with respect to the various perception statements are presented in Table 6 below. The results show that the mean perception index for the packaging material was 0.68 suggesting that the Gari sellers' had an agreeing perception in terms of packaging material having a positive effect on product quality and differentiation. The mean perception index for sellers' perception on consumer's purchasing decision was 0.53 indicating that the Gari sellers had an agreeing perception about consumer's purchasing decision influenced by the packaging of the product. The positive perception can be attributed to the fact that, they regard packaging as an important tool to be kept as an economic asset.

Gari sellers further agreed with a mean perception index of 0.72 and 1.23 for sales and price respectively indicating their total agreement with the perception statements on sales and price. Lastly, other perception statement like packaging as a legal requirement, as a tool for product differentiation and displaying the product content had a mean perception index of 0.64 indicating their agreement with the perception statements.

The overall mean perception index was 0.76, indicating that the sellers had an agreeing perception on packaging as a tool for product success. But the respondents expressed their dissatisfaction with consumers' negative perception on packaged Gari because they consider it as a low cost product which does not need to be packaged.

Table 7: Descriptive statistics on independent variables included in the model

VARIABLES	**CONTINUOUS VARIABLES**			
	Minimum	Maximum	Mean	Std Deviation
Years of formal education	6	16	10.62	2.66699
Years of selling experience	1	20	6.80	4.42315
Quantity purchased	2.00	30	9.16	4.42532
	1.50	25	5.62	6.60692
Cost of packaging material	**DUMMY VARIABLES**			
	YES		NO	
	Frequency	percentage	Frequency	percentage
Legal requirement	70	57.4	28	23
Product safety	91	74.6	7	5.7
Shelf life	90	73.8	4	3.3
Durability of packaging material	29	23.8	37	30.3

Source: Field Survey, 2021

Table 7 shows the summary descriptive statistics for the variables included in the model. Out of the 122 respondents, the minimum years of sellers' with basic formal education level was 6 and maximum of 16 years representing sellers' with tertiary education level. The minimum years of selling experience was 1 and a maximum of 20, minimum quantity purchase of 2 bags which is equivalent to 132kg and a maximum quantity purchased of 30 bags representing 1980kg of Gari. The minimum cost of packaging material was GH₵1.50 and a maximum of GH₵25 per production cycle (1 month).

In addition, 70 respondents out of the total sample for the study representing a percentage of 57.4 agreed (Yes) to the perception that packaging is done because is a legal requirement and 28 respondents representing a percentage of 23 disagreed (Otherwise). 91 respondents representing 74.6% agreed to the perception on product safety and 7 representing 5.7% disagreed whiles 90 respondents with a percentage of 73.8 agreed to the perception statement that packaging increases the shelf life of a product and 4 respondents representing 3.3% disagreed. Respondents of 29 representing 23.8% agreed and 37 representing 30.3% disagreed with the perception statement on durability.

Determinants of Gari packaging using binary logistic regression model

Table 8: Determinants of Gari packaging

Decision to package					
	Coeffi-cient	Z	Marginal effect (dy/dx)	P>z	SE
Years of selling experience	-0.08	-0.96	-0.00	0.34	0.08

Years of education	0.23**	2.01	0.03	0.04	0.12
Quantity purchased	-0.05	-0.67	-0.01	0.51	0.07
Legal requirement	-0.53**	-2.07	-0.06	0.04	0.25
Product safety	0.44	1.15	0.05	0.25	0.38
Shelf life	-0.05	-0.14	-0.00	0.89	0.32
Durability of packaging material	0.66**	2.16	0.08	0.03	0.30
Cost of packaging material	.019***	3.78	0.01	0.00	0.05
Constant	-3.94			0.01	1.58

*Number of obs = 122 ***, ** Sig @ 1% and 5%.*
Prob>chi2= 0.0000 Pseudo R2 = 0.37
Source: Field Survey, 2021

Using the binary logistic regression model where decision to package was categorized into two (1 representing decision to package and 0 otherwise), sellers' decision to package was regressed against the socioeconomic variables.

From Table 8, all the independent variables were in conformity with the a-priori expectations. This means that as the years of education of a seller increase, the seller's decision to package also increases. Legal requirement which has a negative marginal effect with regards to the decision to package means that as the legal requirements on Gari packaging increases, the decision to package also decreases. From the table, four of the independent variables were statistically significant. Years of education, legal requirement and durability of the packaging material were significant at 5% whereas cost of packaging material was significant at 1%.

The marginal effect of the years of education of a seller means that a year increase in a seller's education will increase the seller's decision to package by 3%. This is concluded that, the higher the years of education of a seller, the higher their decision to package. This can be attributed to the fact that, sellers with higher number of years of education have better understanding on packaging requirement and technique.

The coefficient of legal requirement means that strengthening of packaging laws will increase the seller's decision not to package by 6%. This is because as the law backing Gari packaging is strengthened sellers will be required to increase their extent of packaging to the required standard, but because of the constraints of lack of technical know-how, cost of capital equipment and lack of knowledge on the packaging material or equipment sellers may not be able meet the standard which may trigger their decision not to package.

The coefficient of durability of the packaging material given also means that an increase in the quality of the packaging material will increase the seller's decision to package by 8%. Meaning an increase in the durability of a packaging material will have a positive marginal effect on the sellers' decision to package because, the durability of the packaging material will determine the price of the Gari which will eventually determine the net sales and gross profit of the production.

The coefficient of cost of packaging material also means that a cedi increase in the cost of the packaging material will increase the seller's decision to package by 1%. Meaning a cedi increase in the cost of packaging material will have a positive marginal effect on the sellers' decision to package because, the cost of the packaging material will determine the price of the Gari which in returns will eventually determine the net sales and gross profit of the production.

The Pseudo R2 of 37% means that the significant variables; Years of education, Legal requirement, Durability of the packaging material and cost of packaging material will affect the sellers' decision to package by 37%.

Choice of packaging using the multinomial logit model

Table 9: Choice of Packaging using Multinomial Logit Regression

Choice of packaging	Coefficient	Z	Marginal effect (dy/dx)	P>z	SE
0	**(Baseline)**				
1 (medium level)					
Years of selling experience	-0.04	-0.44	0.01	0.658	0.08
Years of education	0.13	1.06	0.03	0.291	0.12
Quantity purchase	-0.01	-0.18	0.00	0.855	0.08
Legal requirement	-0.54*	-1.85	-0.08	0.064	0.29
Product safety	0.56	1.26	-0.06	0.207	0.44
Durability of packaging material	0.71**	2.09	0.09	0.036	0.34
Cost of packaging material	0.18***	3.52	0.02	0.000	0.05
Constant	-3.96			0.003	2.15
***, ** & * Sig @ 1%,5% and 10% respectively					
2 (high level)					
Years of selling experience	-0.24	-1.57	0.01	0.12	0.15
Years of education	0.48***	2.78	0.03	0.00	0.17
Quantity purchase	-0.11	-1.00	0.00	0.32	0.11
Legal requirement	-0.59*	-1.70	-0.08	0.09	0.35
Product safety	0.08	0.15	-0.06	0.88	0.54
Durability of packaging material	0.59	1.49	-0.09	0.14	0.39
Cost of packaging material	0.20***	3.32	0.02	0.00	0.06
Constant	-6.36			0.00	2.14
***,* Sig @ 1% and 10%					

Number of obs = 122 Pro>chi2 = 0.00 Pseudo R2 = 0.33

Source: Field Survey, 2021

Using the multinomial logit model where choice of packaging was categorized into three (3) namely low (0), medium (1) and high (2) levels of packaging with the low level as the baseline. This model was used in addition to the binary logit model because the dependent variable here is nominal which allows for a dependent variable with more than two (2) categories and it's also considered as an extension of the binary logit model.

From Table 9 (medium level), it can be seen that durability of the packaging material has a 9% increase on a seller's choice to package at the medium level however, it is insignificant in high level. Amongst the other significant variables in each level (medium and high), it is quite clear that an additional increase in the years of education of a seller will have a 3% increase on the seller's choice of packaging at a high level. Legal requirement which is significant at both levels will have between 8% decrease on a seller's choice of either the medium or high level of packaging. Whereas cost of the packaging material has a 2% increase on the seller's choice to package at both medium and high levels.

Constraints faced by Gari Sellers

Table 10: Constraints faced by Gari Sellers

Constraints	Total	Mean	Rank
Lack of technical know-how	10132	83.05	1st
Capital equipment	10015	82.09	2nd
Lack of knowledge of the materials and or packaging requirements	7212	81.80	3rd
Time constraints	9912	81.25	4th
Access to packaging materials and equipment	9798	80.31	5th
Cost of packaging materials	9612	78.79	6th
Low consumer patronage	9560	78.36	7th
Price fluctuation	9382	76.90	8th
Lack of information on packaging	9198	75.39	9th
Environmental issues	8896	72.92	10th
Inadequate storage facilities	8810	72.21	11th
Pricing pressure from consumers	8788	72.03	12th
Transportation	8782	71.98	13th
Material handling	8778	71.95	14th
Labour	8748	71.70	15th
Space constraints	8740	71.64	16th

Source: Field Survey, 2021

Constraints are considered as any factors or elements that work as bottlenecks or obstacle that restrict an entity, project, or system (Such as a manufacturing or decision making process) from achieving its potentials or goals (Mboge, 2015). Some of the constraints such as cost of packaging material, transportation, environmental issues, lack of technical know-how, material handling, lack of knowledge of the materials and /or packaging requirements, low consumer patronage, labour, pricing pressure from consumers, capital equipment, space constraints, time constraints and inadequate storage facilities were identified through literature and were confirmed by our various respondents. Price fluctuation, lack of information and access to packaging materials were amongst the least constraints realized on the field.

Data collected from respondents was analyzed using the garret ranking technique where total scores obtained from the respondents based on the constraints were divided by the total number of respondents (122) to get their respective mean scores. The resulting mean scores were ranked in a descending order with the first (1st) position being the most limiting factor or severe constraint which affects packaging. The results in Table 10 show that lack of technical know-how, capital equipment and lack of knowledge of the materials and/or packaging requirements were the most limiting constraints faced by the Gari sellers which rank 1st, 2nd and 3rd respectively with material handling, labour and space as the least constraints faced by sellers ranking 14th, 15th and 16th.

CONCLUSIONS

The study shows that Gari packaging is categorized into two forms with rubber recording the highest number of 110 representing ninety percent (90.2) as compared to plastic of 12 in number representing ten percent (10%) of the total respondents. The study also shows that the choice of Gari packaging can be categorised into three (3) different levels with low level having the highest frequency with a percentage of 71.3, medium having 12.3% and high level with 16.4%. The empirical results also show that the Gari selling as a business is profitable when well packaged and unpackaged, however the packaged Gari is more profitable since it has a gross margin of 37% greater than that of the unpackaged Gari which has a gross margin of 32%, giving a difference of 5%. The T-test results show that there is a statistically significant difference between the profit of the packaged and unpackaged Gari at 1%.

The mean perception for the packaging material, sales, price, and seller's perception on consumer's purchasing decision and the other perception statements are 0.68, 0.72, 1.23, 0.53 and 0.64 respectively. The study also shows a total perception index of 0.76, which indicates the seller's agreement with regards to the perception statements. It can also be concluded that the cost of packaging material, durability and years of education are the significant factors that affect seller's decision to package. Lack of technical know-how, capital equipment and lack of knowledge of the materials and/or packaging requirements are the most limiting constraints faced by the Gari sellers with material handling, labour and space as the least constraints faced by sellers.

From the study, the following recommendations are given: the profit margin in the study shows that, both ventures are profitable. Hence, investors are encouraged to invest in the Gari packaging business since it has a relatively higher rate of returns as compared to the unpackaged one as their profit difference is statistically significant. Periodic packaging training and seminars for all sellers in the Gari industry should be held to educate them on current trends, do's and don'ts of the industry as well as formulate appropriate packaging laws well-tailored towards improving made-in-Ghana Gari to meet international standards. The study showed that majority of the sellers package their Gari in an unstandardized way (lower level), this has negative implications on both sellers and consumers (Oluwamukomi and Adeyemi, 2015) therefore there is a need for sellers to package their Gari in a standardized way (higher level).

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INTENSITY AND PROFITABILITY OF SMALLHOLDER CASSAVA FARMERS PARTICIPATION IN VALUE ADDITION IN AFIJIO LOCAL GOVERNMENT AREA OF OYO STATE, NIGERIA

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Abstract: *This study investigated the intensity and profitability of smallholder cassava farmers' involvement in cassava value addition in Afijio Local Government Area of Oyo State, Nigeria. Data were collected from 150 cassava farming households through the use of a well-structured questionnaire and employing a simple random sampling procedure. The data collected included information on the socioeconomic characteristics of the respondents, intensity of value addition among the respondents, factors influencing their decisions to add value as well as the extent of value addition, profitability of cassava value addition and the factors that determined the profitability level of the enterprises. The data were analyzed using the descriptive statistics for profiling the socioeconomic characteristics of the respondents, gross margin was used to measure profitability, and ordinary least squares regression model was used to determine the factors influencing the decisions of smallholder cassava farmers to add value to cassava as well as the extent of value addition among them. The results revealed that majority of the respondents were females (52.7%) with average age between 31-40 years of age while the average household size (52.7%) is between 6-10 members. Regression analysis of the determinants of the intensity of value addition revealed that the decisions to add value to cassava as well as the extent to which value was added were influenced positively by educational attainment, household size, and years of experience in cassava value addition. Results of the gross margin analysis revealed a positive return on variable costs thus indicating that the cassava value adding enterprise is a profitable one. These findings presented the need for all the stakeholders concerned to focus their attentions on proffering solutions to the challenges faced by cassava processors within the minimum time possible.*

Keywords: *Cassava, Cassava Processors, Profitability, Smallholder farmers, Value Addition.*
(JEL CODE: L11, M11, M21, Q13, R32)

INTRODUCTION

In sub-Saharan Africa, the agricultural sector is the key sector for rural development. Majority of rural household dwellers, who represent 70% of the poor, depend upon agriculture for their livelihood (Diao et al., 2010). Thus agriculture primarily contributes towards economic development of most African countries by reducing poverty as well as creating employment opportunities (FAO, 2012; World Bank, 2008). Currently, about half of the world's production of cassava is in Africa (FAO, 2018).

Cassava is cultivated in around 40 African countries, stretching through a wide belt from Madagascar, in the southeast to Senegal and Cape Verde in the Northwest. Food industry accounts for around half of the total global cassava consumption followed by feed industry. Region-wise, Nigeria is the world's leading producer of cassava accounting for around fifth of the world's production followed by Thailand, Indonesia, Brazil, Ghana, Congo and others (FAO, 2018). Throughout the forest and transition zones of Africa, cassava is either a primary staple or a secondary staple food. Cassava has the potential to increase farm incomes, reduce rural and urban poverty and help close the food gap.

Without question, cassava holds great promise for feeding Africa's growing population. Cassava can be produced with family labour, land and a hoe, making it an attractive and low-risk crop for farmers. Furthermore, cassava is available to

low-income rural households in the form of simple food products which are significantly cheaper than grains such as rice and wheat. Similarly, urban households in many parts of West Africa consume cassava in the form of gari (Nweke, 2001).

Cassava production is vital to the economy of Nigeria as the country is the world's largest producer of the commodity, with about 50 million metric tons annually from a cultivated area of about 3.7million hectares, accounting for cassava production of up to 20 percent of the world's, about 34 percent of Africa's and about 46 percent of West Africa's production (FAO, 2020). The growth in Cassava production in Nigeria has been primarily due to rapid population growth, large internal demand, availability of high yielding improved varieties and the existence of a relatively ready market. Table 2 (see appendix) shows the trend of cassava production in Nigeria from 2007-2017. Nigeria's cassava production moved from about 43 million tonnes in 2007 to an unprecedented 59 million tonnes representing 20.4% of global production in 2017.

Estimates of industrial cassava-use suggest that 165,000 metric tonnes of cassava root production was utilized as an industrial raw material in 2014 in Nigeria, representing just 0.3% of the total reported by FAO. The majority of agricultural produce in Nigeria is sold raw and at the farm gate leading to lower returns to the farmers. It is estimated that over 50 percent of farm produce in the Nigerian agricultural sector is rural-based and below commercial value. However, potentials exist for improved returns and income from value addition in the agricultural sector, which involves the development of new products and creating remunerative markets for higher value agricultural commodities. Value addition is important for raising the livelihood of smallholder farmers in Nigeria (Adeyemo et al., 2019).

Arising from the preceding points, this study will therefore attempt to provide answers to the research questions listed below;

1. To what extent are farmers involved in value addition in Afijio Local Government Area?
2. What are the determinants of cassava value addition among smallholder farmers in Afijio Local Government Area?
3. How profitable is cassava value addition enterprise on the basis of the intensity of smallholder cassava farmers in Afijio Local Government Area?
4. What effect does value addition have on profitability of cassava farmers in Afijio Local Government Area?

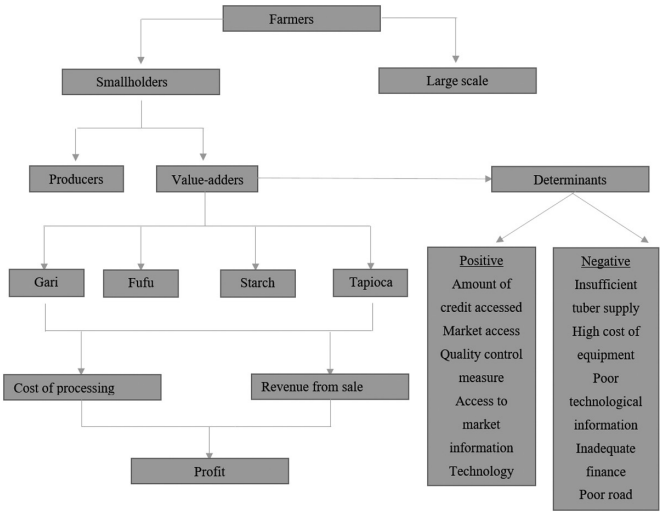
MATERIALS AND METHODS

The study area

The study was conducted in Afijio Local Government in Oyo State, Nigeria. Oyo state is one of the 36 states in Nigeria; it is located in south-west geopolitical zone of the country. Geography of Oyo state covers 28,454 square kilometers (Nigeria-Galleria, 2022). It is bounded in the south by Ogun State and in the north by Kwara State, in the west by the Republic of Benin while in the east it is bounded Osun State. Oyo State has a totality of 33 Local Government. Administratively, it has 33 local government areas which are then grouped into four Agricultural zones done by Oyo State Agricultural Development Programme (OYSADEP), namely; Ibadan-Ibarapa, Oyo, Saki and Ogbomoso zones.

Agriculture is the major occupation of the people and subsistent agriculture is prevalent. The climate in the state favours the cultivation of crops such as: maize, cassava, yam, kola,vegetable, plantain and cowpea. Afijio is a local government area in Oyo State with its headquarters in Jobele town. It has an area of 722km² and a population of 134,173 at the 2006 census. Afijio local government is subdivided into 10 wards, which are: Ilora I, Ilora II, Ilora III, Fiditi I, Fiditi II, Aawe I, Aawe II, Jobele, Iware and Imini (NigeriaGalleria, 2022). The indigenous of Afijio local government are mostly farmers and the area is blessed with vast agricultural products such as maize, cassava, yam and so on. Cassava is the major tuber crop produced by almost every household in Afijio local government area, hence the choice of the crop.

Figure 1: Conceptual Framework of the Intensity and Profitability of Cassava Value Addition



Source: Adapted from Author's Compilation, 2022

Research Design/Sampling Technique/Data Collection

The survey method of design was adopted for the study. The study adopted the random sampling procedure in selecting the respondents which are the cassava farmers/processors. Primary data was generated through the use of interview and well-structured questionnaires that was administered to the respondents to access information on various determinants of the intensity of cassava value addition and profitability in the study area.

Data Analysis

A combination of analytical tools was employed to analyze the data collected in the study. These include the descriptive statistics, such as tables of frequencies, means, standard deviation and so on which were used to profile the socio-economic characteristics of the respondents.

Descriptive Statistics

The descriptive statistics was used to analyze data on basic characteristics of the sampled household such as socioeconomic characteristics, farm size, age, sex, educational attainment. These results were presented in frequencies, percentages and means.

Intensity Ratio

This was used to determine the extent to which value was added to cassava.

$$\textit{Intensity ratio} = \frac{\text{Total quantity of value added product}}{\text{Total quantity of cassava produced}}$$

Ordinary Least Squares Regression Model

Ordinary least square regression analysis was used to determine the various socio-economic, institutional and market factors determining the decision to add value to cassava and also the extent to which value is added to cassava by the respondents.

It is expressed as follows:
$Y = \beta_i X_i + \varepsilon_i$
Where Y= intensity of value addition as the dependent variable,
$X_{(i)}$= smallholder characteristics and
ε_i is the error term.
X_1=age of the respondents
$X_{(2)}$=household size
X_3=cooperative society
X_4=cassava farming experience
X_5=proximity to the nearest market
X_6=sex
X_7=farmland size
X_8=credit access
X_9=access to market information
X_{10} =level of education
X_{11}=extension access

In the second step the Inverse Mills ratio (IMR) is added as a regressor in the extent of value addition equation to correct for potential selection bias. After estimating the determinants of the decision to add value, then the mills ratio from the selected equation is used as an independent variable in the target equation to assess the determinants of the extent of value addition. This is expressed as follows:

$$E(Z_i| Y=1) = f(x_i\beta) + y\lambda + u_i$$

Where E is the expectation operator
Z_i is the extent of value addition measured by the proportion of cassava output to which value was added.
x is a vector of independent variables influencing the extent of cassava value addition.
B is a vector of the corresponding coefficients to be estimated.

Gross Margin Analysis

Gross margin analysis was computed to evaluate the profitability of both the value added cassava products and the unprocessed raw tubers to assess the level of profitability. The gross margin was determined using the data obtained on variable cost incurred and the revenue realized.

The cost and return analysis of the cassava value addition enterprise was carried out using the GM= TR-TVC of production. This was done in order to ascertain the profitability of cassava processors in the study area. Profitability measures how profitable the cassava value addition enterprises are; a profitable enterprise must have TR>TVC with a positive Gross Margin. This further explains that cassava processing is profitable supporting the study conducted by Achem et al., (2013).

RESULTS AND DISCUSSION

Table 1: Socio-economic Characteristics of the Respondents

Variable	Frequency	Percentage
Age of respondent		
≤ 30	16	10.7
31-40	55	36.7
41-50	42	28.0
51-60	24	16.8
> 60	13	8.7
Total	150	100
Mean	44.21(±11.73)	918.47
Sex		
Male	55	47.3
Female	95	52.7
Total	150	100
Mean	1.53(±0.501)	
Marital status		
Never married	6	4.0
Married	140	93.3
Widowed	3	2.0
Divorced	1	0.7
Educational Attainment		
No formal education	10	6.7
Vocational	12	8.0
Primary	57	38.0
Secondary	49	32.7
NCE	13	8.7
OND	4	2.7
Degree	5	3.3
Total	150	100
Household Size		
1-5	67	44.7
6-10	79	52.7

>10	4	2.7
Mean	5.88	
Total	150	100
Years of farming experience		
<10	46	30.7
11-20	49	32.7
21-30	38	25.3
31-40	15	10.0
>40	2	1.3
Total	150	100
Farm size (acres)		
1-5	86	57.3
6-10	27	18.0
11-15	11	7.3
>15	26	17.3
Total	150	100
Major crop produced		
Cassava	138	92.0
Maize	6	4.0
Yam and others	6	4.0
Total	150	100
System of production		
Mixed farming	56	37.3
Mixed cropping	60	40.0
Mono cropping	34	22.7
Total	150	100
Size of farmland allocated for cassava		
1-5	111	74.0
6-10	26	17.3
11-15	9	6.0
>15	4	2.7
Total	150	100
Formal training		
Yes	37	24.7
No	113	75.3
Total	150	100
Years of experience in value addition		
1-10	87	58.0
11-20	44	29.3
21-30	14	9.3
>30	5	3.3
Total	150	100
Cooperative society		
Yes	31	20.7
No	119	79.3
Total	150	100
Primary occupation		
Farming and processing	80	53.3
Artisan	38	25.3
Trading	21	14.0
Civil servant	11	7.3
Total	150	100
Secondary occupation		
None	51	34.0
Farming and processing	69	46.0
Artisan	11	7.3
Trading	15	10.0
Civil servant	4	2.7
Total	150	100

Source: own construction based on questionnaire, 2022

The results obtained in Table 1 showed that the mean age of the respondents in the study area is 44.21years with a standard deviation of 11.73years. Majority of the respondents (36.7%) were between 31 and 40 years old. This implication of this result is that a large number of the respondents are not too old and are in their productive and working age population.

Gender distribution of the respondents in the study area showed that 52.7% were females while 47.3% were males. This agrees with the study of Falola et al., (2015), which claims that value addition is female-dominated. The results also gave the statistics on the marital status of the respondents as (93.3%) married, while rest are either single, divorced or widowed. The results also indicated that 38.0% of the respondents acquired only primary education while 32.7% were educated up to secondary school level, 8.0% acquired vocational education and only 3.3% had degree. The low level of education among the respondents could have a serious implication on their ability to access information, use new technological innovations and even access to credit facilities from financial institutions. Majority of the respondents (97.4%) have their household size ranging between 1 to 10 members, these results suggest the availability of family labour that could engage in cassava value addition and hence saving the cost of hiring labour by the respondents.

The results on Table 1 revealed that 30.7% of the respondents had 1 to 10 years of farming experience, 32.7% had 11 to 20 years of farming experience, 25.3% had 21 to 30 years farming experience while 13.3% had 31 and above years of farming experience. This could be an indication of a higher involvement in cassava value addition. Majority of the households in the study area (57.3) own between 1 to 5 acres of land, 18.0% own between 6 to 10 acres, 7.3% own between 11 to 15 acres while 17.3% own above 15 acres of land. Of the total acreage own by these farmers, 74.0% allocated between 1 to 5 acres for cassava production while 17.3% allocated between 6 to 10 acres for cassava production. These figures indicated that majority of the respondents in the study area are smallholder farmers which could negatively affect the level of produce available for value addition.

The major crop produced by the farmers in the study area was cassava with a percentage of 92 while maize was the next after cassava. The system f production adopted by majority of the respondents in the study area was mixed cropping 60%, followed by mixed farming 56% while only a few of

the respondents practiced mono-cropping. From the analysis, 75.3% of the respondents had no formal training in agriculture while 24.4% had formal training in agriculture. This may be attributed to the low level of education among the respondents. Out of the 150 respondents that took part in this study, only 20.7% belong to a cooperative society while 79.3% do not belong to a cooperative society. This may be a result of social constraints encountered in the society as belonging to a cooperative society will avail them the opportunities to access loans, credits and improved inputs easily.

Intensity of Cassava Value Addition

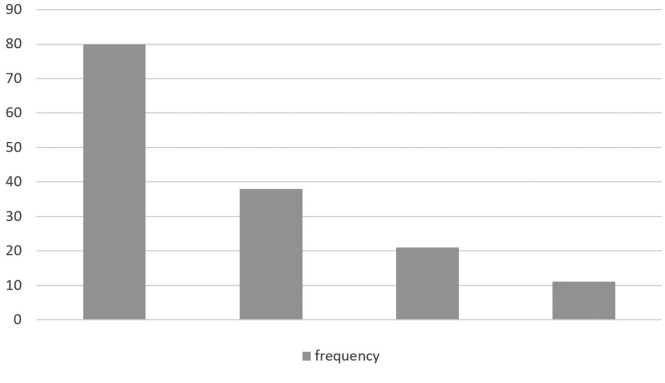
Table 2 represents the distribution of the respondents based on the total quantity of cassava processed to total value of cassava produced. The result in Table 2 showed that majority (47.3%) of the respondents in the study area were highly involved in cassava value addition, 28.7% processed above average while 24% processed between less than 0.25% and 0.5%. This is an indication that a large number of the farmers processed above half of the quantity produced and hence a high involvement in value addition. The farmers' high level of involvement in cassava value addition offers the opportunities for increasing their farm income.

Table 2: Distribution of the Intensity of Value Addition by Respondents

Variable	Frequency	Percentage
Intensity ratio		
0-0.25	6	4.0
0.251-0.50	30	20.0
0.51-0.75	43	28.7
0.751-1.0	71	47.3
Total	150	100

Source: own construction based on questionnaire, 2022

Figure 2: Distribution of the intensity of value addition by respondents



Source: own construction based on questionnaire, 2022

Profitability of Cassava Value Addition Enterprise

Table 3: Total Cost and Returns of Cassava Value Addition Enterprise

Variable	Values
Total revenue (TR)	90,823,640
Total cost (TVC)	23,854,000
Gross margin (GM)	66,969,640

Source: own construction based on questionnaire, 2022

Table 4: Gross Margin Analysis of the Enterprise

Variables	Observation	Minimum	Maximum	Mean	Std. deviation
Total revenue	150	39,000	5,010,000	688,495.30	812,650.80
Total cost	150	10,000	1,296,000	175,380.00	165,714.00
Gross margin	150	23,500	3,960,000	489,479.20	627,133.18

Source: own construction based on questionnaire, 2022

The result of the Gross Margin analysis revealed that the cassava processors make huge profits per season. This could be inferred from the returns on variable costs being positive. These findings matched other studies conducted on gross margin where the authors found the returns on cost for value added cassava products (Achem et al., 2013). All the value added products were profitable from the result of the analysis and gari was the most profitable.

Keeping all other factors constant, cassava value adding enterprise is a profitable enterprise.

Table 5: Ordinary Least Square Regression Results for the Factors Affecting the Intensity of Cassava Value Addition

Variables	Coefficients	Std. Error	T	P >/t/
Age	-.0088*	.0072502	-1.21	0.233
Sex	.0440832	.0890507	0.50	0.624
Marital status	.1680608	.1584007	1.06	0.296
Educational attainment	.00819502**	.0393544	2.08	0.044
Household size	.084295***	.0308763	2.73	0.010
Years of farming experience	-.0081752*	.0079605	-1.03	0.311
Farm size	-.0077364*	.0074526	-1.04	0.306
Farm size allocated for cassava	-.0105375	.0097527	-1.08	0.286.
Formal training	.0038168	.092937	0.04	0.967

Yrs of exp in value addition	.014928**	.0101403	1.47	0.150
Quantity of cassava produced	-9.93e-07*	3.59e-07	-2.77	0.006
Source of credit	.0437176*	.0372923	1.17	0.249
Nearness to market	.1921713	.0840588	-2.29	0.028
Extension contact	.092415	.1179392	0.78	0.438

*Note: ***=1%sig. level, **=5% sig. level; Prob>t=0.000;*
Source: own construction based on questionnaire, 2022

The results obtained from table above revealed that the level of involvement of smallholder farmers in cassava value addition is negatively influenced by the age of the respondents. This implies that the ability of the farmers to add value to more quantity of cassava declines as they get older.

The table also revealed that the educational attainment of the respondents is signifiant and positively related with the volume of cassava processed (β=.00819502, P=0.044). This is in line with the result obtained from the study conducted by Adeyemo et al., (2019). This means that the likelihood to process more volume of cassava increases with the level of education of the respondents.

There is a positive and highly significant relationship (P=0.010) between the quantity of cassava processed and the number of individuals in a household. This implies that an increase in the number of individuals per household increases the likelihood of the farming household to engage more in value addition process. This could also mean that a larger household size provides a greater opportunity for the household to engage more number of people in the value addition process.

The coefficient of farm size of the respondents was negatively and significantly related (P=0.3) to the level of involvement of smallholder cassava farmers in value addition. This explains that the larger the size of farmland available to the farmers for production processes, the lesser is the probability of the household to engage more in vale addition. This may also be related to the fact that farmers with a larger farm size would have to dedicate more of their time to production activities on the farm rather than engaging themselves in the value addition processes.

The quantity of cassava processed by the respondents in the study area is positively and significantly by year of experience of the respondents in cassava value addition. This means that as the number of years spent in the value addition chain increases, the likelihood of the respondents to increase their scale of production also increases. And hence the availability of more raw cassava tubers for processing.

The quantity of cassava produced is negatively and significantly related to the level of involvement of the respondents in the study area and this is against the findings from the study conducted by Falola et al., (2015). This means that the higher the quantity of cassava produced by the respondents in the study area, the leower is the probability of the respondent to participate more in cassava value addition. This may be a result of the fact that a farmer with a larger quantities of output may find it difficult to process all due to the perishability nature of cassava or labour shortage, and hence decides to sell it off at farm gate prices.

CONCLUSION AND RECOMMENDATIONS

The study revealed that the decisions to add value to cassava as well as the extent to which value was added to cassava were influenced by various factors which could be positive or negative. Age, years of farming experience, farm size, quantity of cassava produced all had negative impacts on the intensity of cassava value addition in the study area, meaning that they reduced the extent to which value was added to cassava in the study area. the positive factors such as educational attainment, household size, years of experience in cassava value addition. Extension contact and intensity ratio all increased the level of intensity of cassava value addition.

It can be inferred from the study that cassava processors with large intensity ratios had higher gross margin. This justifies the study conducted by Mugonola et al., (2017) that cassava processing enterprise was profitable. The study recorded high profit margin among respondents with high intensity ratios despite the fact that majority of these respondents operated using localized method of processing cassava. This is an indication that the respondents can do better in terms of their profit level if modernized method of processing was adopted since this has the potential for reducing costs incurred during the course of processing and improve the level of their output in terms of efficiency.

In light of the above conclusion, the following recommendations are made:

- More farmers, especially the youths should be encouraged to engage in farming and cassava value addition. As this will also influence greatly the volume of value added.
- There is need for all the stakeholders concerned to focus their attentions on proffering solutions to the challenges faced by cassava processors within the minimum time possible.
- It is also recommended that farmers should be more organized in order to develop integrated ways of obtaining production and marketing information system. This would militate against the problem associated with getting buyers for their products.
- It is also recommended that government should provide more funding for agricultural researches and increase the number of extension agents.

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ENVIRONMENTAL MANAGEMENT ACTIVITIES OF NHL TEAMS

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Abstract: *Over the past two decades, the sports sector has paid increasing and growing attention to un-derstanding sustainability, including the environment, and in particular what can be done in practice. The purpose of this study is to examine the environmental CSR measures adopted by professional hockey teams in North America.*

To answer my research question, I used a comparative analysis based on secondary data sour-ces. For all 32 teams, I examined the available reports and their information on CSR activities, the information published on the teams' websites, and the research results related to the teams. I have selected 3 teams (Minnesota Wild, Pittsburgh Penguins, Seattle Kraken) that are at the forefront of the issue under study, using an evaluation system based on international literature, and case studies to showcase good practices that can serve as examples for the sports sector.

Keywords: *CSR, Sustainability, Environmental protection, NHL*
(JEL Classification: Q56)

INTRODUCTION

The history of social responsibility can be traced back to the mid-20th century, when business and academia began to explore the links between the economy and society. Since the 1990s, there has been a growing identification with responsible corporate ideals and corporate social responsibility. Nowadays, larger companies are creating specific strategies for their CSR activiti-es and allocating resources to them.

Understanding the concept of a "responsible" company is far from easy, as there is no single definition in the literature that clearly defines its meaning. The various definitions are consistent in that business must strike a balance between economic interests, social expectations and environmental constraints. The objectives should include complementary objectives based on a moral foundation, a tendency that leads to the concept of a "value-based" or "responsible" com-pany. (Ráthonyi-Ódor-Bácsné-Ráthonyi, 2019).

As a rule, the European Commission's 2001 and 2011 definitions are recognised. CSR activities are defined in 2011 as "the responsibility of enterprises for their impact on society". (EC, 2011, p. 6) CSR is about setting long-term goals, creating value and preserving value (Nagy-Tóth-Győri, 2012).

The benefits of environmental corporate governance and environmental management tools:

When analysing environmental corporate governance, it is important to look at the economic reasons, the relationships with public authorities, the new market segments, the market value of the company and the quality of products and services.

- Economic reasons: several NHL teams have built so-called water storage tanks around their arenas, thus reducing the cost of water. For example as the Seattle Kraken did.
- Relations with authorities: joining the NHL Green movement helps teams to work in a more environmentally conscious way. It also helps them to gain the support of several local authorities. such as Pittsburgh Penguins.
- New market slices: NHL teams are trying to use environmentally friendly cleaning pro-ducts. A good example for this is Minnesota Wild.
- The market value of the company: the NHL and the sports companies involved in the league are highly conscious of their environmental CSR activities.
- Quality of products and services: protecting the arena's environment is a natural part of quality assurance. Anaheim Ducks is exceptional in this regard (Ráthonyi-Ódor, 2015).

Examples of environmental management tools include:

- obtain certifications, e.g. the Vegas Golden Knights Arena is LEED certified,
- using cleaner technologies, e.g. Tampa Bay Lightning's internal air filter systems,
- use of renewable resources, e.g. Minnesota Wild solar panels,
- various reports for external communication, such as the Montreal Canadiens' annual sus-tainability report,

- waste minimisation, e.g. Edmonton Oilers have launched a city-wide waste management programme.
- recycling, using recycled material, e.g. Los Angeles Kings jerseys are made from recycled material (Ráthonyi-Ódor, 2015).

Sport and CSR

Responsible behaviour can take the form of different activities in different sectors of economic life. Today, the study of responsible behaviour in the sport sector is an area of research that is receiving increasing attention (Scheinbaum-Lacey, 2015).

Based on the international literature (Filizöz - Fisne, 2011; Ibrahim - Almarshed, 2014; Smith - Westerbeerk, 2007; Trendafilova et al., 2013), we can summarise the links between sport and CSR as follows:

- The global scale of sport means that it can disseminate information to a wide section of society.
- The sport-related CSR programme is popular among young people.
- Sports-focused CSR spreads positive messages about healthy lifestyles.
- Sport-centred CSR strengthens social interactions.
- Participating in sporting events contributes to well-being.
- Sports organisations can support the environment through their sustainability measures.

Szlávik wrote in 2009 about the importance of embedding two broad groups of CSR activities in the strategy of organisationsThese two groups are social and environmental CSR activities. It can be clearly seen that sport can support both aspects of the CSR concept (Ráthonyi-Ódor et al., 2020).

Social CSR measures in the sports sector can be divided into 4 categories: (1) educational prog-rammes, (2) sport/health programmes, (3) social/cultural programmes and (4) charity program-mes (Nilson, 2018; Ráthonyi-Ódor et al., 2020).

Environmental aspect of CSR activities in Sport

Environmental sustainability has received increasing attention within the concept of CSR and environmentally responsible business practices (e.g. energy rationalisation, water use reduction, waste management, minimisation of toxic substances) have become a core element of CSR (Jenkins, 2011; Moghaddam et al., 2018).

It is undeniable that all sport-related activities use natural resources and therefore have an im-pact on the natural environment. Expropriation of land, impacts on biodiversity, use of drinking water quality water, waste discharge, catering, construction and operation of sports facilities, commuting between sports venues, and the production and sale of sports equipment multiply the challenges that need to be addressed/greened up and that responsible behaviour can help address (Brar -Pathak, 2016; Ráthonyi-Ódor, 2019; Shiply, 2018).

According to Shipley (2018), if we want to make sport greener, the following measures need to be taken:

- an organisational form to support environmental protection,
- developing sports activities and programmes in harmony with nature and the environ-ment,
- greening the sports infrastructure,
- public involvement in this area,
- integrating environmental considerations into the operation of sports organisations.

When studying the environmental activities of sport activities and sport companies, the follo-wing aspects are taken into account (Casper-Pfahl, 2015; Dikácz-Ujj, 2004; IOC, 2005, NRDC, 2012; Ráthonyi-Ódor et al., 2020; Tarradellas, 2003):

1. environmental conditions,
2. land use,
3. use of raw materials and energy,
4. waste management,
5. environmental pollution, damage,
6. protection of cultural heritage,
7. environmental impact of sport-related activities.

Environmental conditions:
Environmental conditions are very important when we talk about sport. If the environmental conditions are not right, or even harmful, sport cannot be practised. Lack of drinking water, basic hygiene conditions, or even a hazardous facility may pose a risk of health hazards (Di-kácz-Ujj, 2004).

Land use:
When considering the environmental aspect of CSR activities, it is essential to take the landscape into account. Large investments can change the existing environmental system which can lead to the destruction of the environment. The construction of new roads or deforestation have a nega-tive impact on the environment.

Raw material and energy use:
The 21st century has seen the emergence of environmental problems caused by inappropriate use of resources. Humanity is living a highly energy-wasting life, which can lead to resource depletion. Therefore, the use of renewable energy sources, such as wind or solar energy, is be-coming increasingly popular today.

Waste management:
Any material that is no longer economical to use after the sporting event is called waste (Rátho-nyi,-Ódor, 2019). Unfortunately, today selective waste collection is not yet widespread every-where, but it is gaining more and more attention. Resource use and waste management are closely linked, as the quantity and composition of the materials used determines how they are recovered and recycled. Here it is important to mention the “4R Principle”, according to which recycling takes place: recovery, reduction, reuse and recycling

Environmental pollution, damage:
Waste is produced for sporting events. These can be of different materials, which can someti-mes be polluting and toxic. Pollution can occur in water, soil and air. (Dikácz-Ujj, 2004).

Protecting cultural heritage:
When organising a sporting event or building a sports facility, we need to pay attention to environmental values and protect cultural heritage. It is important to protect and develop them whenever we have the opportunity.

Environmental impact of sport-related activities:
As a result of sporting events or the operation of sports facilities, there are many things that have an impact on our environment. It is therefore particularly important to consider the long-term impacts when organising a sporting event or sports facility. Examples include minimising the use of drinking water quality water, or installing waterless urinals.

NHL environmental programmes (NHL, 2010)

The NHL Green movement began in 2010 with the Bridgestone Winter Classic to promote susta-inable business practices in the league and engage fans in environmental awareness.

2010 - Food recovery programme:
A food recovery movement was launched. Each club takes the initiative to collect prepared but untouched food to help organisations in need. In the movement's first 4 years, the programme diverted more than 100 tonnes of food waste from landfills, equivalent to more than 120,000 meals for regional food banks.

2011 - Water recovery:
The "Gallons for Goals" movement is very valuable for the environment. The NHL restores 1,000 gallons of water per goal scored in the regular season by purchasing Water Restoration Certificates. Since 2011, the National Hockey League has restored more than 88 million gallons of water.

2012 - Tree planting:
As part of the "Legacy Tree" project, a tree is planted at the NHL Draft by team representatives in the host city. In the first 5 years of the programme, 1500 trees have been planted.

2013 - Energy savings:
Centre Bell, home of the Montréal Canadiens is the first NHL arena where LED lighting was used.
Since 2014, LED lighting has been used for all NHL All-Star games. More than 2/3 of NHL team arenas have switched to LED lighting, resulting in significant energy savings.

2014 - Sustainability Report:
The NHL has released the first sustainability report by a North American professional sports league. The report includes a description of the league's carbon emissions, also a first in US pro-fessional sports.

2015 - Carbon footprint:
The NHL commits to offset its entire carbon footprint for three consecutive seasons. The first, in professional sports, cooperatively with Constellation Energy, has offset more than 963,200 MWh of energy since 2014. The Xcel Energy Center, home of the Minnesota Wild, is the first sports facility in the United States to receive three environmental certifications. The Xcel Energy Center has received LEED, Golden Globe and ASTM/APEX certifications.

2016- Greener ice rinks initiative
NHL launched the Greener Rinks program in 2016. This initiative gives more information about the new technologies and practises used in the local ice rinks, which helps them reduce their operational costs and environmental impact.

2017 - Declaration of Principles
Declaration of Principles was published in 2017. The aim of the NHL Green to improve access to ice hockey, to make it available for everybody to join and enjoy the beauty of this sport.

2018 –Second sustainability report:
The NHL published its second sustainability report. It contains new goals for the next 5 years. NHL commits itself to educate the ice rink industry and make a collaboration with Chemours.

2019 – Offsetting carbon emissions
NHL proposes the teams to offset their carbon emissions associated with air travel during the season. To enable this, the league purchased 1729 carbon offsets.

2020 – Involving fans
For the 10th Anniversary of NHL Green, the main goal is to engage fans to ice hockey, to build a vivid and healthy community through ice hockey, at the same time ensuring that the sport inf-rasctructure –from natural ice to community rinks-continues to thrive.

The purpose of this study is to examine the environmental CSR measures adopted by professio-nal hockey teams in North America.

MATERIAL AND METHODS

To answer my research question, I used a comparative analysis based on secondary data so-urcesFor all 32 teams, I examined the available reports and their information on environmental CSR activities, information published on the teams' websites, and team-related research results.

Afterwards, I used an evaluation system based on international literature to select the 3 teams (Minnesota Wild, Pittsburgh Penguins, Seattle Kraken) that are at the forefront of the issue and present case studies of good practice that can serve as examples for the sport sector.

RESULTS AND DISCUSSION

In the table below, I have analysed the environmental activities of the 32 NHL teams and identi-fied the groups that the sports organisation is advocating for in their environmental CSR activiti-es

Table 1: NHL teams' environmental activities

	Environmental Conditi-ons	Land use	Raw material and energy use	Wastte management	Environmental pollution, damage	Protection of cultural heritage	Environmental impact of sport-related activities
Anaheim Ducks	X	X		X	X	X	X
Arizona Coyotes	X	X	X	X	X		X
Boston Bruins	X	X		X	X	X	X
Buffalo Sabres	X	X	X	X	X	X	X
Calgary Flames	X	X	X	X	X	X	X
Carolina Hurricanes	X	X	X		X		X
Chicago Blackhawks	X	X	X	X	X	X	X
Colombus Blue Jackets	X	X	X		X	X	X
Colorado Avalanche		X	X	X	X	X	X
Dallas Stars	X	X	X	X	X	X	X
Detroit Red Wings	X	X	X	X	X		X
Edmonton Oilers	X	X	X	X	X	X	X
Florida Panthers		X	X	X	X	X	X
Los Angeles Kings	X		X	X		X	X
Minnesota Wild	X	X	X	X	X	X	X
Montreal Canadiens	X	X	X	X	X	X	X
Nashville Predators	X	X	X	X	X	X	X
New Jersey Devils	X	X	X	X	X	X	X
New York Islanders	X	X	X	X	X	X	X
New York Rangers	X	X	X	X	X	X	X
Ottawa Senators	X	X	X	X	X	X	X
Philadelphia Flyers	X		X	X	X	X	X
Pittsburgh Penguins	X	X	X	X	X	X	X
San Jose Sharks	X	X	X	X		X	X
Seattle Kraken	X	X	X	X	X	X	X
St. Louis Blues	X	X	X		X	X	X
Tampa Bay Lightning	X	X	X	X	X	X	X
Toronto Maple Leafs	X	X	X	X	X	X	X
Vancouver Canucks	X	X	X	X	X	X	X
Vegas Golden Knights			X	X	X	X	X
Washington Capitals	X	X	X	X	X	X	X
Winnipeg Jets	X	X	X	X	X	X	X

Source: own editing (NHL, 2021 a; Anaheim Ducks, Arizona Coyotes, Boston Bruins, Buffalo Sabres, Calgary Flames, Carolina Hurricanes, Chicago Blackhawks, Colombus Blue Jackets, Colorado Avalanche, Dallas Stars, Detroit Red Wings, Edmonton Oliers, Florida Panthers, Los Angeles Kings, Minnesota Wild, Montreal Canadiens, Nashville Predators, New Jersey Devils, New York Islanders, New York Rangers, Ottawa Senators, Philadelphia Flyers, Pittsburgh Penguins, San Jose Sharks, Seattle Kraken, St. Louis Blues, Tampa Bay Lightning, Toronto Map-le Leafs, Vancouver Canucks, Vegas Golden Knights, Washington Capitals, Winnipeg Jets, 2022)

Based on the table, there are two main areas that are included in the environmental strategy of all NHL teams, namely the use of raw materials and energy (water collection systems, use of solar panels) and waste management (selective waste collection, recycling). Less popular ones include environmental conditions and land use (protecting the environment, reducing non-essential construction).

Among the environmental conditions, the most common is the use of an internal air filter (e.g., Tampa Bay Lightning).

In terms of landscape use, it is important to emphasise the importance of increased protection of the city and the sites around the ice rink. For example, teams encourage fans to ride bicycles (e.g. Anaheim Ducks).

Regarding the use of raw materials and energy, it is important to mention the Opteon cooling systems used at each rink to produce ice. The machinery is not harmful to the ozone layer (e.g. San Jose Sharks).

On the subject of waste management, all teams participate in the greening programme, which includes proper waste collection and recycling.

To combat pollution and damage to the environment, teams are taking a stand by buying less biologically harmful cleaning products (e.g. Nashville Predators).

Cultural heritage protection takes into account the natural assets of the locality when designing a new facility. Buildings are only built on developable land and try to design for the most efficient use of energy (e.g. Vegas Golden Knights - LEED certified T-Mobile Arena in Las Vegas).

In response to the environmental impact of sports-related activities, the best example is the Se-attle Kraken's climate-centric arena, which has zero carbon emissions.

Hereinafter I will analyse the environmental activities of 3 NHL teams. The teams are outstand-ing performers, using all resources to protect their environment.

Seattle Kraken

The NHL team called Seattle Kraken joined the major hockey league in the autumn of 2021. They have burst into the public consciousness with their environmentally friendly CSR activities. They have named their sports facility 'Climate Pledge Arena'. The name encompasses the most important issue of the 21st century, namely climate change and the measures necessary for environmental protection

In many ways, the Arena is unique in the world. Important environmental features and structu-res of the Arena:

„Zero Carbon"
They built the world's first zero-carbon arena certified by the International Living Future Institu-te. No fossil fuels are used in the arena on a day-to-day basis: the mechanical systems, gas engi-nes, heating, dehumidification - all built to run on electricity. The solar panels on Alaska Airli-nes' atrium and garage, combined with additional off-site renewable energy sources, provide 100% renewable energy.

„Zero Single Use Plastic"
Seattle Kraken is the first arena and NHL team to announce their intention to phase out single-use plastics and have committed to 100% phase out by 2024.

„Zero Waste"
By simplifying their supply chain, they are able to recycle over 97% of their waste, which is considered "zero waste" in the industry. Through educating their consumers with nice and simple info-graphics, and on-the-spot selection they are able to achieve this unique level of per-formance. Their waste is composted and widely recycled throughout the arena.

„Rain to Rink"
The sports company is committed to water saving. Given their localization (Puget Sound), they are leaders in water quality and water use.
Their "Rain to Rink" system collects water from the roof and collects it in 15,000 gallon tanks, creating the greenest ice in the NHL with this method.
Waterless urinals and ultra-efficient showers are used in the arena. Large tanks reduce rainwater run-off. Water bottle filling stations have been installed throughout the arena (Climate Pledge Arena 2021).

Other environmental programmes of the sports organisation:

Advisory Committee:
By establishing an Advisory Committee, Amazon and its partners can deepen their commitment to making the Climate Pledge Arena the most progressive and sustainable arena in the world (NHL, 2020).

Minnesota Wild

Founded in 2000, the sports organisation is based at the Xcel Energy Center in Minnesota. The sports company has made the NHL playoffs four times in its history and has been division champion once.

The Xcel Energy Center is known for try to provide the best possible experience for their guests, including an environment that is a model of sustainable practicesTheir environmental activities are an integral part of their organisational strategy and are part of their everyday lifeThis ensures that their efforts and achievements bring lasting benefits to the community. The Xcel Energy Center is honored to have various organizations in the community take a leadership role in sus-tainability.

There are also several environmental points in the construction of the arena:

Table 2: Xcel Energy Center adatai details

Air quality	Constant air movement, non-smoking, greening cleaning to keep the air in the building clean and fresh.
Community	Every year, more than 3,000 pieces of replacement equipment are recycled or given to the younger generation.
Certificates	LEED, Green Globes, EIC/SES
Energy	4th largest purchaser of wind energy in Minnesota
Acquisitions	63% of the cleaning products purchased comply with environmental standards.
Transport	65% of staff and visitors travel by bus, bike, car or other environmentally friendly means.
Water	1,500 gallons of water per day saved with rainwater harvesting technology.
Waste management	In the season of 2019-2020, 61.7% of waste was recycled.

Sources: own editing (Xcel Energy Center, 2022)

The team's environmental CSR activities are:

They are involved in the NHL Green movement:
Since the NHL Green's launched in 2010, the League has been committed to promoting more sustainable business practices among the sport franchises. The Xcel Energy Center, home of the NHL Minnesota Wild, has been certified to three international sustainability standards - LEED, Green Globes and the Event Industry Council - making it the first in the world to achieve these three certifications.

"Adopt a River" is Minessota Wild's own environmental program:
The Minnesota Wild celebrated their 10th anniversary in October 2019. In honor of this celebra-tion, the Wild launched its Day of Service, including the annual „Adopt a River" program, at 10:10 a.m. on 10/10/2019. Dozens of staff removed 367 pounds of debris from the banks of the Mississippi River. Of that, 147 pounds were recycled.

"Adopt a storm drain" is also Minnesota's own invention: To help protect lakes and rivers around Minnesota, the Minnesota Wild adopted eight canals in downtown St. Paul near the Xcel Energy Center and the team's executive offices. As part of the "Adopt a Storm Drain" program, the Wild is committed to protecting the environment by cle-aning storm drains of leaves and other debris, thereby reducing water pollution (Minnesota Wild, 2020).

Pittsburgh Penguins

The Pittsburgh Penguins sports company was founded in 1967. In their long history, they have won the Stanley Cup five times. They are based at PPG Paints Arena in Pittsburgh (PPG Paints Arena, 2022). PPG Paints Arena is a multipurpose indoor arena in Pittsburgh, Pennsylvania, ho-me to the National Hockey League (NHL) Pittsburgh Penguins. The facility is LEED certified.

The Pittsburgh Penguins and PPG Paints Arena are the newest members that joined the Green Sports Alliance, a coalition of sports stakeholders dedicated to environmental and social res-ponsibility.

The Pittsburgh Penguins are working with other members of the Green Sports Alliance, including professional sports leagues, teams, venues, universities and corporate partners to support, ex-pand and promote their sustainability practices. They can develop sustainability programmes lead by PPG Paints Arena and the Pittsburgh Penguins.

The Green Sports Alliance uses the cultural and market influence of sport to promote healthy, sustainable communities where people live and play. The association encourages professional sports leagues, governing bodies, colleges, teams, venues, partners, and millions of fans to adopt renewable energy, healthy food, recycling, water efficiency, safer chemicals, and other environmentally friendly practices (NHL, 2021b)

The Pittsburgh Penguins recycling program is a huge step forward for green initiatives in the North American sports industry. The campaign serves as a catalyst for increased environmental stewardship and an inspiration for sports franchises across the league. The Pittsburgh Penguins recycling campaign encourages fans to recycle waste at every official game.

The Penguins place great emphasis on recycling their jerseys. This is partly reflected in the fact that they donate the jerseys for fundraising purposes or give them to the junior age team who can wear them at training sessions, so there is no need to order new jerseys.

Their authentic ADIZERO Primegreen jerseys are an important environmental activity. They are made partly from recycled materials, designed for players and fans and designed with the future of our planet in mind (NHL 2021c).

CONCLUSIONS

Overall, it can be concluded that both the NHL and the sports companies involved in the league are highly conscious of their environmental CSR activities. The inspected sports franchises are at the forefront of environmental protection and consciously follow the NHL's environmental guidelines. Sports organisations in North America pay particu-lar attention to the energy-efficient design of their facilities and proper waste management. Regarding the use of raw materials and energy, it is important to mention the Opteon cooling systems used at each ice rink to produce ice. The machine does not harm the ozone layer (San Jose Sharks). In response to the environmental impact of sports-related activities, the best example is the Seattle Kraken's climate-centric arena, which has zero carbon emissions.

It is vital for them to raise awareness of the importance of environmental protection not only among the sports company, but also among their fans, so they organise activities and programmes where they can join in the protection of the environment.

In my opinion, the activities of NHL teams can serve as a good example for Hungarian sports organisations. Even small steps can make a big difference, both in their sports facilities and in their daily lives, thereby involving their fans in environmental protection. It would be important for clubs to pay attention to selective waste collection, electricity consumption, the preservation of local assets and the creation of new ones.

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NEXUS OF NON-FARM ENTERPRISES AND RURAL HOUSEHOLDS LIVELIHOOD: EVIDENCE FROM NIGERIA

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Abstract: *Agricultural sector in Nigeria is faced with diverse challenges that threaten the survival of rural households who constitute a significant proportion of the country's population, thereby forcing them to diversify into alternative occupations outside farming. This study assessed the contributions of non-farm enterprises to livelihood of rural households in Osun State, Nigeria. The quantitative data were elicited from120 rural households' heads across the state. The data collected analysis appropriate statistics. Results revealed that majority of rural households were involved in multiple non-farm enterprises and provide full-time employment for majority. Many were favourably disposed to contribution of non-farm enterprises to their households' livelihood. Majority indicated that non-farm enterprises contributed moderately to their households' livelihood. Income from non-farm enterprises, association membership and age were significantly correlated with the contribution of non-farm enterprises to rural households' livelihood. It was concluded that non-farm enterprises play significant roles in sustaining the livelihood of rural households in the study area.*

Keywords: *Socio-economic characteristics, livelihood, non-farm enterprises, households' assets, Nigeria*
(JEL code: Q16, 19)

INTRODUCTION

The World Bank estimated the rural population of Nigeria to be 99, 033, 580 as at the year 2020 representing about half (48.04%) of the total population FAO (2017) identified Nigeria among the countries of the world where the extremely poor people are found, mostly rural dwellers who earn meagre income from agriculture, fisheries and forestry. OVWIGHO (2014) observed that, due to the seasonal nature of primary agriculture and other production constraints, rural households have diversified into different non-farm enterprises to argument their income. ELLIS (2000) also established the diversification of rural household skills and labour into other sources of income outside farming. The various income generating activities in which rural households are engaged are refer to non-farm enterprises are used in this study as all income-generating activities excluding income generated directly from traditional farming, as defined by NAGLER AND NAUDÉ (2014). Mining, agro-processing, utilities, construction, commerce, and financial services are among these non-farm enterprises (HAGGBLADE et al.., 2010).

GORDON AND CRAIG (2001) cited in ABBOTT et al.(2012) refers the term "non-farm" to designate activities other than primary agriculture, forestry, or fisheries, such as trading and agricultural product processing, even when done on the farm. To put it another way, they refer to all economic activity in rural areas, with the exception of basic agriculture. These include processing, marketing, manufacturing and wage employment within the local communities (IGWE, 2013; AGBAREVO and NMEREGINI, 2019). Others include operating restaurant/beer parlour, barbing saloon, teaching, clergy, craft making, tie and dye, textile and soap making (OBINNA, 2014). MISHRA AND SINHA (2019) also reiterated that non-farm activities cover ventures like handicrafts, household and non-household small-scale manufacturing, construction, mining, quarrying, repair, transport and community services undertaken in rural areas. Studies have shown that 42% of rural households in the world operates on non-farm activities (NAGLAR and NAUDE, 2017). AYAMBILA et al. (2017) also reported that non-farm sources account for 40-45% of average rural household income in Sub-Saharan Africa and Latin America and 30-40% in South Asia while in Nigeria, the share

of non-farm income to total household income stood at 70.8%. Non-farm enterprises have become a crucial component of rural households' livelihood strategies for various reasons (AGBAREVO AND NMEREGINI, 2019). For instance, it has been observed that this sector has a great capacity for increasing rural employment, improving income distribution, contributing to economic growth, and alleviating poverty (NISHAD AND TANJILA, 2015). They also enhance the purchasing ability of participating rural households in terms of procurement of food and other necessary consumer goods, house building and repair, payment for medical and health care services, payment of wards/children's education and enhancement of agricultural production activities (JABO et al.., 2014). According to Davis, DIGUISEPPE, and ZEZZA (2014), 44 percent of rural African households participate in the non-farm sector, with self-employment accounting for 15% of household income on the average.

CHAMBERS and CONWAY (1992) cited in WANG (2018) defined livelihood as the capabilities, assets and activities required for a means of living. WANG (2018) also defined the concept as the means by which people secure a living, which includes their capabilities and activities, as well as their tangible and intangible assets. Household's livelihood therefore, refers to the means by which household secures basic necessities of life like food, water, medicine, shelter and clothing (AKVOPEDIA, 2016; MPHANDE, 2016). With the inconsistent nature of the employment growth of the farm sector, non-farm activities become important avenue for sustainable livelihood of smallholder farmers in the rural households by providing them employment opportunities and preventing rural-urban migration resulting from lack of employment opportunities. Research have also shown that households that combine non-farm activities are generally better off than those that rely solely on subsistence agriculture (ABBOTT et al.., 2012). ADEPOJU and OBAYELU (2013) observed that the agricultural sector in Nigeria is plagued with several constraints such as soil infertility, inadequate infrastructural facilities, risk and uncertainty as well as seasonal operation among others. These problems have negative implications on the welfare of rural households and serve as threats to their livelihood and survival, hence, they are forced to develop coping strategies such as diversification into non-farm activities in a way to mitigate the vulnerability associated with agricultural production.

Although, non-farm enterprises in Nigeria are in form of small and informal businesses (NAGLAR and NAUDE, 2014), with 95 percent of them employing less than five workers; According to BABATUNDE and QUAIM (2009), majority of rural households in Nigeria have diversified their income sources, with farming accounting for only 50% of total household income while the remaining come from other non-farm activities. ADEPOJU and OBAYELU (2013) also noted that, despite various policy reforms, the rising incidence of low levels of rural household welfare in Nigeria emphasizes the need for a better understanding of the problem as well as providing solutions through approaches that could enhance the means by which rural households can maintain their livelihood through income diversification. To formulating potent agricultural and rural development policies, it is very important to understand the extent to which non-farm enterprises are contributing to rural households' livelihood. It was against this background that this study seeks to investigate the specific contributions of non-farm enterprises to the livelihood of rural households in Osun State, Nigeria. The specific objectives were to

i. describe the socio-economic characteristics of the respondents;
ii. identify the non-farm enterprises in which they were involved;
iii. examine the reasons for engaging in non-farm enterprises, the form and nature of involvement;
iv. examine the respondent's perception towards non-farm enterprises; and
v. determine the level at which non-farm enterprises contribute to the livelihood of respondents.

The hypothesis for this study was stated in null form: There is no significant relationship between the socio-economic characteristics of respondents and contributions of non-farm enterprises to rural households' livelihood.

METHODOLOGY

The study was conducted in Osun State, Nigeria. The state lies within latitude 7° 30′ 0″ N and longitude 4° 30′ 0″ E (State of Osun Official Website, 2022). The respondents for this study were chosen using a multistage sampling procedure. Osun State has 3 agricultural zones namely: Ife-Ijesha, Osogbo and Iwo zones. At the first stage, two LGAs were randomly selected from each zone making a total of 6 LGAs namely; Irewole and Aiyedaade from Iwo zones, Ilesa East and Ife North from Ife-Ijesa zone as well as Ede South and Ifelodun from Osogbo zone. At the second stage, two rural communities were selected from each of the selected LGAs, making a total of twelve communities. The next stage involved proportionate sampling of 120 households from the selected communities while at the last stage, the household head for every selected household was chosen for interview making a total of 120 respondents. Duly validated and pretested structured interview schedule was used to elicit information from the respondents. Data were processed using Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics such as frequency counts, percentages, means and standard deviation were used while chi-square and correlation analyses were used to draw inferences.

The study investigated the personal and socio-economic characteristics of the household heads to test whether there is significant relationship between this and the contributions of non-farm enterprises to rural households' livelihood or not. The contribution of non-farm enterprises to livelihood of rural households was measured using a five-point Likert like scale of contribution to the households' capital, human, natural, physical and social assets (4 = very much, 3 = much, 2 = little, 1= very little points, 0 = not at all). The contribution score of each respondent was calculated by adding all scores from the five indicators (physical=48 points, social=24 points, human=24 points, natural=12 points and capital=24

points). The obtainable maximum and minimum scores were 132 and zero respectively. Equal interval method was used to categorise respondents into high, medium and low levels. This was calculated by finding the range between the minimum and maximum scores and divides it by 3, that is, respondents with contribution scores below 44 were ranked as low, and those with scores between 44 and 88 were ranked as moderate while those with scores above 88 were ranked as high. The perception of respondents towards non-farm enterprises was measured using a five-point Likert scale (5= strongly agreed, 4= agreed, 3= undecided, 2= disagreed, 1= strongly disagreed for the positive statement and vice versa for the negative statements). The mean perception score was used to categorise respondents' perception to favourable and unfavourable.

RESULTS AND DISCUSSIONS

Socio-economic Characteristics of the Respondents

Results as present in Table 1 reveal that the mean age of the respondents was 43 ± 12.6 years, indicating that respondents were in their active age during which they would be willing to engage in diversified economic activities to enhance their households' livelihood (ALABI et al., 2020). This is similar to the findings of AMOGNE et al. (2017) who reported that the mean age of participants of non-farm activities in North central Ethiopia was 45 years. Almost two–third (60.8%) of the respondents were male while 39.2% were female, which implies that more males than females were sampled for the study. This distribution agrees with the report of JONASSON (2005) that households headed by men usually get more involved in different activities including the non-farm enterprises. Majority (85.0%) of the respondents were married and 10.8% were single parents. This implies that the majority of the respondents could employ family labour to run their enterprises. This disagrees with the findings of DARY and KUNNIBE (2012) who reported that singles, divorce and widowed were more likely to be involved in non-farm enterprises. The mean household size was 6 ± 3 persons, indicating moderate household size. An increase in household size would push individuals to diversify into different non-farm enterprises. These findings agree with NAGLAR and NAUDE (2014) who identified household size as one of the possible reasons which push people into non-farm enterprises. Results further shows that the mean year of schooling was 11.4 ± 4.1 years, indicating low literacy level. This could have serious implications on their enterprises' performance and their attitude towards adoption of innovations that could enhance their non-farm enterprises. DARY and KUNIBE (2012); JANVRY and SADOULET (2001), provided evidence from Ghana that education increases the livelihood activities of people who engage in rural non-farm enterprises and the use of modern technologies. Above half (56.7%) of the respondents were indigenes while 43.3 percent were not. Indigenes stand better opportunity of having access to some limited resources (such as land) than the non-indigenes.

The results show further that the mean total annual income of the respondents from all occupations was 496,600 ± 380,267 NGN (N) translating to about N41,000 (approximately 99 USD at 415 NGN to 1 USD) monthly while the mean annual income from non-farm enterprises was N 378,366:67 ± N234,843.91 translating to approximately N 32,000 (77 USD) per month. This is higher than the Nigerian national minimum wage of N 30,000 (72USD). Comparing the mean income from all occupations (N496,600.00) and income from non-farm enterprises (N378,366.70), it shows that non-farm enterprises contributed about 76% to the total income of respondents and consequently, contributed greatly to their livelihood. This finding agrees with that of JANVRY and SADOULET (2001) who reported that contribution of non-farm enterprises among participants in terms of income generation is high. Majority (88.3%) of the respondents belonged to one association or the other. The fact that respondents belonged to associations could enhance their accessibility to relevant information that could improve their enterprise performance. This is in line with the findings of DARY and KUNNIBE (2012) who established that membership of association enables access to credits and relevant information. The mean years of experience of the respondents in non-farm enterprises was 13 ± 9 years. This shows that they had enough experience in their respective enterprises. This is in line with the observation of OBIANNA (2014) who asserted that prolong engagement in business enterprises increases knowledge and technical know-how of the business.

Table 1: Distribution of respondents by their socio-economic characteristics

Variables	Frequency	Percentage	Mean	S.D
Age (years)				
≤ 40	56	46.6	43.0	12.6
41-55	41	34.2		
56 and above	23	19.2		
Sex				
Male	73	60.8		
Female	47	39.2		
Marital status				
Single parents	13	10.8		
Married	102	85.0		
Widowed	5	4.2		
Household size				
≤ 5	39	32.5	6	3
6 – 10	73	60.8		
11 – 15	8	6.7		
Years of schooling				
None	7	5.8	11	4
1-6	10	8.4		

7-12	81	67.5		
13 and above	22	18.3		
Indigenous status				
No	52	43.3		
Yes	68	56.7		
Annual income from all occupations				
≤ N 200,000	23	19.2	N 496,600	N 380,267
N 200,001 – 450,000	42	35.0		
N 450,001 -700,000	32	28.3		
Annual income from non-farm enterprises				
≤ N 200,000	25	20.8	N 378,366.7	N 4,843.9
N200,001-450,000	67	55.8		
N 450,001 – 700,000	17	14.2		
N 700,001 +	11	9.2		
Association membership				
No	14	11.7		
Yes	106	88.3		
Years of experience				
≤ 5	28	23.8	13.0	9.0
6-15	61	50.8		
16-25	19	15.8		
26-35	10	8.3		
36 and above	2	1.7		

Source: Field survey, 2020

Types of Non-farm Enterprises

Results in Table 2 show that respondents indicated that their households engaged in both traditional and non-traditional non-farm enterprises to sustain their livelihood. Trading (55%) take the lead followed by agro-processing (45.8%), casual wage labour (28.5%), fashion designing (7.5%), motorbike transport service (6.7%), mechanical/electrical work (6.7%), bricklaying (6.7%), car/bus transport service (5.8%), civil service (5%), hairdressing/barbing (5%), cloth weaving (5%), carpentry (5%) among others. The result shows further that rural households in the study area engaged in multiple non-farm enterprises. This concurs with the finding of ALABI et al. (2017), MICHAEL et al. (2016) and HAGGBLADE et al. (2010) who identified bricklaying, hairdressing, agro-processing, and cloth designing as common non-farm income generating enterprises among the rural households and MULAT et al. (2021) who identified petty trading as the most prominent non-farm livelihood activity of rural household.

Table 2: Distribution of respondents by types of non-farm enterprises

Non-farm enterprises	Frequency	Percentage
Petty trading (traditional)	66	55.0
Agro processing (traditional)	55	45.8
Farm labour (traditional)	31	28.5
Fashion designing (non-traditional)	9	7.5
Motorbike riding (non-traditional)	8	6.7
Mechanic/Electrician (non-traditional)	8	6.7
Modern bricklaying (non-traditional)	7	5.8
Car/bus transport service (non-traditional)	7	5.8
Civil service (non-traditional)	7	5.8
Modern hairdressing/barbing (non-traditional)	6	5.0
Cloth weaving (traditional)	6	5.0
Carpentry (non-traditional)	6	5.0
Event planning (non-traditional)	5	4.2
Traditional herbal practice (traditional)	4	3.3
Plumbing/metal work (non-traditional)	4	3.3
Blacksmithing (traditional)	4	3.3
Shoemaking (non-traditional)	3	2.5
Chemist shop (non-traditional)	3	2.5
Grinding mill operation (non-traditional)	2	1.7
Hunting (traditional)	1	0.8
Pottery (traditional)	1	0.8

Source: Field survey, 2020

Reasons for Engaging, Forms and Nature of Involvement in Non-farm Enterprises

Results in Table 3 show that respondents engaged in the non-farm enterprises for multiple reasons such as: for increase in livelihood assets (94.2%), for self-employment generation (92.5%), to augment household's income during agriculture off season (27.5%), for personal interest in the enterprise (25.8%), for income diversification (20.8%) and to retain the family business heritage (13.3%). The implication of the finding is that major reasons why households in the study area venture into non-farm enterprises are for employment generation and to increase their livelihood asset. The finding is in line with KAZUNGU and GUUROH (2014) who identified income and employment

generation as the importance of non-farm enterprises in rural communities. It also collaborates the findings of GORDON and CRAIG (2001) who established that non-farm enterprises help to eliminate rural under-employment and reduce rural-urban migration. The results show further that majority (91.7%) were involved in the non-farm enterprises as full-time business while only few (8.3%) were involved in them as part-time business. This implies that non-farm enterprises were providing full time employment for rural households in the study area. Result in Table 3 also reveal that majority (87.5%) of the respondents were self-employed in the various non-farm enterprises, 5 percent were employers who hired employees in operating their enterprises, 4.2 percent were involved as apprentices learning the enterprises while 3.3 percent were employees working for the original owners of the enterprises. This is an indication that non-farm enterprises provide self-employment for majority of the rural households in the study area.

Table 3: Distribution of respondents by their reasons for involvement, nature of involvement and form of involvement in non-farm enterprises

Variables	Frequency	Percentage
***Reasons for engaging in non-farm enterprises**		
For self -employment	111	92.5
Augment income during agriculture off season	33	27.5
Interest in the enterprise	31	25.8
Income diversification	25	20.8
To retain family business heritage	16	13.3
Nature of involvement		
Full time	110	91.7
Part time	10	8.3
Form of involvement		
Apprentice	5	4.2
Self employed	105	87.5
Employer	6	5
Employee	4	3.3

** multiple responses*
Source: Field survey, 2020

Perception of Respondents towards Non-farm Enterprises

Based on the scale of measurement, results in Table 4 show that respondents agreed with the positive perception statements that non-farm enterprises provide employment for people (mean= 3.8), non-farm enterprises help to generate income (mean = 3.7), non-farm enterprises are done by both genders (mean = 3.6), non-farm enterprises help in increasing livelihood assets (mean = 3.6) and non-farm enterprises are means to self-employment (mean = 3.5). They were indifferent to the statements that non-farm enterprises enhance community development (mean= 3.0), non-farm enterprises have less vulnerability (mean = 2.9), non-farm enterprises devalue society culture and norms (2.7), non-farm enterprises are for lazy and weak people (2.6) and non-farm enterprises cause food insecurity (2.5). They agreed to the negative statements that non-farm enterprises cause environmental pollution (2.4), non-farm enterprises are capital intensive (2.3) and non-farm enterprises encroach agriculture (2.1) while they disagreed to the positive statement that non-farm enterprises require full attention (2.3). The findings further strengthened the fact that non-farm enterprises are panacea to solving the problem of unemployment and inadequate income generation prevailing in the rural areas. Further analysis was done to categorise the respondents' perception scores to favourable and unfavourable perception. Results in Table 5 show that more than half (55%) of the respondents had favourable perception towards non-farm enterprises while 45 percent had unfavourable perception. The fact that the higher proportion of the respondents indicated favourable perception implies that there is high potential for non-farm enterprises to contribute significantly to rural household livelihood if they are well developed by relevant institutions.

Table 4: Distribution of respondents by their perception towards non-farm enterprises

Perception statements	Ranked Mean
Non-farm enterprises provide employment for people	3.8
Non-farm enterprises help to generate income	3.7
Non-farm enterprises are done by both gender	3.6
Non-farm enterprises help in increasing livelihood asset	3.6
Non-farm enterprises are means to self-employment	3.5
Non-farm enterprises enhance community development	3.0
Non-farm enterprises have less vulnerability	2.9
Non-farm enterprises devalue society culture and norms	2.7
Non-farm enterprises are for lazy and weak people	2.6
Non-farm enterprises cause food insecurity	2.5
Non-farm enterprises cause pollution into the environment	2.4
Non-farm enterprises are capital intensive	2.3
Non-farm enterprises require full attention	2.3
Non-farm enterprises encroach agriculture	2.1

Scale of measurement: 5= strongly agreed, 4= agreed, 3= undecided, 2= disagreed, 1= strongly disagreed for the positive statements and vice versa for the negative statements

Table 5: Distribution of respondents by their perception toward non-farm enterprises

Perception score	Frequency	Percentage
Favourable >39.95	66	55
Unfavourable ≤ 39.95	54	45

Mean perception score = 39.95
Source: Field survey, 2020

Contributions of Non-farm Enterprises to Livelihood

Contributions of Non-farm Enterprises to Capital Assets
Based on the scale of measurement, results in Table 6 show that non-farm enterprises contributed much to respondents' capital asset in form of cash at hand (mean = 3.1) but contributed little to credit saving (mean = 2.3), settling of debts (mean = 2.1), gift to others (mean = 2.0), community project donation (mean= 1.9) and access to loan/credit (mean = 1.8). The finding implies that income from non-farm activities help in reducing poverty among rural households. This agrees with the findings of NAUDE and NAGLAR (2014) that non-farm enterprises are important source of income for rural households.

Contributions of Non-farm Enterprises to Human Assets
Results in Table 6 show that non-farm enterprises contributed much to human assets in terms of provision of food (mean= 3.3), clothing (mean=2.9), health care (mean=2.2) and children education (mean=2.2) among others. This implies that non-farm enterprises are means of improving rural households' standard of living in agreement with ELLIS (2000).

Contributions of Non-farm Enterprises to Natural Assets
Contributions of non-farm enterprises to natural assets was also much in terms of access to well water (mean= 3.3), access to good land (mean = 2.8) and access to borehole water (mean = 2.2). This implies that non-farm enterprises contributed positively to rural households' natural assets in agreement with BARBIER and HOCHARD (2014) who submitted that non-farm enterprises contributed greatly to natural assets of those who participated in them.

Contributions of Non-farm Enterprises to Social Assets
As regards social assets, results in Table 5 reveal further that non-farm enterprises contributed much to the respondents' household interpersonal relationship (mean = 2.9), participation in ceremonies (mean = 2.6), membership rate of traveling (mean = 2.5) among others. This implies that contributions from non-farm enterprises have significantly contributed to building of strong social networks and cohesion among the rural households in the study area.

Contributions of Non-farm Enterprises to Physical Assets
Non-farm enterprises also contributed much to the physical assets in terms of purchase of mobile-phone (mean= 3.0), purchase of new utensils in the household (mean = 2.8), affordance of health care services (mean = 2.6), purchase of working implements (mean= 2.5) among others as presented in Table 7. The implication is that non-farm enterprises contributed positively to physical assets of rural households in the study area in agreement with ELLIS (2000).

The results in Table 7 show the overall contribution of non-farm enterprises to rural households' livelihood with the majority (87.5%) of the respondents indicating that non-farm enterprises contributed moderately to their households' livelihood while few (10.8%) and very few (1.7%) indicated high and low level of contributions respectively. This implies the potential of non-farm enterprises for optimum contribution to the livelihood of rural households if well developed.

Table 6: Distribution by contributions of non-farm enterprises to rural households' livelihood

Assets	Ranked Mean
Capital asset	
Cash at hand	3.1
Credit saving	2.3
Debit saving	2.1
Gift to others	2.0
Community project donation	1.9
Access to loan/credit	1.8
Human assets	
Provision of food	3.3
Provision of clothing	2.9
Health care	2.3
Children	2.3
Education	
Skill acquisition	1.4
Social assets	
Interpersonal relationship with community	2.9
Participation in ceremonies	2.6
Association membership	2.5
Rate of travelling	2.3
Political participation	1.2
Social networking	1.2
Natural asset	
Access to well water	3.3
Access to good land	2.8
Access to bore water	2.2
Physical asset	
Purchase of telephone	3.0
Purchase of new utensil in household	2.8
Affordance of health care service	2.6
Purchase of non-farm implement	2.5
Building of personal house	2.0
Purchase of generator set	2.0
Ownership of landed properties	1.8
Purchase of new farm tool	1.7
Purchase of sprayers	1.7
Purchase of motorcycle machine	1.6
Purchase of personal car	1.5
Purchase of pumping machine	1.0

Scale of measurement: 4 = very much contribution, 3 = much contribution, 2 = little contribution, 1= very little contribution, 0 = no contribution
Source: Field survey, 2020

Results of Pearson's Product Moment Correlation Analysis

Results in Table 8 reveal that years spent in schooling by the household head (r = 0.24), income from non-farm enterprises (r = 0.59) and association membership (r =0.25) had positive and significant relationship with non-farm enterprises contributions to livelihood. This implies that the higher these significant variables, the higher the contribution of non-farm enterprises to the livelihood of rural households.

Table 7: Distribution of respondents based on the overall level of contribution of non-farm enterprises to livelihood

Total asset	Frequency	Percentage
Low ≤ 44	2	1.7
Moderate 45-88	105	87.5
High Above 88	13	10.8

Source: Field survey, 2020

Table 8: Relationship between selected socio-economic characteristics and non-farm enterprise contribution

Variables	Correlation coefficient	r^2	p-value
Age	0.09	0.01	0.34
Family size	0.15	0.02	0.09
Years spent in school	0.24	0.06	0.08*
Income from non-farm	0.06	0.04	0.00**
Association membership	0.25	0.06	0.05*

*** Correlation is significant at the 0.01 level,*
**Correlation is significant at the 0.05 level*
Source: Field survey, 2020

CONCLUSION

Rural households in the study area engaged in multiple non-farm enterprises with trading and agro-processing taken the lead. Majority of the respondents had favourable perception towards non-farm of enterprises and indicated that they contributed moderately to their overall livelihood status. Also, income from non-farm enterprises, years of formal education and association membership were found to be significantly related to contribution of non-farm enterprises to livelihood to rural households. It is therefore, recommended that rural households should harness various non-farm enterprises available in their community while capacity building trainings and workshops on both traditional and non-traditional non-farm enterprises should be organised by relevant rural development agencies in order to enhance sustainable interest of rural households in these enterprises. Finally, institutional support services including provisions of credits and necessary infrastructure capable of enhancing non-farm enterprises should be put in place by the government at the grass root to develop various rural non-farm enterprises for sustainable rural livelihood.

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COMPARISON STUDY OF THE AGRICULTURAL SUBSIDY POLICY APPLIED BY ECUADOR AND HUNGARY IN THE LAST 10 YEARS

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Abstract: *Agricultural subsidies have long been a consistent concern of government policies; they influence the use of resources for pursuing different goals in this sector. In this research, we are comparing the agricultural subsidy policies of Ecuador and Hungary in the last ten years by a comparative analysis applied for empirical generalization to explain and better understand the subsidies used in the two countries. The results show an enormous advantage for Hungary compared to Ecuador regarding agricultural subsidies. Since they are part of the Common Agricultural Policy of the European Union, Hungary's subsidies are institutionalized and planned in the long term within a series of programs financed by the EU and national funds. While in Ecuador, agricultural policies exist as a general framework, the governing body manages the subsidies through programs and projects that do not remain over time and depend on the current political situation in the country. In the same way, the data collected reflects that although the share of the agricultural sector in Ecuador's GDP is higher than in Hungary, the subsidy amounts for this sector are 36% lower than in Hungary.*

Keywords: *agricultural subsidies, policies, CAP, EAT.*

INTRODUCTION

Agricultural subsidies have long been a consistent concern of government policies; they influence the use of resources in pursuing different policy goals in this sector. This support largely shapes production and consumption patterns, with significant effects on poverty, nutrition, food security, and other sustainability concerns such as climate change, land-use practices, and biodiversity (Belman, 2019). In many countries, agricultural subsidies are used to achieve particular objectives, like increasing farmers' income or productivity, improving environmental performance, or enhancing rural employment (Ciaian , Pokrivcak, & Szegenyova , 2012).

These basic definitions and assumptions characterized the main proposal of this research, which is to identify the agricultural subsidy policies applied in Ecuador and Hungary in the past ten years with the comparison of both realities within the framework of their geographical, socio-economic, and governmental national environment.

For Hungary, based on the Hungarian Statistic Institute data, the importance of the agriculture sector has been increasing in the past years; in 2018, this sector represented 4.9% of the national GDP. Regarding employment, 214.9 thousand people were working in the agriculture sector, and the share within the national economy was 4.8 per cent that year. Another introductory remark of Hungary is that since they became part of the European Union in 2014, they adopted the Common Agricultural Policy (CAP) that provides financial support to farmers in member states. According to the Ministry of Agriculture, in Hungary, every year, from direct payments and national subsidies, it has paid almost HUF 500 billion out to farmers to stabilize their income, mitigate their risks, and improve their financing positions.

For Ecuador, the agricultural sector had a modest share of the economy in the last decade; it contributes around 10% of GDP, or 14% if the agro-industrial sector is also considered. However, it is still an essential source of employment for the rural sector since over two-thirds of the economically active rural population work in it (Inter-American Development Bank, 2018). The government of Ecuador supports the agricultural sector in two ways by measures regarding the external and internal market and by public investment. The first one consists

mainly of tariff barriers and the definition of minimum prices for support in domestic markets and does not require spending of State resources. In contrast, the second corresponds to interventions involving spending the public budget.

LITERATURE SEARCH

The analysis carried out by the (Inter-American Development Bank, 2018), shows that before 2006 agricultural policy in Ecuador was characterized by frequent changes, in part influenced by the climate of the political instability of previous decades and the pressures of the different actors of the agricultural and commercial sector. The suspension of FTA negotiations with the United States in 2006 and the approval of a new Constitution in 2008 laid the foundations for redirecting the Food Sovereignty Regime in 2009. Together with the National Plans for Wellbeing 2009-2013 and 2013-2017, the previous actions established general guidelines for designing policies, programs, and projects to promote production, food security and sovereignty, and rural development.

According to the national regulations, Ecuador's Ministry of Agriculture and Livestock is the governing and executing institution responsible for agricultural public policies. Its mission is to promote the productivity and competitiveness of the sector, with environmental responsibility through the development of technical, organizational, and commercial capacities for agricultural producers at the national level with emphasis on small, medium, and peasant family farming, contributing to food sovereignty of the country. According to (Ministry of Agriculture and Livestock of Ecuador, 2020) in Ecuador, the main strategic objectives of agricultural Ecuadorian policy are:

- Strengthen associative cooperation and alternative circuits for sustainable production and fair trade of agricultural products that benefit producers, emphasizing small, medium, and family and peasant agriculture.
- Increase access, democratization, and redistribution of production factors and agricultural technification, promoting the efficient use of soil resources to guarantee food sovereignty.
- Strengthen agricultural and forestry systems (commercial species) through assistance, innovation, generation of information, technification, and implementation of incentives; that promote the insertion of the sector's products in national and international markets
- Increase access, democratization, and redistribution of the factors of production and agricultural technification, to promote the efficient use of the soil to guarantee food sovereignty

Figure 1 mentions the main axels of the Ministry of Agriculture in Ecuador that generate projects for the country's agricultural and livestock sector.

In the last years, the agricultural policies in Hungary have developed in the context of a transition towards a market economy and the entry into the Europe Union Common Agricultural Policy denominated (CAP).

Figure 1: Strategic axels of the Ministry of Agriculture in Ecuador

Source: Palma Espinosa, 2018

According to (Regional Institute of Agricultural Economics, 2014) , before the accession into the EU, border measures, administered prices, input subsidies, area, and headage were the main policy instruments used to support agriculture in Hungary. Export subsidies constituted a policy instrument of declining importance in regulating crop and animal produce markets, especially in the poultry and pig meat sectors. Tariffs regulated imports and rate quotas, and the significance of agri-environmental and rural development measures increased gradually.

With its accession to the European Union, Hungary adopted the Common Agricultural Policy (CAP) as an agricultural policy that implements a system of agricultural subsidies and other programs found by the EU member states. According to (European Commission, 2019), this policy aims to:

- Support farmers and improve agricultural productivity, ensuring a stable, affordable food supply.
- Safeguard European Union farmers to make a reasonable living..
- Help tackle climate change and the sustainable management of natural resources.
- Maintain rural areas and landscapes across the EU.
- Keep the rural economy alive by promoting jobs in farming, agri-foods industries, and associated sectors.

The (Hungarian Invest Promotion Agency, 2017) shows that during the 2014 - 2020 financial period, 38% of the overall EU budget has dedicated to this policy program, out of which Hungary received approximately 13.061 billion euros. In Hungary are two central institutions responsible for the agricultural sector, the Ministry of Agriculture as the primary institution and the Ministry of Environment and Regional Policy for regional and rural development.

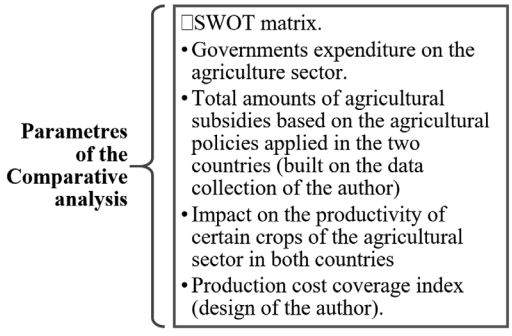
MATERIALS AND METHODS

Some authors define the comparative method as a systematic procedure applied primarily for empirical generalization. The (Rural Development Institute, Brandon University, 2017) defines comparative analysis as explaining differences and similarities. These support establishing relationships between two or more phenomena and provide valid reasons. In addition, comparisons can be conducted at various regional, national, or broader geographic boundaries based on a specific topic or area of interest.

For this thesis, a comparative analysis was applied, mainly to explain and better understand the process of agricultural subsidies in Ecuador and Hungary (2 different regions).

(Tilly, 1984), distinguishes four types of comparative analysis: individualizing, universalizing, variation-seeking, and encompassing. The present research carried out an individualizing comparative analysis to capture the peculiarities of the two countries and contribute to broadening their knowledge.

In order to establish a relationship between these two countries, the results analyzed the agricultural subsidy policies applied in the last ten years in each country and made a comparative analysis of different parameters based on the data set available for both countries.



The collection technique used was a documentary analysis based on the collection and analysis of secondary data. These data were based on statistical information from governmental institutions in Ecuador and Hungary related to the agricultural sector. However, since the reality of the countries is different and their databases, this research also collected information from international databases related, such as the European Union in the case of Hungary and the Andean Trade Community in the Ecuadorian case.

RESULTS AND DISCUSSION

Differences and Similitudes of the country's studies analyzed through the SWOT matrix

Appendix 1 and 2 illustrate the SWOT analysis of the agriculture sector in Ecuador and Hungary, respectively. The analyses were done from a general view of the sector since each crop or livestock has its strengths, weakness, opportunities, and threats to confront. However, it is possible to identify some similitudes in both country's studies, such as:

- The two countries have geographical positions, land vocation, and availability of natural resources that contribute to intensive agricultural and livestock production.
- In both countries, the agricultural and livestock sector has essential participation in the local economy.
- There is a local and international demand for good quality agricultural products as opportunities for Ecuador and Hungary.
- As a common threat to both countries, migration rates from the rural sector remain high. Climate change affects the worldwide environment, especially the agricultural sector, which is more vulnerable.
- Finally, the two countries coincide in producing quality agricultural products exported to different countries.

In the same SWOT matrix, it is also possible to determine differences in the Ecuadorian and Hungarian Agricultural sectors, such as:

- Although government institutions in both countries implement subsidy policies for the agricultural and livestock sector, the primary and significant difference between the two countries is the institutionalization of the subsidies. As a member of the EU, Hungary is under the framework of the Common Agricultural Policy and has a series of tools and subsidy parameters for all Europe Union. In contrast, Ecuador does this on its own without supranational support from another institution through programs and projects that are not necessarily sustainable in the long term.
- Because of the Ecuadorian monetary system (dollars), production costs, especially labour costs, are higher than neighbouring countries. While for Hungary, it is a comparative advantage since its agricultural labour costs are relatively low compared to the rest of the EU countries.
- The climatic factor in Ecuador allows for maintaining permanent production throughout the year, while Hungary depends on the climatic seasons, limiting certain crops' production.
- For Ecuador, one of the potent threats in the Amazon rainforest is the agricultural expansion that deforests extensive areas of land and implements agricultural or livestock production; for Hungary, one threat is an expansion of bioenergy that affects land occupation.

There are countless differences between the two countries since each sector within the agricultural and livestock field is very broad; the analysis is a summary made by the author according to her research and perception of the two countries.

Governmental Expenditure on Agriculture

This analysis was based on data presented by (FAO, 2020), which measures expenditures on agriculture, forestry, fisheries, and environmental protection of government programs based on the Classification of the Functions of Government (COFOG)[1].

[1]*Classification of Functions of Government (COFOG) as outlined in the IMF's Government Finance Statistics Manual, 2001*

The composition of the FAO indicator is explained in terms of the parameters of each category which includes crops and livestock, forestry (cash forest crops and timber), and, finally, fishing and hunting (Food Agriculture Organization of the United Nations, 2020). These parameters are:

a) Agriculture administration of affairs and services.
b) Construction or operation of flood control, irrigation, drainage systems, pest and disease control, forest fire-fighting, fire prevention services, fish hatcheries, extension services, or stocking activities.
c) Operation or support of programs or schemes to stabilize or improve production
d) Production and dissemination of general information, technical documentation, and statistics
e) Compensation, grants, loans, or subsidies
f) Administration and subsidies of government agencies engaged in applied research and experimental development

Table 1 shows the evolution of Ecuador and Hungary's government support between 2006 and 2016. In the first three years, the percentage of Ecuador's government expenditure in agriculture was around 3% and 8% for the Hungarians. Since 2009 these differences have decreased almost five times. The annual variation within each country is different; for Ecuador, only in 2011 presented a negative variation, while in Hungary, only in 2007,2011 and 2014 presented a positive deviation.

Table 1. Government Expenditure on Agriculture between 2006 and 2016 in Ecuador and Hungary.

Years	Hungary		Ecuador		Representation of Ecuadorian vs Hungarian (percentage)
	Million dollars	Annual Variation	Million dollars	Annual Variation	
2006	1346	0	47.84	0	3.43
2007	1 548.5	15.04	61.39	28.32	3.81
2008	986.9	-36.27	94.9	54.59	8.77
2009	959.02	-2.83	243	156.06	20.22
2010	609.12	-36.49	290.71	19.63	32.31
2011	718.02	17.88	174.7	-39.91	19.57
2012	630.32	-12.21	224	28.22	26.22
2013	606.4	-3.79	267	19.20	30.57
2014	840.49	38.60	440	64.79	34.36
2015	680.41	-19.05	554.87	26.11	44.92
2016	590.97	-13.15	341.9	-38.38	36.65

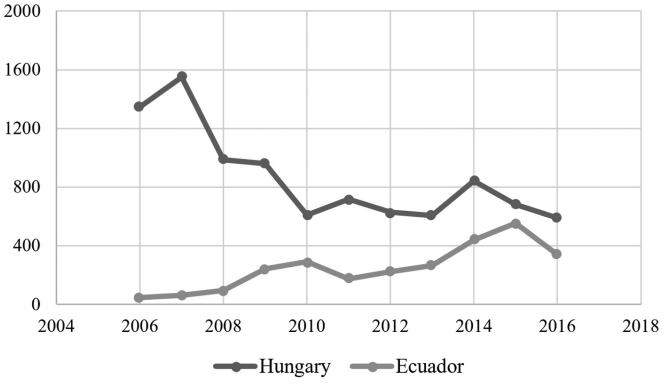
Source: own analysis based on annual statistics of Food Agriculture Organization of the United Nations (FAO), 2020.

To complement the previous analysis, Figure 2 illustrates the evolution of government expenditure in Ecuador and Hungary; in the last three years, the gap between the countries is less than in the first years of the comparison. This analysis is relevant as it emphasizes the importance for Hungary of the funds received by the EU in the framework of the Common Agricultural Policy since part of the subsidies to the agricultural sector come from this fund plus government resources, contrary to Ecuador, which only the state resources subsidize the farm sector.

Total amounts of agricultural subsidies are based on the agricultural policy instruments applied in the two countries.

This comparison is based on the data collection of the research made by the author from the total amounts of subsidies from agricultural subsidy policy instruments applied by each country. This data does not include fishing and aquaculture areas, only crops and livestock production.

Figure 2: Evolution of Government Expenditure for Ecuador and Hungary (million dollars)



Source: based on Food Agriculture Organization of the United Nations (FAO), 2020.

In the case of Ecuador, the data considered is the Estimated Total Support to the Agricultural sector based on:

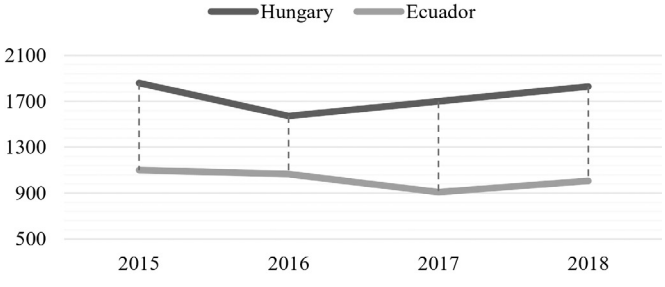
- Individual support to producers (through mechanisms or programs that distort market prices and by direct transfers),
- Price support or direct transfers from the consumers,
- General services that benefit the broad conglomerate of producers

For Hungary, the data consider is the Common Agricultural Expenditure based on:

- Direct payment expenditure
- Rural development expenditure
- Market expenditure

Figure 3 compares both countries' agricultural subsidies according to their instrumental policies. The percentage difference between Ecuador compared to Hungary is 36% less than the total data set, which confirms the relevance of the Common Agricultural Policy for Hungary.

Figure 3: Total amount of subsidies according to agricultural subsidy policies instruments implemented in Hungary and Ecuador between 2015 and 2018 (million euros)[2]



Sources: own analysis based on Inter-American Development Bank, 2018 and Europe Union Commission, 2020

Impact on the productivity of certain crops of the agricultural sector in both countries

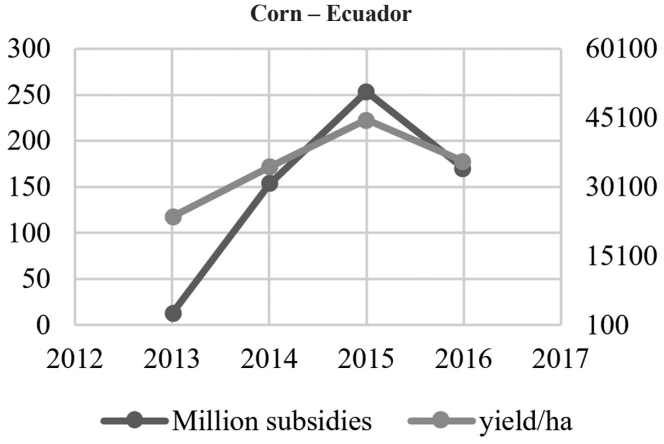
In order to compare both countries for this parameter, the data analyzed was between 2013 and 2016. This short period is because the data in the variables to be evaluated were only available in these years for the two countries; that is why the significant degree of the data is minimal since it does not have more extensive historical databases.

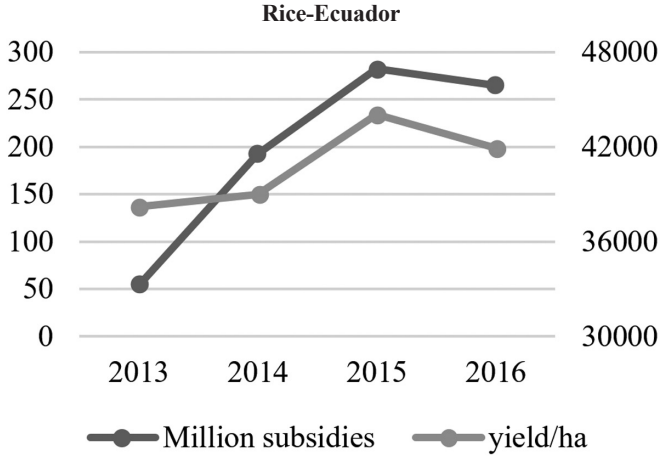
This analysis intended to determine the correlation between the number of subsidies given to a specific crop and the yield per hectare of that evaluated crop. To understand the data to be assessed, it is essential to know the information analyzed in the two countries.

- **Amount of subsidies:** For Ecuador, the amounts analyzed were the levels of product-specific support to specific crops that come from tariff and price control measures (APM) and public intervention expenditures. The amount analyzed was corn and rice since those are relevant crops to country food security. For Hungary, subsidy amounts analyzed were the decoupled direct payments, based on the assumption that the highest allocation of these resources is directed to cereals and oilseeds crops.
- **Yield per hectare:** the data was obtained from the Food Agriculture Organization (FAO) statistics database to standardize the measures between the two countries; the data shows hg/ha in each crop. The significant difference to consider in this variable is that for Hungary, the cereals were analyzed in single value as a group of crops (wheat, corn, barley, rye, and oats); the same case for oilseed that groups crops as (rapeseed, soybeans, sunflower, among others).

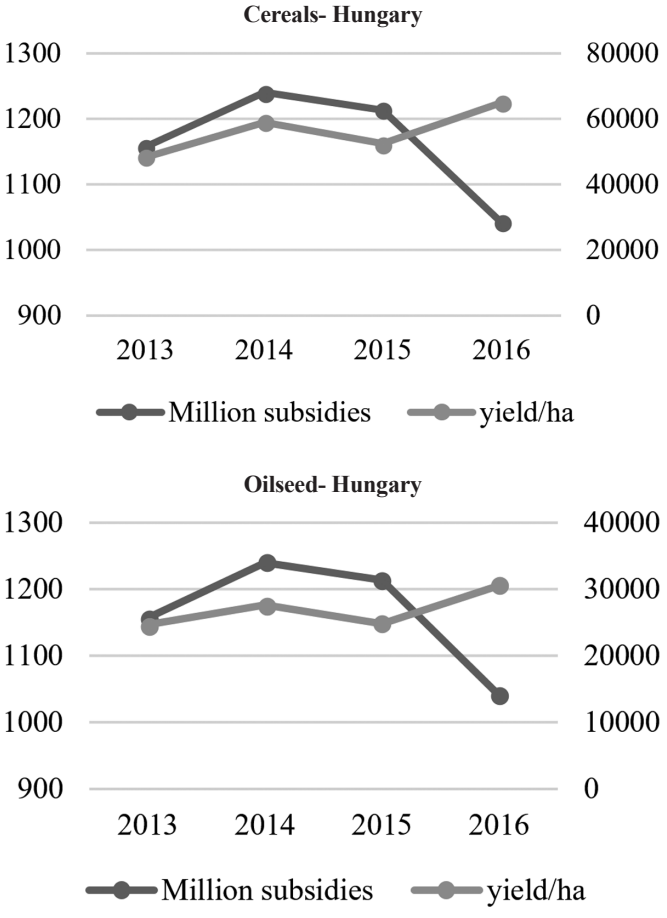
Figure 4 shows the evolution between the amounts of subsidies and the yield/ha in each crop evaluated by the country.

Figure 4: Evolution between the amounts of subsidies and the yield/ha in each country between 2013 -2016





[2]*For Ecuadorian amounts the currency was converting from US dollars to euros according to international rates at the years refers in the Figure*



Source: own analysis based on IDB and Euro Commission, 2018.

For Ecuador, the correlation is positive, and to a high degree (Table 2), it is estimated that the contribution of subsidies increases to the same extent as the yield of the compared crops (corn and rice). It is important to note that for both crops, there is a minimum support price and technological packages provided by the government, which include high-yielding seeds that influence crop productivity. According to (Astudillo, 2020), although state aid and subsidies have expanded the mechanized chemical agriculture model that has improved productivity, they did not generate competitive local supply since productivity levels are far from reaching international levels. Local supply continues to be more expensive than foreign.

In the case of Hungary, the correlation is harmful and to a moderate degree (Table 2), estimating that as the contribution of subsidies increases, crop yields decrease. However, this assumption needs further evaluation by adding more data and specifying the number of subsidies for each crop group analyzed.

Figure 4 shows a relevant decrease in yield per ha in both crop groups in 2015; according to (Hungarian Central Statistical Office, 2015) the production volume decreased in that year due to the high base of the previous year and unfavourable dry weather for crops.

In the study of (Join Research Center of the Europe Commission, 2015) a survey among farmers indicates their consideration of the most critical determinants of wheat yields: climate change, seasonal weather, and soil conditions. Concerning the effect of CAP subsidies on wheat yields for Hungarian farmers, the yield improvement obtained by additional support has a negative correlation (based on linear prediction).

Table 2: Correlation coefficients between the amounts of subsidies and the yield/ha of crops in Ecuador and Hungary

Type of crop	Correlation Coefficient	Degree of Correlation
Corn	0.99	High
Rice	0.89	High
Cereals	-0.51	Between Low and Moderate
Oilseeds	-0.65	Moderate degree

Source: own analyses

Production cost coverage index (design by the author)

As a final parameter for this study, an index IPCC was designed to determine the coverage in the cost production of the most important crops (area related) by the total amount of agricultural subsidies. This index can be used as a comparative parameter for the two countries, considering the differences in the productive systems of Hungary and Ecuador.

The index is the ratio between the subsidy cost average (per hectare) and the production cost average.

Explanation of the formulas

The subsidy cost average is the total subsidy per year that the government generally supports to the agricultural sector, divided by the total arable land plus grassland in the country.

$$Subsidy\ cost\ average = \frac{total\ subsidy\ per\ year}{total\ arable\ land\ plus\ grassland}$$

The production cost average per hectare can be estimated as the weighted sum of the production cost of the country's most important crops, where the weighted factor WC for each crop is the relative surface occupation of the given crop.

$$(WC) = \frac{(AC\ (one\ crop))}{(total\ arable\ land\ plus\ grassland)}$$

$$\text{Production cost average (PCA)} = \sum \text{WC*PC}$$

PC = production cost of crop per ha

Finally, the IPCC index includes the division between the subsidy delivered per hectare and the surface occupation of the most important crops in each country multiplied by the production cost of each crop. To obtain adequate data is important to emphasize several aspects related to the formula proposed:

- The total agricultural subsidy considers the total amounts per year that the government supports the agricultural sector in general terms; it does not specify the type of production, whether livestock or agricultural production.
- The area of hectares considers the arable area and the cultivated pastures, and it does not consider other land use types.
- For the correct estimation of the index is essential to include the crops that occupied most of the area considered in the study. The margin error comes from those uncounted crops with smaller area coverage.
- Production costs (P) are those reported by each country's agricultural authorities yearly and consider each crop's direct and indirect costs.
- Interpreting the values obtained by calculating the index will be: (0) no coverage of production cost by the subsidies, and (1) complete coverage of production cost by the subsidies.

The following formula is a sample of the previous considerations, which will help visualize the proposal index better. We take this sample as a reference year (2016) and one of the two countries studied (Ecuador).

$$Subsidy\ cost\ average = \frac{1\ 013\ 000\ 000\ \$}{5\ 390\ 000 ha} = 187{,}94\ \$/ha$$

$$Production\ cost\ coverage = [\ \frac{559\ 000 ha}{5\ 390\ 000 ha} * 2000\$ + \frac{385\ 000 ha}{5\ 390\ 000 ha} * 2009\$ + \frac{341\ 000 ha}{5\ 390\ 000 ha} * 1702\$ +$$

$$\frac{320\ 000 ha}{5\ 390\ 000 ha} * 2153\$ + \frac{186\ 000 ha}{5\ 390\ 000 ha} * 3190\$ + \frac{109\ 000 ha}{5\ 390\ 000 ha} * 2275\$ + \frac{3\ 101\ 000 ha}{5\ 390\ 000 ha} * 1182\$\ ] = 1422{,}58\$/ha$$

For the denominator, the crops considered were cocoa, rice, corn, oil palm, banana, sugar cane, and grassland in the respective order in the formula.

$$IPCC\ 2016\ (Ecuador) = \frac{187{,}94}{1422{,}58} = 0{,}13$$

Due to not having all the necessary data within a broader historical database in all the parameters required for the index calculations, only a sample was generated for 2016 and 2017 in the two countries (Table 4). As illustrated, the subsidy coverage of production cost is three times higher in Hungary than in Ecuador, while in 2017, it is 4 points higher, respectively.

Table 4: Production cost coverage index between 2016 and 2017

Year	IPCC Ecuador	IPCC Hungary
2016	0.1	0.3
2017	0.1	0.4

Source: own analyses

From the data reviewed, it is essential to note that crop production costs are significantly lower in Hungary than in Ecuador. This could be attributed to the degree of mechanization applied in production. For example, in Ecuador, the main crops are not fully mechanized, and harvesting is still manual and a dollarized economy, making labour more expensive.

The IPCC shown in Table 4 also indicates Hungary's dependence on agricultural subsidies as they cover a significant percentage of the cost of crop production. At the same time, Ecuador has a smaller and less substantial coverage.

CONCLUSIONS

Hungary and Ecuador have different production systems determined by their geographic conditions and natural resources. However, for both countries, the agriculture sector is important in their internal composition and external trade economies.

The SWOT matrix generally reflects the differences and similarities between the agricultural sectors of the two countries within their geographical and climatological realities.

Regarding the agricultural subsidy policies, in comparison with Ecuador, Hungary possesses an enormous advantage for being part of the Common Agricultural Policy of the European Union. The subsidies in EU countries are institutionalized and planned long-term within a series of programs financed by the EU and national funds and evaluated periodically. In Ecuador's case, there are agricultural policies as a general framework; however, the governing body manages the subsidies through projects that do not necessarily remain over time and depend on the current political situation in the country.

According to the data collected, although the share of the agricultural sector in Ecuador's GDP is higher than in Hungary, the subsidy amounts for this sector in Ecuador are 36% lower than in Hungary. In the case of Ecuador, support for the agricultural sector is provided in two ways: the first is through

measures related to the external and internal markets, which do not require the expenditure of government resources. The second is public investment, which involves spending from the government budget. Hungary is in line with the European Union's Common Agricultural Policy, which is found by two sources. The first is the European Agricultural Guarantee Fund, which directly supports and finances market measures. The second is the European Agricultural Fund for Rural Development, which finances rural development.

In Ecuador, there is no system for registering agricultural areas that recognizes a direct monetary incentive based on the crops subsidized under the agricultural policy, which exists in Hungary under the CAP policy. Furthermore, in Ecuador, there is no specific rural development program that invests in the progress of these areas.

Despite the lack of a comparative historical database for the two countries, from the analysis of the impact on the yield of certain crops with the amount of subsidies granted to them, it is observed that the correlation coefficient for Ecuador is positive while for Hungary it is negative in the periods analyzed.

As part of the comparison of subsidy policies, an index of coverage of production costs by aggregate agricultural subsidies is proposed. The calculation method is based on the most representative crops within the total area, their production costs, and the agricultural subsidies provided by the State. As a sample, the research points out the results of a specific year for the two countries. In conclusion, the IPCC could indicate Hungary's dependence on agricultural subsidies as they cover a significant percentage of the cost of crop production, while in Ecuador, it is lower and less significant in its coverage.

Over time, sustainable agricultural subsidy policies are essential to encourage this sector, which is important in the two countries' economies.

As a recommendation, both countries need to have historical databases of agricultural subsidies from the governing bodies of agricultural sectors that allow a more detailed analysis by type of crop or livestock. The data available for this study proceeds from online sources from different institutional departments that making the analysis more complex during the selected period.

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FARMERS KNOWLEDGE ON FALL ARMYWORM (SPODOPTERA FRUGIPERDA) PESTICIDE APPLICATION AND ITS RELATIONSHIP WITH QUANTITY OF MAIZE THAT IS LOST TO FALL ARMYWORM

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Abstract: *Fall armyworm (Spodoptera frugiperda) has spread rapidly and posed numerous threats to the food security and livelihood of millions of smallholder farmers in Ghana. This study quantifies the damages of fall armyworm infestation in maize production and identifies the various methods used in controlling fall armyworm infestation. Almost all farmers (94%) experienced fall armyworm infestation on their farms. They cited key common visual damages as yellowish leaves, stunted growth, poor yield quality, holes in leaves, and egg masses on leaves. Farmer's loss an average of GH¢2616.07 to fall armyworm infestation. Pesticide application is the frequent control measure mostly used by farmers. Farmers do not mostly use biological methods for the control of the fall armyworm. The use of pesticide as a control method is however not effective as about GH¢ 3 000 per 1 acre is lost with the use of insecticides. It is recommended that the use of other control measures like the contemporary measures involving the use of birds and chickens as predators of eggs and worms of fall armyworm should be encouraged.*

Keywords: *pest control, fall armyworm, maize pest, pesticide application*
(JEL code: Q16)

INTRODUCTION

Maize is a staple food (Shiferaw, 2011) in Ghana. Most Ghanaian foods like banku, akpele, kenkey, and porridge are made from maize. There is however a threat to maize production caused by the Fall armyworm (FAW). Maize loss in Africa is estimated at $150 000 as of 2017 (Toepfer et al., 2019). Maize is among the crops fall armyworm infects most (Igyuve et al., 2018; Kammo et al., 2019). The proportion of maize loss to fall armyworm (Spodoptera frugiperda) is between 21-53%. The percentage loss allocated to fall armyworm infestation in Ghana however is unknown (Igyuve et al., 2018). Also, the quantitative and monetary loss to the farmer is not known.

Farmers are not able to identify that their farms are infected with the fall armyworm until the period when the worm has taken over the entire farm. A female worm can lay 2000 eggs in one period. The practices that cause an infestation of fall armyworm is not known as they travel mostly by wind dispersal (Wightman, 2018). Fall armyworm is a viral pest and very hard to control with normal practice. With the fall armyworm (FAW) invasion worldwide, looking at their destructive work on maize fields, has left farmers with fewer options to combat this crop pest. Pesticides application remains prominent among control options against FAW. However, due to lack or less education on the part of smallholder farmers, who are major cultivators of maize, the understanding of the nitty-gritties of pesticide use, i.e. reading of labels (Sharma et al., 2015) and decoding the precautions information on adverse impacts of pesticides (Lekei et al., 2014) prevail leading to wrong decisions.

Farmers' inner drive and individual differences influence how the application is done (Pan et al., 2020), applying excessively both recommended and banned ones, although fully aware of pesticide risks that they pose. The majority of small-

holders, trusting their farmers' network (Pan et al., 2020), pass on erroneous experience and information among themselves (Rios-Gonzalez et al., 2013), and also rely on village suppliers to procure pesticides, access information on dosage (C. Zhang et al., 2015), though suppliers' advice on the safe and proper application of pesticides are deficient (Fan et al., 2015).

Upadhyay et al., (2020) remark that during FAW pest invasion, smallholder farmers normally do not take time to check the effect pest have had on the crops (i.e. the economic threshold level, ETL) before deciding measures and they tend to adopt environmentally unfriendly practices. In trying to avert the problem, most farmers seek advice from other local farmers, extension officers or agrochemical dealers. Most farmers lack knowledge about FAW pest and maize plant morphology (Bariw et al., 2020), production requirements (Nie et al., 2018) and the relationship between pesticides and agricultural products (L. Zhang, Li, et al., 2018). Therefore, in farmers' quest to see quick results, heavy doses of sometimes restricted-use chemicals are frequently applied (Jepson et al., 2020), without ascertaining the morphology of the pest, specific pesticide that is used for control, and the right time to spray (Bariw et al., 2020). A common trend is that some farmers think that any handy chemical could be used on just any pest without a thorough check of its efficacy, pertinence and how it will enhance yield.

Even though there is increased use of pesticides on maize fields against FAW, losses experienced have been huge (Quansah, 2020), largely due to the misapplication of pesticides. This is due to poor execution of pesticide application by farmers in less developed countries (Schreinemachers et al., 2017). Averagely an estimated 90% of farmers acquire agricultural skills, in this case, pesticide application, through their exploits or as learned from parents (Pan et al., 2020), leading to poor efficacy. The following question were answered through this study

Which control method is effective?
What are the steps taken by farmers in the application of pesticides?
What is farmer's knowledge on the application of chemical pesticides in relation to fall armyworm infestation?
What is the relation between how spraying is done and the quantity of maize that is lost by farmers to fall armyworm?

This research is essential because most farmers about 60% do not have a suitable solution to combat the deadly infestation (Bonsu, 2017). The research would help to know the most frequent way farmers take to combat FAW. This research is going to provide farmers and the general public with the right knowledge concerning FAW and how proper pesticides use positively affect the control of FAW pest. The study would examine how farmers use the right steps in applying pesticides when their farms are infested with FAW to ensure that maize that reaches the final consumer is of the best safety. The farmers would know the best way and timings to apply chemical pesticides during infestation to enhance yield and profitability. The work would bring out the best way spraying should be done on farms to cut maize lost to FAW to improve the country's GDP. The research would be relevant to academia due to limited studies on causes of fall armyworm infestation on maize production.

MATERIALS AND METHODS

The survey was conducted in Ejura-Sekyeredumasi Municipality, in the Ashanti Region and the Sunyani and Nkoranza district in the Bono region. The Ejura-Sekyeredumasi Municipality, Sunyani and Nkoranza district were randomly chosen among the many maize producing municipalities or areas due to its favourable environment and because most farmers are in maize production.

A total of 110 respondents were selected. About fifty (50) respondents was carefully selected from maize farmers in the Sunyani district and Nkoranza district all in the Bono region respectively. A simple random sampling technique was utilized in picking 60 farmers from the four communities in the the Ejura-Sekyeredumasi municipality.

Anyinaso, Sekyeredumase and Drobu were randomly selected from the maize producing areas in the Ejura-Sekyeredumasi municipality. New Dormaa, Old Abbisim, Nkrankrom, Kofikrom and Kyiribogya were randomly selected from the communities in the Sunyani and Nkoranza district. A list of farmers were garnered from the extension department of the municipality's Ministry of Food and Agriculture (MoFA) office in sampling maize farm households. The number of farmers picked from each community depended upon the number of maize farm households in each given area

The selection criteria were that each participant had to be at least 18 years and cultivate maize in addition to other crops. Local dialect (Akan) was used in the data collection because illiterate participants were included.

The research relied on primary data for the work. Respondents were interviewed during data collection and gave answers to a list of questions about the study. The interview was done with a structured questionnaire. A questionnaire was administrated as the data collection tool. Data was collected on the socioeconomic characteristics of farmers, the quantity of maize lost to fall armyworm infestation on the maize field, the agronomic practices observed in the field, and the method of controlling fall armyworm infestation. Descriptive statistics were utilized in assessing spray actions of farmers and was analyzed using the Microsoft Excel . The choice of pesticides, knowledge on the morphology of maize plant and fall armyworm (FAW) pest, knowledge on pesticide use, how spraying is done, the number of times spray was applied was computed in percentages.

Respondents were asked if their field was infected with fall armyworm. Farmers were asked the total amount in kg of maize lost to fall armyworm infestation. This amount was converted in Ghana cedis to know the monetary value of maize lost to fall armyworm infestation on the farm. Question on the experience of fall armyworm and agronomic practices were measured as a dummy variable. Where 1= Yes to a practice and 0= No to a practice. Also, the different methods of controlling fall armyworms were mentioned of which farmers chose the most frequent method they used in controlling fall armyworm on their various farms.

Frequency, mean, and correlation were the method of data analysis. Correlation analysis using STATA was performed on the various variables to see their relationship.

Questions focused on the steps farmers took before pesticide application against fall armyworm (FAW) was done. Respondents were asked about prophylactic measures they took against FAW infestation, how they monitored and scouted for pest presence, the reason why they chose to spray, the type of pesticide used as per the literature reviewed.

We sought to ascertain the knowledge of farmers in pesticide application regarding fall armyworm (FAW) infestation as reviewed in the literature. The 5-point Likert scale was used in ascertaining farmers knowledge. The scores (totally agree = 1 point, agree = 2 points, neutral = 3 points, disagree = 4 points and totally disagree = 5 points) were applied. The respondent scores were presented as mean ± standard deviation (SD) with $p < 0.05$ level of significance.

Farmers were asked when and how they apply pesticides with regards to calibration and spraying on maize plants against fall armyworm. The field outcomes of the application were inquired of to find out how effective each farmers' case was, and then compared with maize loss. The results were correlated to determine the direction and degree of relationship between the educational level and their application methods, and then their application methods and maize loss.

RESULT AND DISCUSSIONS

Demographic characteristics of respondents

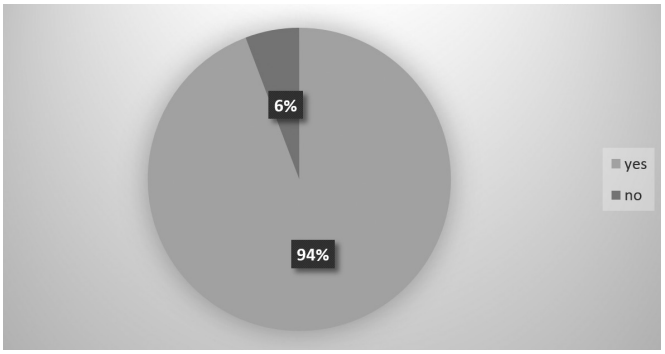
Analysis of demographic characteristics of the respondents indicate that more than two-thirds (67%) of respondents are males (Table I). This might be because males have more access to funds and resources for farming as compared to their female counterparts (Tijani and Umoh, 2020). More than half (59%) of the respondents are youth between the ages 31 and 50 years (Table I). This shows that there is more vigor as the youth are encouraged to go into agriculture. More than four-fifth (88%) of the respondents are married (Table I). This might explain the support maize farmers get in the cultivation of the crop from their spouses. About one quarter (22%) of farmers have no formal education (Table I).

Table I: Demographic Characteristics of Respondents

Variables	Measurement	Frequency	Percentage (%)
Sex	Male	74	67%
	Female	36	33%
		110	100%
		18	16%
Age	15-30	65	59%
	31-50	19	17%
	51-65	8	8%
	66-80	110	100%
Marital Status	Single	13	12%
	Married	97	88%
		110	100%
Household	1-5	56	50%
	6-10	44	38%
	11-15	7	10%
	Above 15	3	2%
		110	100%
Level of Education	Primary	26	26%
	J.H.S	28	40%
	S.H.S	9	4%
	Tertiary	21	8%
	No Formal Education	26	22%
		110	100%

About 96% of farm households experience fall armyworm (Spodoptera frugiperda) infestation (Figure I). They cited key common visual damages as yellowish leaves, stunted growth, poor yield quality, holes in leaves, and egg masses on leaves.

Figure I: Infestation by fall armyworm



Fall armyworm infestation is high during the dry season resulting in huge income loss to farmers. Farmer's loss an average of ¢2616.07 (Ghana Cedis) for 1 acre of land to fall armyworm infestation. It appears that fall armyworm infests farms whether they weed their farms frequently or not (Table II).

Table II: Relationship between KG of maize lost to fall armyworm and the various agronomic practices

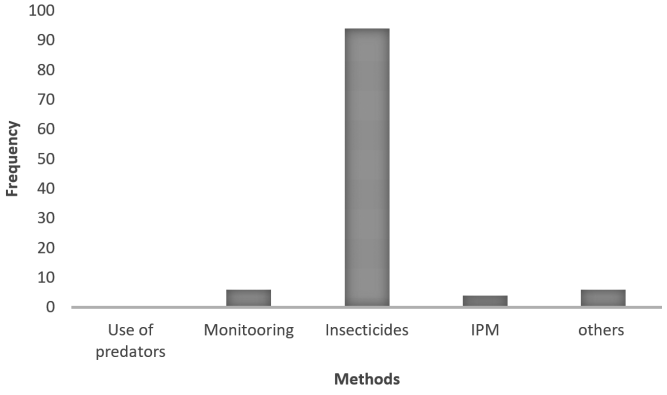
	Kg lost	Weeding	Intercropping	Harvest
Kg lost	1.0000			
Weeding	0.1108	1.0000		
Sig	0.4389			
Intercropping	0.1235	-0.1243	1.0000	
Sig	0.3877	0.3849		
Harvest	0.0450	-0.1878	0.3328*	1.0000
Sig	0.7539	0.1868	0.0170	

All other agronomic practices have not relationship with kg of maize lost to fall armyworm infestation on a farm. Acevedo-Siaca and Goldsmith (2019) mentioned that crop rotation with maize and soybean can lead to the transmission of fall armyworm from one plant to the other. It is perceived that intercropping maize with other crops reduces the infestation of fall armyworm. The results however show that intercropping does not affect the infestation of fall armyworm.

Methods used for combating the infestation of fall armyworm

The most frequent method used by farmers to combat the infestation of fall armyworm is pesticides (Figure II). This finding agrees with that of All et al. (1986) that insecticide is the most frequent method used for combating the infestation of fall armyworm.

Figure II: Frequency of the various methods used by farmers to combat fall armyworm infestation



This finding however shows that farmers do not conform with contemporary measures as stated by Wightman (2018) or the use of natural enemies (Tendeng et al., 2019). The use of natural enemies involves the use of other parasites (nematode Hexamermis sp. and two Hymenopterans Chelonus sp. and Campoletis sp.) which are enemies to fall armyworm. The insecticide is preferred to the use of contemporary measures since birds cannot see some hiding sites of fall armyworm on the farm (Tendeng et al., 2019).

Contemporary measures involve the use of birds and chickens as predators of eggs and worms of fall armyworm. This method discourages the use of pesticides and pesticides on farms. It appears that farmer's use of pesticides is quite moderate as compared to not taking any measures as proposed by Kammo et al. (2019).

Pesticides are a combination of biopesticides and chemical pesticides. It appears that the use of biopesticides or chemical pesticides has little effect on the damage of fall armyworm. This is in agreement with Kammo et al. (2019) and Tendeng et al. (2019) that the relation between the use of pesticides and fall armyworm infestation was insignificant. The use of pesticides to control fall armyworm is however better than when no measures are applied to the field. All et al. (1986) however noted that pesticides with methomyl and chlorpyri can reduce fall armyworm infestation. Fenvalerate and permethrin chemicals were not effective in controlling fall armyworm (All et al., 1986).

From Figure III, the use of chemicals led to the highest loss of maize (3 000 Ghana cedis for 1acre). The use of diverse methods like monitoring and the use of integrated pest management led to the reduction of maize loss in Ghana cedis.

A correlation test showed a weak correlation (p=0.2227) between the use of pesticides and the quantity of maize lost to fall armyworm infestation (Appendix). This finding agrees with Wightman (2018) assumption that pesticides are not a good way of controlling the fall armyworm. This finding agrees with that of Goergen et al. (2016) that pesticides are mostly used by farmers to control fall armyworm infestation but it is often ineffective. The frequent misuse of pesticides has led to resistance to insects.

Steps taken by farmers in the application of pesticides against fall armyworm.

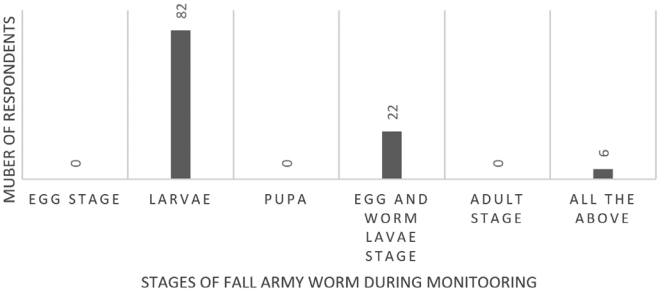
More than three-fourth (84%) of the respondents revealed that they visit and monitor their farms against fall army worm infestation on a weekly basis (Table III). A week is so long for effective monitoring of fall army worm since they spread very fast. There was not one pheromone traps in the Municipality, with some farmers totally oblivious of it.

Table III: Frequency of monitoring of farm against fall army worm infestation

How frequently farmers monitor maize crops	Percentage
Every day	16%
Every week	84%
Totals	100%

Farmers know there is fall army worm infestation when there are holes in leaves. Most farmers (82 out of 110) notice fall army worm infestation when the armyworm is at the larvae stage (Figure III). This might be because farmers do not monitor crops on daily basis (Table III).

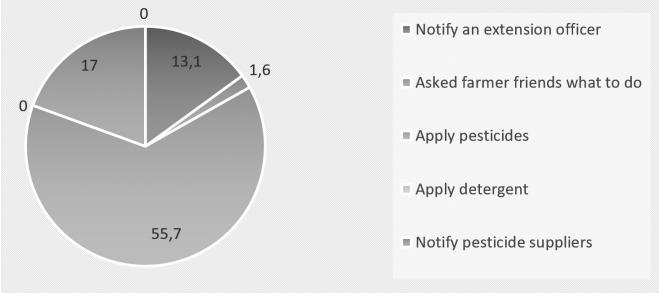
Figure III: Stage at which fall army worm is seen by farmers



Very surprisingly, some farmers reported they have never sighted eggs masses of the fall armyworm. Leave damages was mostly reported by farmers, proceeded by ear damages.

Even though farmers weed regularly to prevent infestation of fall army worm on their farm, the opposite is seen. Farmers thus averagely apply pesticides when there is fall army worm infestation on their farms (Figure IV). This confirms why all farmers use pesticides (Figure I).

Figure IV: Step taken when farm is infested with fall army worm



Farmers apply pesticides 1-3 days after seeing signs of fall army worm infestation. One would think that farmers would notify experience farmers, pesticide suppliers and extension officers before he applies pesticides. It might be that since farmers averagely have about 20 years of experience (Table I) on maize production, they know the pesticides to be used for fall army worm infestation on their farms. Farmers mentioned that pesticides received from extension officers was not effective.

Farmers' knowledge on the application of chemical pesticides in relation to fall armyworm infestation.

Using the 5-point Likert scale farmers knowledge and attitudes were determined. The scores (totally agree = 1 point, agree = 2 points, neutral = 3 points, disagree = 4 points and totally disagree = 5 points) were applied and presented as mean. The survey revealed that a large number of the respondents in the survey were not abreast with information on pesticide application on fall armyworm (Table IV).

Table IV: Farmer's knowledge and attitudes on negatives questions

Questions	Totally agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Totally disagree (5)	Mean
You can mix different chemicals for spraying at the same time	30%	15%	1.7%	18.3%	35%	3.13
Detergent is more effective than pesticides	0%	5%	8.3%	50%	36.7%	4.18
Pesticides given by extension officers is not effective	21.7%	18.3%	16.7%	23.3%	20%	3.02
All leaf damages are caused by fall armyworm?	63.3%	11.7%	3.3%	18.3%	3.3%	1.87
Spraying can be done just anytime	36.7%	48.3%	8.3%	0	6.7%	4
Spraying can be done when maize is above chest level	15%	13.3%	1.7%	26.7%	43.3.%	3.7
My nozzle is faulty	11.7%	8.3%	16.7%	30%	33.3%	3.65

The average of the mean numbers is 3.36 (Table IV). Farmers response on questions posed from the negative angle shows that they were neither in between doing the wrong things or the right ones, which is dangerous. Farmers that participated in the survey agreed that all leaf damages are caused by fall armyworm, which is not always the case (Table V). Though some used detergent, they emphasized that detergent is not more effective than pesticides. Comments from respondents also show that different chemicals are mix in the same tank, and DDT a banned chemical was used. Respondents' reasons for mixing different chemicals were that they give better efficacy than using only a single chemical.

Table V: Farmer's knowledge and attitudes on positives questions

Questions	Totally agree (1)	Agree (2)	Neutral (3)	Disagree (4)	Totally disagree (5)	Mean
Best treatment should be administered 30 days after seedlings emerge	46.7%	40%	6.7%	5%	1.7%	1.75
Insecticide treatment prevent leaf damages	46.7%	46.7%	10%	0	0	1.67
Spraying can be done multiple times	36.7%	48.3%	8.3%	0	6.7%	1.91
Frequent spraying increase yield	18.3%	38.3%	25%	18.3%	0	2.43
Labels on pesticides provides the correct dosage to use for fall army worm infestation	31.7%	23.3%	6.7%	21.7%	16.7%	2.68
Fall army worm has a white head	16.7%	13.3%	43.3%	20.0%	6.7%	2.87
I wear PPE when applying pesticides	30.0%	11.7%	8.3%	20%	30.0%	3.08
Nozzle type and size used is recommended on labels of pesticides	16.7%	31.7%	41.7%	8.3%	1.7%	2.46
I have a drift shield fixed to my knapsack sprayer	11.7%	10.0%	25.0%	26.7%	26.7	3.06
My hose is very close to the plant when I am spray	35.0%	25.0%	10.0%	26.7%	3.3%	2.38
I don't spray when the atmosphere is windy	26.7%	25.0%	3.3%	20.0%	25.0%	2.91

Averagely, farmers response to questions posed from the positive angle indicated that, farmers were doing the right things. Farmers agreed fairly that insecticide treatment prevent leaf damages. With regards to PPE, farmers agreed that putting on PPE is a good practice but most did not use it because they complained of the tropical weather. Some also do not have the PPE at all (Table V). When more than 100kg of maize is lost to fall amry worm, spraying of field is frequent (Table VI).

Table VI: Relationship between how spraying is done and the quantity of maize that is lost by farmers to fall armyworm.

		kg of maize was lost per acre 1=25-50 kg 2=50-100 kg 3=More than 100 kg		Total
		2	3	
Number of times the field were sprayed 1=1 2=2 3=3 4=More than	1	0	4	4
	2	1	32	33
	3	3	30	33
	4	0	40	40
Total		4	106	110

As more kg of maize is loss more spraying is done. This implies that farmers spend money on insecticides when fall army worm has already infested the farm. Farmers thus prefer to spend money on eliminating fall army worm infestation than spend money on preventive measures to aviod the infestation of fall army worm on maize fields.

CONCLUSION

We analyzed and assessed the damages and effects of control on Fall armyworm (Spodoptera frugiperda) infestation in maize production using recent survey data from maize growing households. Results show that pesticides are adopted by farmers for the control of fall armyworm. There is however loss of income with the use of pesticides.

It is recommended that the use of pesticides in controlling fall armyworm infestation should be reduced. The chemical composition of biopesticides should be researched to know their chemical composition. Further studies should look at other methods of controlling fall armyworm infestation in maize farms.

- Farmers monitor their farms weekly so are not able to detect fall armyworm infestation on time
- Farmers averagely have knowledge and a positive attitude on the application of pesticides on fall armyworm infested farms
- Farmers spray their farms more than twice as kg of maise loss increases

RECOMMENDATION

- Farmers should monitor their farms every day to detect fall army worm infestation early
- Farmers should frequently call the services of experts like the extension officers to help detect fall armyworm infestation early

STATEMENTS AND DECLARATIONS

The authors did not receive support from any organization for the submitted work. All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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