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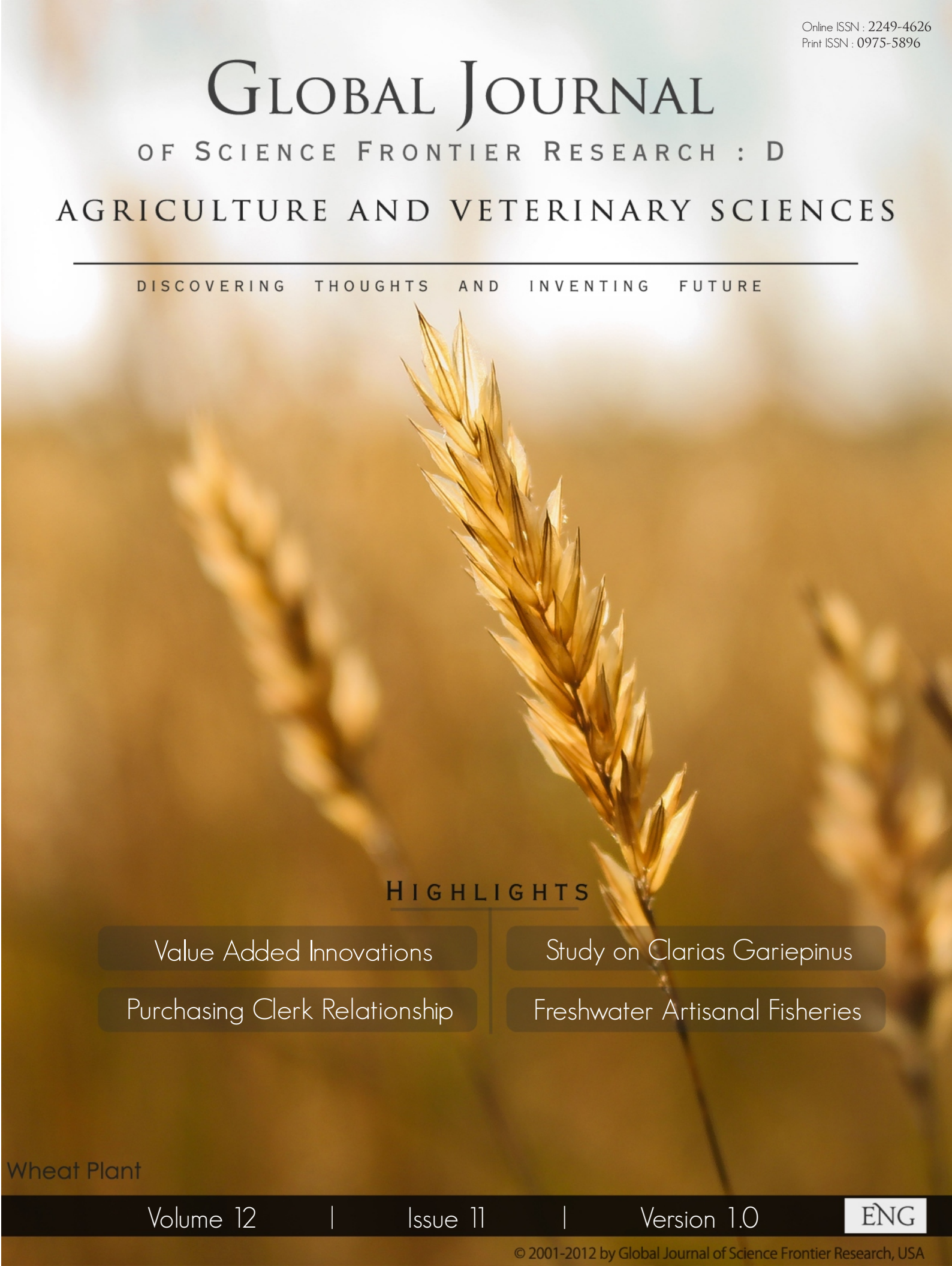

HIGHLIGHTS

- Value Added Innovations
- Study on Clarias Gariepinus
- Purchasing Clerk Relationship
- Freshwater Artisanal Fisheries

Wheat Plant

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Impact and Adoption of Value Added Innovations in Root and Tuber Crops Among Farmers in Imo State, Nigeria

By Aniedu, C., Aniedu, O. C. & Nwakor, N.
National Root Crops Research Institute (NRCRI), Umudike

Abstract - The National Root Crops Research Institute (NRCRI), Umudike embarked on massive training and extension of technologies of new and improved food forms of root/tuber crops to rural farmers/women groups from 2005 to date in this country generally and in South-eastern parts in particular. However, the main purpose of this study is to determine the impact and adoption rate of the training/extension activity among farmers in Imo State of Nigeria. A structured interview schedule, administered to 90 farmers in 3 zones of Owerri, Orlu and Okigwe was the major instrument used in data collection. The respondents were 30 generated from a particular training point in each zone. The data were analysed using means, percentages and means scores. The result revealed that although the respondents were mostly women, an appreciable number of men participated in the training and these respondents were reasonably aware of the innovations. However, the adoptions of cassava innovations (value added and cultivation)by the respondents were near average but that of cocoyam and sweetpotato were very low.

Keywords : *adoption, impact, training, value added products, innovations, technologies.*

GJSFR-D Classification : *FOR Code: 820401, 070108*

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Impact and Adoption of Value Added Innovations in Root and Tuber Crops Among Farmers in Imo State, Nigeria

Aniedu, C. [α], Aniedu, O. C. [σ] & Nwakor, N. [ρ]

Abstract - The National Root Crops Research Institute (NRCRI), Umudike embarked on massive training and extension of technologies of new and improved food forms of root/tuber crops to rural farmers/women groups from 2005 to date in this country generally and in South-eastern parts in particular. However, the main purpose of this study is to determine the impact and adoption rate of the training/extension activity among farmers in Imo State of Nigeria. A structured interview schedule, administered to 90 farmers in 3 zones of Owerri, Orlu and Okigwe was the major instrument used in data collection. The respondents were 30 generated from a particular training point in each zone. The data were analysed using means, percentages and means scores. The result revealed that although the respondents were mostly women, an appreciable number of men participated in the training and these respondents were reasonably aware of the innovations. However, the adoptions of cassava innovations (value added and cultivation)by the respondents were near average but that of cocoyam and sweetpotato were very low. The adoption of the technologies had reasonable impact on the livelihood of the respondents as a reasonable of those who adopted the technologies used them as food and in receiving visitors at home. Also, tangible impact was made in the livelihood of the respondents as income earned from the adoption of the innovations helped them in paying school fees and near tangible impact were made in acquisition of more farmland and payment of medical bills. This was adjudged as being contributory to the realization of some Millennium Development Goals (MDG). However, the major challenges associated with the adoption were lack of funds, lack of equipment/facilities and lack of marketrespectively.Challenges such as inadequate knowledge of the innovations and no retraining facilities were also viewed as important. It is therefore recommended that re-training and provision of equipment and market facilities should be intensified to enhance the adoption and impact of these technologies among the farmers.

Keywords : adoption, impact, training, value added products, innovations, technologies.

I. Introduction

a) Value Added Technologies in Root and Tuber Crops

Agricultural produce are known to be highly perishable, hence most rural farmers do not get the desired reward for their work as most of their produce are lost a day or two after harvest. Consequent upon this, the National Root Crops Research Institute (NRCRI), Umudike which had the national mandate to research into root and tuber crops, developed some processing technologies of root and tuber crops in order to curtail their perishability and add value to these crops. Food items such as cassava fufu flour, high quality cassava flour for confectionery production and other products were developed. The essence is to ensure that these crops can be put to wider uses in the home, for income generation and possibly for export purposes. Armed with value added products of the root/tuber crops the NRCRI, Umudike participated in World Food Days in Abuja and other parts of Nigeria and also took part in many other food shows in which NRCRI was adjudged the best food exhibitor. To this effect, groups and individuals all over Nigeria appreciated this development and requested to be trained in those technologies. In Imo State of Nigeria this training by NRCRI, Umudike was conducted for various farmers' and women groups in all the agricultural zones of the state based on request by such groups. However, ever since this massive dissemination of these technologies to farmers/women groups in ImoState of Nigeria started in 2006, no data have been collected in order to specify the impact and adoption of these technologies among farmers trained.

The work of Atala (1990) inferred that the appropriateness of any technology depends on its acceptability by the people. Hence, if an innovation was not acceptable by the people the time, money and efforts spent in developing the innovation and that spent in its disseminations must have been wasted. Also Adams (1985) opined that the appraisal of the impact and adoption rate of an innovation will help to establish strength and weakness of the extension activities in order to modify methodology for more effective extension activities in future, as well as determine the attributes of technologies recommended for adoption.

The adoption of innovation is the last step in a decision process to make full use of an innovation having considered that such will impact positively on the livelihood of the adopter (Adams, 1985, Chambers, 1993). The level of adoption Roger and Shoemaker, (1971) contended is usually influenced by personal, socio-economic and communication factors.This *implies that the individual meant to adopt an innovation* must

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first consider what benefits he/she stands to earn out of the innovation to be substantial above the cost of adoption in order to adopt. In other words, such innovation should possess attributes or characteristics enticing to the farmer that will warrant high adoption rate. Also, Aniedu (2006) indicated that such personal issues such as gender, availability of resources required for the use of innovations, priority and benefits expected to be gained motivate people to adopt innovations. This study is therefore aimed at the determination of the impact and adoption of value added technologies in root and tuber crops disseminated to farmers in Imo State through various training programmes of NRCRI, Umudike which commenced in the state in 2006.

Objectives of the Study

The specific objectives of this study were to:

- Establish the socio-economic characteristics of the respondents
- Ascertain that NRCRI, Umudike conducted training on value addition in the area.
- Establish the adoption rate of the innovations of value added products of root/tuber crops extended to farmers through training of farmer groups
- Determine the impact of the adoption of the innovations on the farmers
- Identify factors inhibiting or enhancing the adoption of the innovations

II. Methodology

The population for the study consisted of farmer groups made up of mostly women farmers who participated in NRCRI, Umudike organized training in value addition to root/tuber crops in Imo State of Nigeria. The state consists of three agricultural zones of Owerri, Orlu, and Okigwe. The random sampling method was used to select one group of farmers in each of the zones among which 30 farmers were in turn, randomly selected giving a total of 90 respondents for the study.

To determine the adoption rate of the selected innovations, the respondents were requested to indicate their levels of adoption on a three-point adoption scale (not aware, awareness and adoption). Percentages were used to determine the rate of "not aware, awareness and adoption. The technologies were value added products of cassava, sweetpotato, cocoyam and some cultivation technologies. In order to ascertain that the training was actually conducted by NRCRI, Umudike in the areas, the respondents were requested to rate their source of training/extension activities on a three point scale of 1 not a source, 2 rarely a source and 3 important source. The options given were NRCRI, Umudike, ADP, radio, TV, newspaper, friends/relatives and the result was processed by adding the values (1+2+3=6) and the product later divided by 3 to get a mean score of 2, which was regarded as the cut-off point. Hence, any source with a mean score of 2 and above was regarded as a major source of training/extension activities in value addition to root/tuber crops.The tangible impact of the technologies was determined by requesting the respondents to rate the impact 1 extremely not important, 2 not important, 3 undecided and 4 important. The options given were acquired a house, a bicycle, a motor cycle, took new title, married new wife, bought/hired more farmland, bought new TV/radio and paid medical bills. The result was processed by adding the values (1+2+3+4=10) the product was later divided by 4 to get a mean score of 2.5 consequently any mean score of 2.5 and above was regarded as a tangible impact on the respondents. In the same way the problem associated with the impact/adoption of the technologies were determined on a five-point scale of 1 extremely not important, 2 not important, 3 undecided, 4 important and 5 very important. The values were summed up (1+2+3+4+5 = 15) and the product was in turn divided by 5 to get a mean of 3. The mean scores of 3 and above were adjudged to have tangible impact. However, the rest of the results were presented in means, frequencies and percentages.

III. Results and Discussion

a) Personal and socio-economic characteristics of the respondents

The result in Table 1 showed that 76% and 80% of the respondents were women and marriedrespectively, also 52% and 48% were part time and full time farmers respectively. This may be a disadvantage for adoption of innovation since Young (1994) opined that women were the poorest of the poor, hence their ability to take risks involved in adoption of innovation is minimal. The report also stated that women have limited time available to them due to their multiple roles and also have subsistence as their priority as against adoption of innovation for income yielding and marketing opportunities.This result also showed that over 93% acquired education from primary to tertiary education levels, while and 98.8% of the respondents belonged to farmers' association. The age of the respondents showed that majority (62%) were 40 years and above, indicating that the respondents comprised of old people, who did not have the energy to embark on farming. The work of Rogers (1983) stated that education facilitates adoption of innovation and the theory of group dynamics by Child (1986) contended that social interaction and imitation of parents, famous people in a group, etc. encouraged adoption of innovation. In the same way, Voh (1982) supported the view by stating that education, young age, peer group and availability of resources were some of the factors that influenced adoption and diffusion of innovations positively. However, it is important to deduce that

although education and memberships of farmer's association were variables favourable to adoption the rest of the variables in personal characteristics were not favourable to adoption of the innovation.

Table 1 : Percentage Distribution of Respondents by Socio-economic Characteristics (n = 90).

Characteristics	Frequency	Percentages
AGE		
20 – 29 years	12	13.30
30 - 39 years	22	24.40
40 – 49 years	21	23.30
50 – 59 years	17	19.00
60 – 69 years	18	20.00
Above 69	0	0.00
TOTAL	**90**	**100.00**
MARITAL STATUS		
Married	72	80.00
Single	5	6.00
Divorced	0	0.00
Widowed	13	14.00
TOTAL	**90**	**100.00**
EDUCATION		
No education	7	7.80
Primary educ	22	24.40
Secondary educ	45	50.00
Tertiary Educ	16	17.80
TOTAL	**90**	**100.00**
OCCUPATION		
Full-time	43	47.80
Part-time	47	52.20
TOTAL	**90**	**100.00**
GENDER		
Male	22	24.00
Female	68	76.00
TOTAL	**90**	**100.00**
MEMBERSHIP OF FARMERS' ASSO.		
Yes		
No	89	98.80
TOTAL	1	1.20
	90	**100.00**

b) Adoption of the value added products of root and tuber crops

The result in Table 2 indicated that cassava value-added products had mean adoption rate of 41%. However, the cassava value added products of high quality cassava flour (HQCF) and cassava chin-chin, recorded the highest adoption rates of 74% and 51% respectively. However, cassava croquette, cassava fufu flour and doughnutsrecorded moderate adoption rates of 49%, 46% and 42% respectively. Although cassava value added products such as cakes, strips and bread had high awareness rates, they recorded very low adoption rates. The cocoyam value-added products recorded mean adoption rate of 19% with its component parts such as crisps,flour and fufu flour having adoption rates of 24%, 19% and 14% respectively. It is important to note that the cocoyamvalue added products recorded high levels of awareness which could mean that respondents probably did not understand the procedure during the training of the innovations. The result also showed that the sweet potato value added products recorded a mean adoption of 9.6% with its component parts offufu, flour and cakesrecording adoption rate of 11%, 11% and 7% respectively. The result of the production technologies had 43% mean adoption rate(which was the highest among the groups) with the component parts recording 52%, 56% and 23% for 1m planting distance, 4node cutting and sweetpotato planting respectively. The moderate rates of adoption of cassava value added innovations and cultivation technologies can be attributed to the fact that the Agricultural Development Project (ADP) and the media have been promoting or reinforcing the training initially conducted by NRCRI in the state. It is important to note that cocoyam and sweetpotato technologies which recorded the lowest mean adoption rates of 19% and 9.6% respectively were newly introduced by NRCRI hence, they need reinforcement or further promotion for the adoption rate to improve.

Table 2 : Percentage Distribution of Respondents based on Adoption Status (N = 90).

Innovations	Unaware (%)	Aware (%)	Adopted (%)	Total (%)
(Cassava)				
i. High Quality Cassava Flour	0	16.00	74.00	100
ii. Cassava chin-chin	0	39.00	51.00	100
iii. ,, cakes	0	67.00	23.00	100
iv. ,, strips	0	66.00	24.00	100
v. ,, bread	0	71.00	19.00	100
vi. ,, croquette	0	51.00	49.00	100
vii. ,, doughnuts	0	58.00	42.00	100
viii. ,, fufu flour	0	44.00	46.00	100
MEAN			**41.00**	100
(Cocoyam)				
i. Cocoyam crisps	0	66.00	24.00	
ii. ,, flour	0	71.00	19.00	100
Iii cocoyam fufu	0	76.00	14.00	100
MEAN			**19.00**	100
(Sweetpotato)				
i. Sweetpotatofufu flour	0	79.00	11.00	
ii. ,, flour	0	79.00	11.00	100
iii. ,, cakes	0	83.00	7.00	100
MEAN			**9.60**	100
Production Technologies				
i. 1m apart cassava planting distance				
ii. 4-node cassava cuttings	0	38.00	52.00	
iii. Planting of sweetpotato	0	34.00	56.00	100
	0	63.00	23.00	100
MEAN			**43.70**	100

c) Sources of Training/Extension Activities

Although the researchers were aware that training in value added innovations of root and tuber crops took place in the study area, the respondents were made to indicate their sources of training and extension activities to ensure that the respondents participated in the training. The result in Table 3 revealed that the respondents accepted that the main source of their training and extension activities was NRCRI. However, the result also indicated that in addition to the training obtained from NRCRI, Umudike the state ADP played an important role in the dissemination of the information as well.

Table 3 : Mean Distribution of Source of Training and Extension Activities.

SOURCE OF TRAINING/EXTENSION ACTIVITIES	MEAN SCORE
1. NRCRI, Umudike	2.84*
2. State ADP	2.10*
3. Radio	1.30
4. TV.	1.20
5. Newspapers/books/etc	1.10
6. Friends/relatives	1.60

**Major sources of training and extension influencing adoption*

d) Impact of adoption of value added products on Respondents

The result of the usefulness of the training in value added innovations of root and tuber crops on the respondents in Table 4a showed that only 22% of the respondents earned income from their value-added products, 35% claimed they used theirs to feed their families and in receiving visitors and while 41% claimed they simply acquired information from the training and 2% claimed that it afforded them a good opportunity of preservation and storage of their perishable food crops. This goes to support the earlier assertion by Young (1994) that women's priority in adoption of innovation was most importantly for subsistence with market and income generation being secondary. The adoption of the value-added products has made appreciable tangible impact on the livelihood of the respondents as revealed in Table 4b. Although no tangible wealth had been acquired from the proceeds from the adoption of the innovations by the respondents, but the result

showed that the school fees (mean score of 2.5) was accomplished by the respondents. Also, the result indicated that the respondents were able to buy/hire more farmland (mean score 2.1) and paid medical bills (mean score of 2.0). However, it is important to note that education, healthcare andfood are critical areas people in developing world need to access if millennium goals will have to be achieved and the training in value added innovations of root and tuber crops has made an appreciable contributions in these areas.

Table 4a : Usefulness of the Training on the Respondents (N = 90).

Factors	Percentage
Usefulness	
Feeding my family/Receiving visitors	35.00
Acquired more information	41.00
Earned more income	22.00
In preservation/storage of foods	2.00
TOTAL	**100.00**

Table 4b : Mean Distribution of Tangible Impact of the Technologies on the Livelihood of Respondents.

Tangible Impact	Mean Score
1. Built a house	1.1
2. Bought a bicycle	1.0
3. Bought motor cycle	1.3
4. Paid school fees	2.5*
5. Took a new title	1.0
6. Married a new wife	1.0
7. Bought/hired more farmland	2.1
8. Bought new TV/radio	1.3
9. Paid medical bills	2.0

**Perceived major impact of the innovations on farmers*

e) Challenges associated with the adoption of value added products

The result in Table 5 revealed that challenges such as inadequate knowledge of the innovation (mean score 2.9) and no-retraining facilities (mean score 2.6) and no extension agent to answer questions (mean score 1.9) were challenges experienced by the respondents, butlack of funds with a mean score of 3.7, lack of equipment/facilities with a mean score of 3.5 and lack of market with a mean score of 3.0 were the major challenges associated with adoption of value added innovations of root and tuber crops. This is in line with the earlier report of Young (1994) which claimed that women were mostly poor resource farmers and in addition have the multiple roles. Hence, to enable the women adopt any innovation funds should be provided and the provision of energy and time saving equipment and facilities to reduce drudgery should be made. Otherwise, any innovation that will add more work to the women will not be readily acceptable by the women. Also there is need have organized market readily available as an incentive for those who adopt these innovation so that there will not be discontinued adoption.

Table 5 : Mean Distribution of challenges Associated with the Adoption of the Technologies.

Factors	Mean Scores
Lack of market	3.0*
Inadequate knowledge of innovation	2.9
Lack of funds	3.7*
No-retraining facilities	2.6
Lack of equipment/facilities	3.5*
No extension agents to answer questions	1.9

**Perceived major challenges associated with adoption*

IV. Conclusion

The studies revealed that the cassava value-added products and production technologies recorded moderate adoption rates in Imo State, while cocoyam and sweetpotato value added innovationrecorded very low adoption rates. The reason may be attributed to the fact that training in the technologies given by NRCRI was being reinforced by extension activities of the State ADP, which is very commendable. This is in line with the argument of Rogers and Shoemaker (1971) which stated that time and reinforcement of an extension

activity were necessary for diffusion of innovation in a given culture. It is important to note that the respondents were mostly women, who were seen to have multiple roles in the society – production roles, reproduction roles, community and family care roles, among others (Young, 1994). The report further stated that adoption and diffusion of innovation among women will be greatly improved if resources such as funds, market, equipment and facilities were provided in order to reduce drudgery and make the burden of their multiple roles lighter on them and also create much needed income. Efforts therefore should be made to ensure that the farmers were retrained in the innovations particularly in cocoyam and sweetpotato innovations. Also, provision ofmarket, equipment and facilities put in place to ensure enhanced adoption and tangible impact of the training on the livelihood of the people in future dates.

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Aflatoxin Effect of Moulded Gala Waste Mixed with Ginger and its Histopathological Study on *Clarias Gariepinus*

By Agbebi O. T., Lawal H. B. & Odebiyi O. C
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Abstract - A feeding trial was conducted to investigate aflatoxin effect of moulded sausage waste with ginger and its histopathological study on *Clarias gariepinus*. One hundred and eighty fingerlings with mean weight 3.90g±0.02 were stocked at 15fish/net happas (0.8mx0.6mx0.4m).The net happa were suspended into ¾ of an earthen pond of (12mx12mx1.5m) LXBXH using kuralon twine at the four edges of the happas to tie around carefully arranged bamboo poles across an earthen pond. The fingerlings were fed with four iso-nitrogenous diets containing 40% crude protein at different inclusion level. Treatment 1 (0% control diet), Treatment 2 (10%), Treatment 3 (20%), and Treatment 4 (30%).The fingerlings were fed at 5% body weight for 8 weeks. It was observed that there was a significant difference ($p<0.05$) in the values obtained for Feed conversion ratio (FCR), Specific growth rate (SGR), Protein efficiency ratio (PER) and weight increase. Feed conversion ratio in Treatment 1 (3.14±0.35) and in Treatment 2 (1.01±0.58).

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Aflatoxin Effect of Moulded Gala Waste Mixed with Ginger and its Histopathological Study on *Clarias Gariepinus*

Agbebi O. T. [α], Lawal H. B. [σ] & Odebiyi O. C [ρ]

Abstract - A feeding trial was conducted to investigate aflatoxin effect of moulded sausage waste with ginger and its histopathological study on *Clarias gariepinus*. One hundred and eighty fingerlings with mean weight 3.90g±0.02 were stocked at 15fish/net happas (0.8mx0.6mx0.4m).The net happa were suspended into ¾ of an earthen pond of (12mx12mx1.5m) LXBXH using kuralon twine at the four edges of the happas to tie around carefully arranged bamboo poles across an earthen pond. The fingerlings were fed with four iso-nitrogenous diets containing 40% crude protein at different inclusion level. Treatment 1 (0% control diet), Treatment 2 (10%), Treatment 3 (20%), and Treatment 4 (30%).The fingerlings were fed at 5% body weight for 8 weeks. It was observed that there was a significant difference ($p<0.05$) in the values obtained for Feed conversion ratio (FCR), Specific growth rate (SGR), Protein efficiency ratio (PER) and weight increase. Feed conversion ratio in Treatment 1 (3.14±0.35) and in Treatment 2 (1.01±0.58). There was significant difference in the final weight in Treatment 2 (106.43 ±5.17) compared to Treatment 1 (36.10 ±2.89) having the lowest value. There was also a significant difference ($p<0.05$) in the value obtained for the specific Growth rate in Treatment 2 (3.33±0.07) having the highest value and Treatment 1 (2.30±0.06) with the lowest value. There was no significant difference ($p>0.05$) in the value obtained for Average feed consumed (AFC) with Treatment 4 (119.92±27.63) having the highest and Treatment 1 (111.35±3.73) with the lowest value. The best treatment was Treatment 2 with the better Feed conversion ratio and the Highest Specific growth rate and Weight gain. The Histopathology studies showed no poor physical condition, and no particular trend of lesion.

I. Introduction

Plant-based ingredients are increasingly used in fish diets due to increase in economic/market pressures on feed compounders to produce lower cost and sustainable alternatives. The increased reliance on commercially prepared feed formulated with higher levels of grain material means that fish have the same risk of potential exposure to mycotoxins as terrestrial agricultural species.

Aflatoxins exert a substantial impact on the fish and shrimp farming production, causing disease with high mortality and a gradual decline of reared fish stock quality,thus representing a significant problem in aquaculture systems. Mycotoxins are secondary metabolites produced by certain filamentous fungi, which can be produced in foods as a result of fungal growth. They cause a toxic response, termed a mycotoxicosis, when ingested by higher vertebrates and other animals. Consumption of mycotoxin contaminated foods has been associated with several cases of human poisoning, or mycotoxicosis, sometimes resulting in death (Sweeney and Dobson, 1998 and Bathnagar and Garcia, 2001). Aflatoxins are considered the most carcinogenic, mutagenic and teratogenic poisonous by-products of the growth of the moulds *Aspergillus flavus* and *Aspergillus parasiticus*, and are important contaminants of certain foods and animal feeds because of their ability to produce aflatoxins (Farr *et al.*, 1989).

Aflatoxin losses to livestock and poultry producers from aflatoxin-contaminated feeds include death and more subtle effects of immune system suppression, reduced growth rates, and losses in feed efficiency (Vincelli *et al.*, 1995 and FAO 1997 & 2002).

Therefore, some scientific efforts were conducted to use the herbs or natural plants which, detoxifies the drastic effects of mycotoxins or aflatoxins on some animals such as, glucomannan (Karaman *et al.*, 2005) or yeast cell wall mannanoligosaccharide (MOS) (Devegowda *et al.*, 1998), or Saccharomyces cerevisiae which were found to have beneficial effects in poultry during mycotoxicosis (Raju and Devegowda 2000), chamomile (Abdelhamid *et al.*, 1985; Soliman and Badeaa 2002 and Ibrahim, 2004), ginger (Vimala *et al.*, 1999 and Abdelhamid *et al.*, 2002c).

The expansion of global aquaculture is increasing the demand for aquaculture feed which is the prime input in fish culture practices. Generally, the selection of feed ingredients for any Production system depends upon its nutritional value costs. Protein is the vital and expensive nutrient of formulated fish feeds (De Silva *et al*, 1989). Both the quality and quantity of protein in fish feed is of paramount importance in promoting fish growth for achieving marketable size of fish at an early phase.

Fish meal is used globally at a dietary protein in formulated fish seeds but the major problems with the

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use of fish meal as source of protein in the fish diet are its rising cost, uncertain availability, adulteration and variation in quality (Prabjeet *et al*, 2011). The increasing demand, unstable supply and high price of the fish meal with the expansion of aquaculture made it necessary for search for alternative protein source (FAO 2004; Lunger *et al*. 2007). Hence there is need to replace this ingredient partially or fully with some other suitable ingredients to reduce the production cost (Prabjeet *et al*, 2011).

The study therefore aimed at examining the additive nature of ginger on inclusion level of the waste sausage (Gala) waste and to determine the histopathological effect of the experimental feed on the fish visceral organs.

II. Materials and Methods

One hundred and eighty experimental fingerlings of *Clarias gariepinus* with average weight of 3.9±0.02 were purchased from a private farm and randomly stocked into twelve (1.0m x 1.0m x 1.0m) happas of 15 fingerlings each. The fish were allowed to acclimatize to the environment for a period of two weeks before the experiment began, during the two weeks period all the fish were fed two times daily with commercial feed (coppen 2.0mm).

The experiment was carried out in 12m x12m x 1.5m earthen pond, replicated thrice. The hapas were suspended and stabilized in the water body using kuralon twine tied horizontally into the bottom substratum.

Table 1

1	2	3	4	5	6	7	8	9	10	11	12
T2R2	T3R3	T3R2	T1R3	T2R1	T4R2	T1R2	T3R1	T4R3	T1R1	T2R3	T4R1

Treatment 1- Control Diets (0% inclusions)

Treatment 2- Ginger (10% inclusion)

Treatment 3- Ginger (20% inclusion)

Treatment 4- Ginger (30% inclusion)

III. Experimental Procedure

A total of 180 fingerlings of *C. gariepinus* were stocked in the net happa. The fingerlings were selected randomly, Fifteen fingerlings were selected into each net hapa, weighed with a sensitive electronic weighing scale (meter toledo FB602) and fed at 3% body weight twice daily for a period of 8weeks between the hours of 07:00-08:00 and 16:00-17:00. Sampling was carried out bi-weekly and the amount of feed was adjusted accordingly with increased in their body weight, mortality was also monitored daily with their response to feed.

a) Growth Performance

The following growth performances were measured:

$$\text{Percentage weight gain PWG (\%)} = \frac{(\text{Final mean body weight})}{(\text{Initial mean body weight})} \times 100$$

$$\text{Specific growth rate, SGR} = \frac{L_n W_2 - L_n W_1 \times 100}{\text{Time (days)}}$$

W1= initial weight gained

W2= Final weight gained

Ln= Natural logarithm

$$\text{Protein efficiency ratio} = \frac{\text{Mean weight gain}}{\text{Average protein fed}}$$

$$\text{Feed conversion ratio} = \frac{\text{weight of feed (g)}}{\text{Weight gained}}$$

$$\text{Mortality rate} = \frac{\text{No of fish dead at the end of the experiment} \times 100}{\text{No of fish at the beginning of the experiment}}$$

$$\text{Survival rate} = \frac{\text{No of fish remaining at the end of the experiment} \times 100}{\text{No of fish at the beginning of the experiment}}$$

Feed conversion ratio, FCR is obtained by dividing the total weight of the food administered to the total increase in weight gained by the fish over a period of time.

$$SGR = \frac{L_n W_2 - LW_1 X100}{\text{Time (days)}}$$

W_1 = Initial weight gain

W_2 = Final weight gain

L_n = Natural logarithm

Time = Number of days of experiment

$$PER = \frac{\text{Fish weight gain}}{\text{Protein gain}}$$

Table 2 : Feed Ingredient.

Ingredients	T1 Control diet	T2	T3	T4
Maize	17.4	17.4	17.4	17.4
Fish meal	34.94	34.94	34.94	34.94
Soybean meal	17.47	17.47	17.47	17.47
Groundnut cake	17.47	17.47	17.47	17.`47
Gala	8.70	8.70	8.70	8.70
Lysine	0.25	0.25	0.25	0.25
Methionine	0.25	0.25	0.25	0.25
Vit. Premix	1	1	1	1
Ginger	-	0.2(10%)	0.4(20%)	0.6(30%)
Salt	0.5	0.5	0.5	0.5
Total	100	100	100	100

Table 3 : Proximate analysis of the experimental diet.

Parameters	T1	T2	T3	T4
Moisture	7.6 ± 0.01^{c}	9.73 ± 0.01^{a}	9.15 ± 0.01^{b}	6 ± 0.06^{d}
Dry	92.98 ± 0.10^{b}	90.27 ± 0.23^{d}	90.85 ± 0.10^{c}	94 ± 0.10^{a}
Fat	19.57 ± 0.05^{a}	13.54 ± 0.04^{d}	16.52 ± 0.01^{b}	15.02 ± 0.01^{c}
Ash	9.26 ± 0.09^{a}	7.96 ± 0.11^{b}	8.23 ± 0.08^{b}	8.15 ± 0.02^{b}
F.C	3.56 ± 0.03^{a}	2.17 ± 0.01^{d}	2.31 ± 0.05^{c}	2.41 ± 0.00^{b}
C.P	31.68 ± 0.05^{d}	38.68 ± 0.20^{c}	39.24 ± 0.06^{b}	41.23 ± 0.06^{a}
CHO	28.91 ± 0.01^{a}	27.95 ± 0.03^{b}	24.48 ± 0.01^{b}	26.54 ± 0.01^{c}

Means along the same row with different superscripts are significantly different ($p<0.05$).

IV. Statistical Analysis

All data obtained were subjected to one-way ANOVA test Where ANOVA revealed significant differences ($P<0.05$), Duncan's multiple-range test (Zar, 1996) was applied to characterize and quantify the differences between treatments using SAS software for windows (SAS, 2009).

V. Results and Discussion

Table 4 : Carcass Analysis of experimental fish.

Parameters	Initial	T1	T2	T3	T4
Moisture	78.62±0.30[b]	78.47±0.03[b]	77.52±0.22[c]	78.81±0.23[b]	80.67±0.06[a]
Dry	21.38±0.01[b]	21.53±0.06[b]	22.48±0.23[a]	21.19±0.03[b]	19.33±0.02[c]
Fat	2.79±0.05[c]	2.81±0.01[c]	4.50±0.11[a]	4.04±0.01[b]	2.93±0.15[c]
Ash	1.44±0.01	6.72±5.04	2.04±0.01	1.96±0.03	1.71±0.05
F.C	0.98±0.21	1.06±0.03	1.45±0.24	1.37±0.02	1.09±0.03
C.P	37.84±0.17[d]	43.23±0.03[a]	41.57±0.01[b]	40.60±0.12[c]	40.44±0.12[c]
CHO	1.22±0.05[c]	1.52±0.04[a]	1.37±0.01[b]	1.18±0.05[c]	0.98±0.02[d]

Means along the same row with different superscripts are significantly different ($p<0.05$).

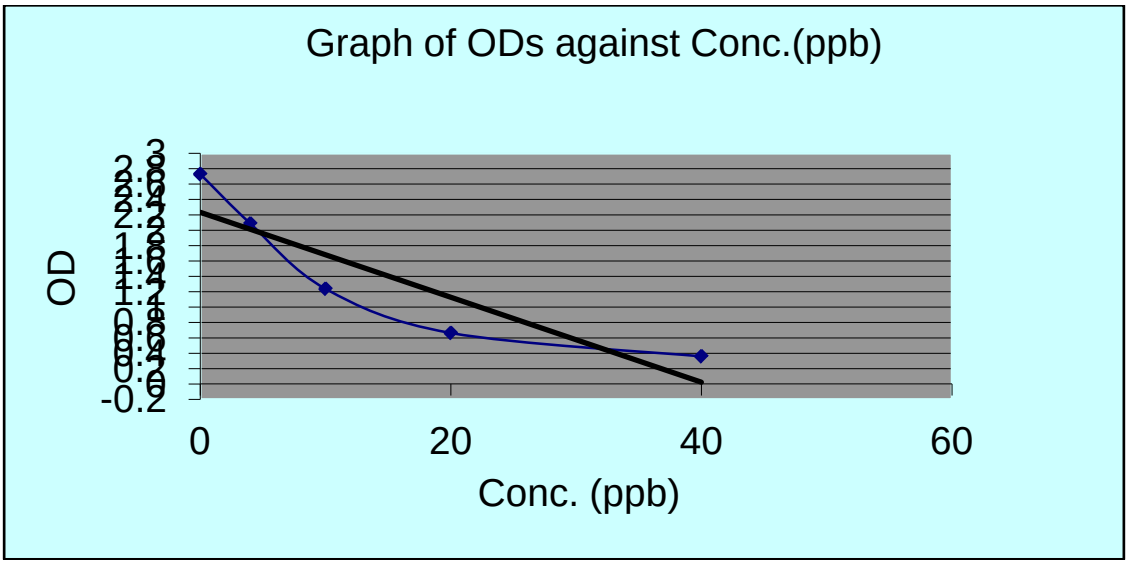
The initial and final carcass analysis of the fish fed with different experimental diet is represented in Table 4. The final moisture content of the fish was high in two Treatments, Treatment 4 (80.67±0.06) which was followed by treatment 3 (78.81±0.23).

Compared to the initial values while treatment 2 was low with treatment 4 having the highest moisture content (80.67±0.06) which was followed by treatment 3 (78.81±0.23).

However, T1 recorded the highest crude protein (43.23) and the lowest was recorded for T4 (40.44). Crude fibre ranged between 1.06 in T2 to 1.45 in T1, Carbohydrate ranged from 40.44 to 43.23. Fat was highest in Treatment 2 followed by Treatment 3.

Table 5 : The Result of Total Aflatoxin Level in Moulded Gala.

X-axis	Y-axis
0	2.034
4	1.741
10	0.990
20	0.644
30	0.350



By extrapolation from the standard curve and multiplication by dilution factor (10), value of total aflatoxin in sample is 69.7 ppb (µg/kg).

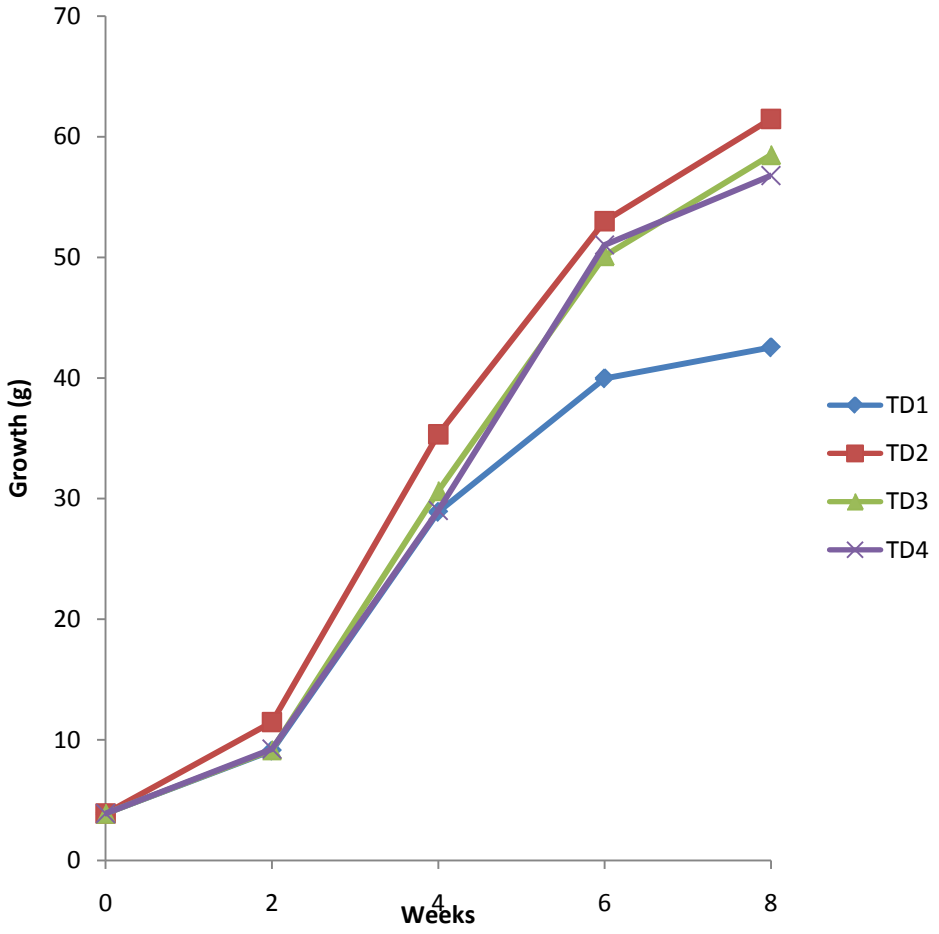
Table 6 : Growth response of fish to different percentage inclusion of Gala-Ginger in the feed.

Parameters	0% Inclusion	10%Inclusion	20%Inclusion	30%Inclusion
Initial Weight (g/fish)	3.90±0.02	3.90±0.04	3.90±0.03	3.90±0.02
Final Weight (g/fish)	40.00 ± 2.89^{a}	110.33 ± 5.17^{ab}	82.67 ± 4.81^{b}	80.00 ± 11.37^{b}
Weight Gain (g/fish)	36.10 ± 2.89^{a}	106.43 ± 5.17^{ab}	78.77 ± 4.81^{b}	76.10 ± 11.37^{b}
AFC(g/fish/day)	111.35 ± 3.73^{a}	110.37 ± 65.71^{a}	112.90 ± 10.12^{a}	119.92 ± 27.63^{b}
FCR	3.14 ± 0.35^{a}	1.01 ± 0.58^{b}	2.32 ± 0.03^{a}	2.61 ± 0.09^{a}
SGR	2.30 ± 0.06^{b}	3.33 ± 0.07^{a}	2.63 ± 0.09^{b}	2.53 ± 0.27^{b}
TPC	31.94 ± 2.43^{b}	42.66 ± 25.40^{b}	44.30 ± 3.97^{a}	49.44 ± 11.39^{a}
PER	0.87 ± 0.10^{a}	1.03 ± 0.06^{a}	0.91 ± 0.01^{a}	0.39 ± 0.22^{b}
SURVIVAL	40.00 ± 10.18^{b}	68.89 ± 2.22^{a}	44.44 ± 15.55^{b}	48.89 ± 8.01^{ab}

Means along the same row with different superscripts are significantly different ($p<0.05$).

AFC: Average Feed Consumed, FCR: Feed Conversion Ratio, SGR: Specific Growth Rate, TPC: Total Protein Consumed, PER: Protein Efficiency Ratio.

Figure 1 : Growth response of *Clarias gariepinus* fingerlings fed with ginger based diets.



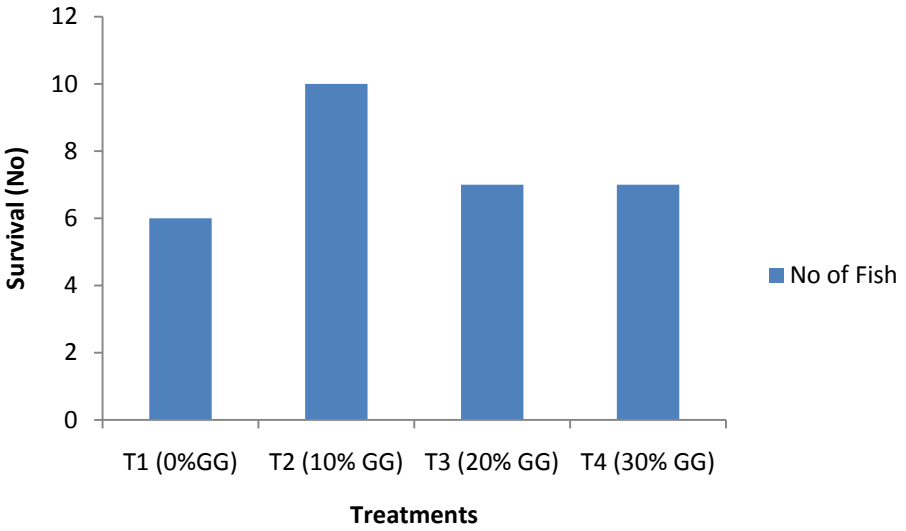


Table 7 : Physcio-chemical Parameters.

Weeks	pH	Dissolve oxygen (Mg/L)	Temp (°C)
0	7.20±0.06	6.17±0.03	26.00±1.15
1	7.31±0.12	6.30±0.20	26.53±0.27
2	7.45±0.32	6.23±0.33	27.17±0.33
3	7.41±0.11	6.53±0.13	27.37±0.07
4	7.25±0.43	7.40±0.80	26.40±0.35
5	7.15±0.20	7.47±0.73	28.01±0.39
6	7.55±0.55	7.25±0.14	27.71±0.19
7	7.26±0.20	7.33±0.33	27.44±1.12
8	7.80±0.30	7.40±0.20	26.78±0.77

Mean weekly values of physico-chemical parameters during the experimental period. Water quality parameters in the pond during the experimental period are represented in Table 3. The pH was between 7.15 -7.80, dissolve oxygen ranged between 6.17-7.47mgL-1 and temperature 26.00-28.01°C.

HISTOPATHOLOGY (NORMAL)

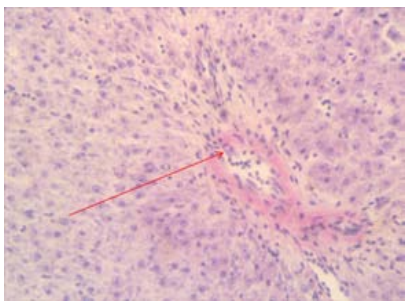


Plate 7
LIVER (TD1)
(Moderate diffuse Vascular Hepatic inoculation of hepatocytes

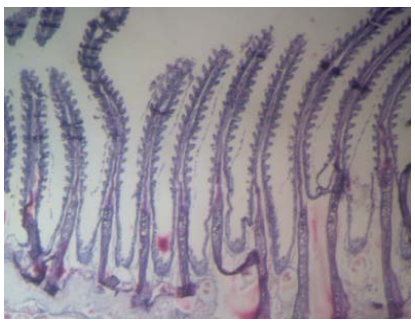


Plate 8
GILLS (TD1)
No visible lesion

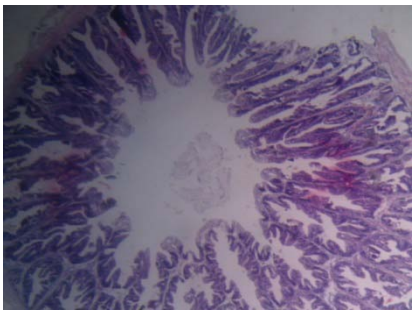
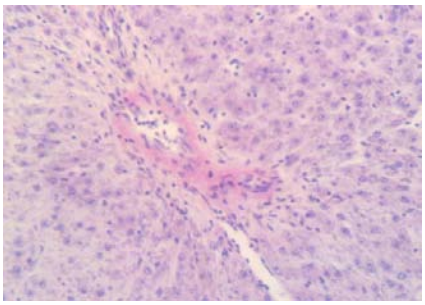
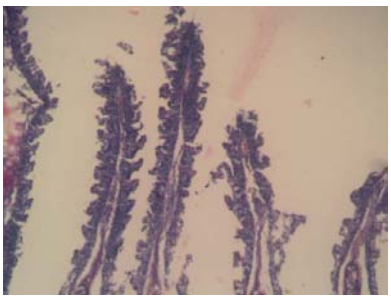


Plate 9
GUT (TD1)
No visible lesion

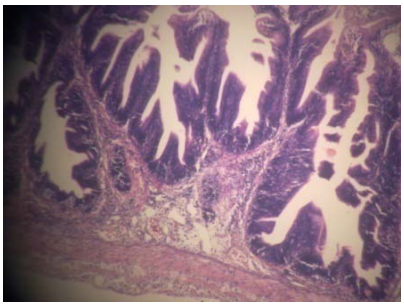
HISTOPATHOLOGY (TREATMENT 2)



Liver
Plate 10 (TD2)
Mild diffuse hepatic vacuolar Degeneration



Gill
Plate 11 (TD2)
No visible lesion



Gut
Plate 12 (TD2)
No visible lesion

HISTOPATHOLOGY (TREATMENT 3)

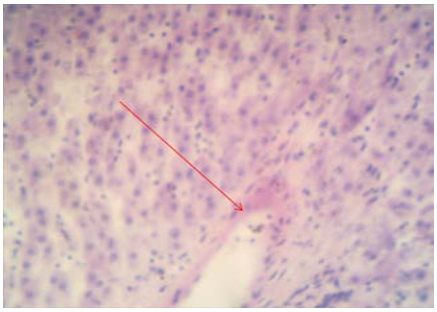


Plate 13
Liver (TD3)
Mild diffuse hepatic vacuolar degeneration

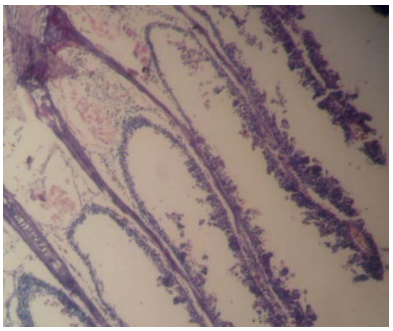


Plate 14
Gills (TD3)
No visible lesion

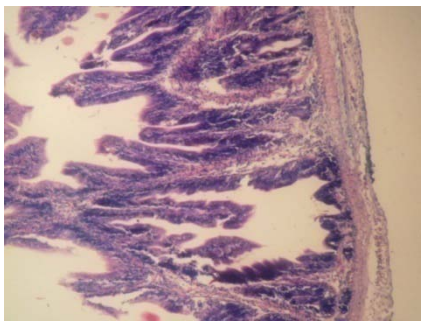


Plate15
Gut (TD3)
No visible lesion

HISTOPATHOLOGY (TREATMENT 4)

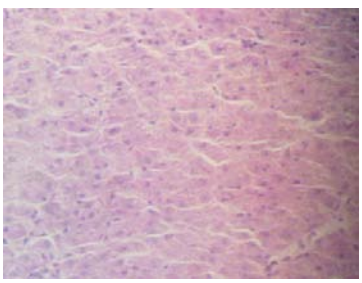


Plate 16
Liver (TD4)
No visible lesion (No physical damage)

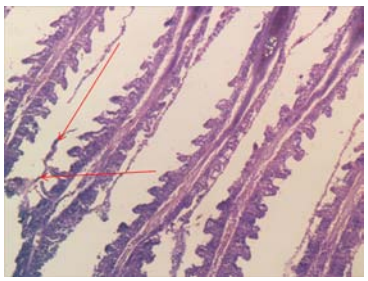


Plate 17
Gill (TD4)
Showing diffuse mild proliferation of the epithelial cells of the secondary lamellae

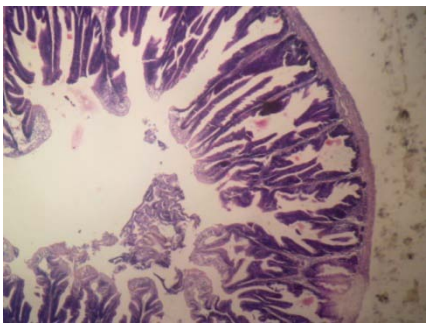


Plate 18
Gut (TD4)
No visible lesion (No physical damage)

VI. Discussion

There was a significant effects (Gala-Ginger inclusion) on final weight, Weight gain, FCR, SGR and PER ($p<0.05$), Protein efficiency ratio (PER) recorded the highest value in Treatment 2 (1.03 ± 0.06) and the lowest was recorded in Treatment 4 (0.39 ± 0.22). Feed conversion ratio (FCR), the highest value was recorded in Treatment 1 ($3.14\ \pm0.35$) and the lowest was recorded in Treatment 2 (1.01 ± 0.58). There was no significant difference ($p>0.05$) between Treatment 1 (3.14 ± 0.35), Treatment 3 (2.32 ± 0.03) and Treatment 4 (2.61 ± 0.09). Treatment 2 is the most effective (1.01 ± 0.58), it converts the feed to growth more than the other treatments.

Treatment 2 had the highest specific growth rate (3.33 ± 0.07) and the lowest value (2.30 ± 0.06) was recorded in Treatment 1.There was no significant difference ($p>0.05$) between the value obtained for Treatment 1 (2.30 ± 0.06), Treatment 3 (2.63 ± 0.09) and Treatment 4 (2.53 ± 0.27).

There was a significant difference ($p<0.05$) between mean weight gain in the value recorded for Treatment 1 (36.10 ± 2.89), Treatment 3 (78.77 ± 4.81) and Treatment 4 (76.10 ± 11.37). A similar result was recorded in final weight gain which complement the results obtain in the FCR (feed conversion ratio), SGR (Specific growth rate) and survival. This is similar to Ceylan *et al.* (1998) who reported that antibiotic supplementation to rye-based diets had no significant effect on the feed conversion ratio of broilers. Similar results were reported by Garcia *et al.* (1999), Aksoy *et al.* (1995) and Jamroz *et al.* (1995) who tested the effect of a xylanase enzyme preparation and Vukic-Vranjes and Wenk (1993) who compared the supplementation of an antibiotic supplement alone or combined with an enzyme. From this, 10% inclusion level is more efficient as recorded in FCR, SGR, final weight gain and survival rate.

The physico- chemical parameters of water were within the range for culturing African catfish, C *gariepinus* (Vivien *et al*,. 1977, Adekoya *et al*., 2004 and Omotayo *et al* 2006) recommended that dissolve oxygen (DO) values observed during the experimental period was 8mg/ litre in the pond and DO values observed during the experimental period fall within these values. The values of physico- chemical parameters observed in the pond were within the range recommended for *C. gariepinus* (Adekoya *et al*., 2004).

The histopathological examination of the liver in the experimental fish in Plate 7(control) shows moderate spread of disease on the liver cells. This is similar to the findings of (Abbas and Ali, 2007) who observed destruction and vacuolation of the muscle cells in *Oreochromis spp* exposed to chromium. Plate10 (Treatment 2), and Plate 13(Treatment 3) indicate deterioration of the membrane containing fluid in the cytoplasm of the liver cells. The vacuolization of hepatocytes might indicate an imbalance between the rate of synthesis of substances in the parenchyma cells and the rate of their release into the circulation system (Gingerich, 1982). Plate 16 (Treatment 4) shows no physical change in the liver cells.

The histopathological examination of the gills in the experimental fish in Plate 8(Treatment 1), (Treatment 2) and (Treatment 3) in plate 8, 11 and 14 shows no physical change in the gills.The gills, participate in many important functions in the fish, such as respiration, osmoregulation and excretion. (Treatment 4) plate 17 shows slow diffuse mild proliferation of the epithelial cells of the secondary lamellae i.e. partial fusion of the secondary lamellae. This is similar to the findings of Ayotunde *et al.* (2011) who worked on Histological Changes in *Oreochromis niloticus* exposed to Aqueous extract of *Moringa oleifera* Seeds Powder .The cellular damage observed in treatment 4 in the gills in terms of epithelial proliferation, separation of the epithelial layer from supportive tissues and necrosis can adversely affect the gas exchange and ionic regulation (Dutta *et al*., 1993) and epithelial lifting are defense mechanisms. The present results are in agreement with those observed in other fish species under the influence of different pollutants (Olurin *et al*., 2003) (Camargo and

Martinez, 2007). In this respect, Camargo (2007) observed hyperplasia of the epithelial cells, fusion of secondary lamellae, lifting of the lamellar epithelium and blood congestion in the gills of *P. lineatus* caged in Cambé stream, Brazil, polluted by industrial, domestic and agricultural wastes. Also, (Triebskorn,*et al*., 2008) noticed epithelial lifting, proliferation of epithelial cells of primary and secondary lamellae, hyperplasia of mucous cells and necrosis of epithelial cells in the gills of *C. nasus* and *L. cephalus* from River Mures, Western Romania, polluted by heavy metals, faecal coliforms and streptococci bacteria.

The histopathology of the gut in the experimental fish shows no physical changes in the four treatments 1(plate 9), followed by Treatment 2(plate12), Treatment3 (plate15), and Treatment 4(plate18) this is similar to the findings of the present work mentioned by (Hussein *et al*. 2000), (Soliman *et al*. 2000) and (Abdelhamid *et al*. 2002 b and Abdelhamid *et al*. 2002c).

VII. Conclusion

The result shows that ginger base diet with 69.7ppb aflatoxin shows reduce survival and 10% inclusion has the highest survival rate. The present result shows no damage in gills and gut with mild diffuse in hepatic vacuolar of two treatments in the liver. The significance of the research work to farmers is that any stored feed that is moulded can still be use with the inclusion of ginger up to 10% to reduce the effect of aflatoxin on fish tissues.

VIII. Recommendation

It is recommended that this study could be researched further to improve moulded aquacultural feeds. Further research should be conducted on blood parameters and tissues with marginal inclusion level of 15% to ascertain the most appropriate ginger inclusion on mould feeds.

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The Impact of Co-Operative Society on Capital Formation (A Case Study of Temidere Co – Operative and Thrift- Society, Ijebu- Ode, Ogun State, Nigeria)

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Abstract - This study is on the impact of co-operative societies on capital formation using a case study of Temidere-co-operative and Thrift-society, Ijebu-ode, Ogun state. The objectives are to: identify the socio-economic characteristics of the cooperators in the study area; identify the uses of funds of co-operative societies; determine to what extent co-operatives have benefited members in financing their investments; identify problems militating against the effectiveness of co-operative societies; and offer suggestions and recommendations on how to improve the cooperative societies towards enhancing the capital formation of members. The study adopted a non parametric method of analysis which involved Chi-Square method, descriptive statistics and correlation analysis to achieve the stated objectives.

Keywords : *cooperative societies, capital formation, descriptive statistics, correlation analysis.*

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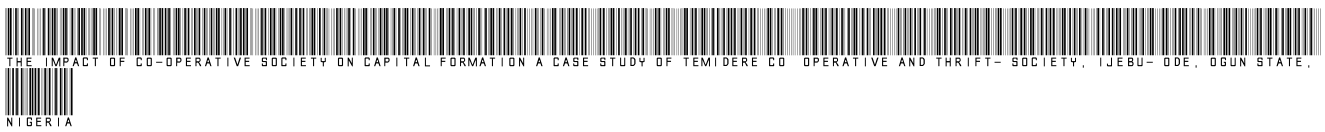

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The Impact of Co-Operative Society on Capital Formation (A Case Study of Temidere Co – Operative and Thrift- Society, Ijebu- Ode, Ogun State, Nigeria)

Kareem, R.O [α], Arigbabu, Y.D [σ], Akintaro, J.A [ρ] & Badmus, M.A [Ω]

Abstract - This study is on the impact of co-operative societies on capital formation using a case study of Temidere-co-operative and Thrift- societies, Ijebu-ode, Ogun state. The objectives are to: identify the socio-economic characteristics of the cooperators in the study area; identify the uses of funds of co-operative societies; determine to what extent co-operatives have benefited members in financing their investments; identify problems militating against the effectiveness of co-operative societies; and offer suggestions and recommendations on how to improve the cooperative societies towards enhancing the capital formation of members. The study adopted a non parametric method of analysis which involved Chi-Square method, descriptive statistics and correlation analysis to achieve the stated objectives.

The study revealed that majority of the respondents are males, still in their active age and married, majority have children ranging from 1-3, practice Islam, fairly educated and majority of the respondents are self employed in their various businesses and they are mostly in the management position of their businesses. The results also show that the total amount deposited enhances the capital available to cooperators, majority of the loan collected by the co-operators ranges from ₦20,000 - ₦100,000. Also, the major way by which co-operative societies increase co-operators capital formation is by granting credit services and the problem mostly faced by co-operative societies is the problem of capital

It was concluded that co-operative societies have effect on member's welfare and the role of co-operative societies in poverty reduction and capital formation cannot be overemphasized in the development process of any country particularly Nigeria. The research therefore recommended that the government should assist co-operative societies to improve their capital base through substantial allocation of money to the co-operative societies like the other sectors of the economy.

Keywords : cooperative societies, capital formation, descriptive statistics, correlation analysis.

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I. Background to The Study

Nigerian economy has a lot of potentials for growth and development. The abundant and natural resources of the country remain largely un-explored. These have to be harnessed to the fullest for the general well-being of Nigeria in the world economy. Perhaps, one important way to the realization of this goal is through the encouragement of cooperative movement. (Ayanwu *et al*, 1996).

Cooperatives are defined as "an autonomous association of persons who unite voluntarily to meet their common economic and social needs and aspiration through a jointly owned and democratically controlled enterprise (IC1A, 1995). Cooperatives are established by like-minded persons to pursue mutually beneficial economic interest. Researchers are of the opinion that under normal circumstance Cooperative play significant role in the provision of services that enhance agricultural development. Regular and optimal performance of these roles will accelerate the transformation of agriculture and rural economic development. Ijere (1981), further explains that, it is the cooperative that embraces all type of farmers and a well organized and supportive Cooperative is a pillar of strength for agriculture in Nigeria.

Capital formation can be defined as the transfer of savings from households and governments to the business sector, resulting in increased output and economic expansion (Wikipedia).

The growing need for credit and access to the basic necessities of life and articles of trade led to the formation of most of the co-operative societies. A co-operative societies formed when at least two persons who have common problems joined together to solve such problem collectively (Akanni, 1986).

Co-operatives vary in meaning for different purposes and with the profession of the people. However a co-operative is a voluntary association of people, engaging in a democratically controlled business organization, operating at cost which is

owned, capitalized and controlled by member patrons as users, sharing risks and benefits in proportion to their participation to achieve a common economic goal. Therefore, a co-operative can be defined as a business, voluntarily organized, operating at cost which is owned, capitalized and controlled by member patrons as users, sharing risks and benefits proportional to their participation (Akanni, 1986).

Co-operatives are defined by the International Cooperative Alliance's Statement on the Cooperative Identity as autonomous associations of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through jointly owned and democratically controlled enterprises.

A co operative, according to Shaar (1989) in farmer co-operative.What they are and what they are not, is a business voluntarily controlled and owned by the member patrons and operated for them on a non-profit or cost basis.

Barko (1985) views co-operative as a voluntary association of man and woman, organized to solve the socio-economic felt needs of members, called co-operators. Member owner often capitalize, finance, supervise, control and direct the policy of the organization. In this regard, members usually pool their resources together for their socio-economic interest.

Co-operative is a voluntary organization of persons with common interests formal and operated along democratic lines, for the purpose of supplying goods and services at affordable cost to us members who contribute both capital, time, and energy to the co-operatives (Olajide, 1992).

Lot (1980) depicts that co-operatives were created and delivered by the economic in which all co-operative benefits felt. An organization of this need was given by early classical cooperative theorist Charles as quoted by Alao (1990) in which he says that the enormity of the disadvantages in the case when there would be In a village a single large granary will tended to instead of large number of granaries exposed to rats, weevils, humidity and fire which economical large tasks managed by unskilled people who either know to improve or conserve year outputs.

The United Nation Research in Social Development (1999) said that co-operative societies are all organizations legally organized as such, which are subject to organized supervisions which claim to follow co-operative principles.

The International Labour Organization (ILO) has provided what is regarded as an internationally accepted definition of co-operative.

It is an established fact that many household in the country today, live below the poverty line, in fact, investigation has shown that the highest percentage of Nigeria's workforce work in the public sector and earn their monthly salary of below one dollar per day (Godwin, 2011).

The rural community, whose main occupation is agriculture, produces the food consumed in the country, but which is hardly sufficient to feed the people, because farmers still use crude farming implements to till the land. The federal government, in a bid to fight the menace of poverty therefore, has set up some agencies essentially to provide financial assistance particularly to youths and women involved in small scale businesses. So recently, Cooperate Societies, a concept that was given birth from the traditional thrift collection, began to spread like wild fire in virtually every part of Nigeria. There is hardly any workplace in Nigeria today particularly government establishments, where a cooperative society is not operational. It's quite effective because transactions of money are carried out in conjunction with employers of labour on behalf of their staff. For example, staff's savings into the co-operatives are deducted at source and repayment of loans is done through deductions from staff salaries as requested by the operators of the societies (Godwin 2011).

In the same vein, there are co-operative societies that have been set up by private initiative, i.e. group of people seeking a common economic goal and hoping in the long run to improve their economic status. These people-oriented cooperate societies, have capital base in some cases running into millions of Naira which they use to execute multipurpose projects that are commercially viable for the benefit of members. Due also to the multipurpose nature of these societies, they are engaged in selling of shares, purchase of agro-allied products, estate and in addition to members savings. For a co-operative society to operate in Nigeria, it is mandatory for the applicants to register with the Ministry of Commerce both at the state and federal government level and/or with the Corporate Affairs Commission, before the law of the land can back them in their activities (Godwin 2011).

After completing the registration formalities, a certificate of incorporation is issued to the society as well as bye-law which guide the society to draft its constitution. Having fulfilled these guidelines, people can then be registered to form the membership of the society. Subsequently, any surpluses arising from business carried out with members' funds, will be shared accordingly to all shareholders of the society (Godwin 2011).

Going by the experience of some countries that tried these co-operatives like Malaysia and Bangladesh in Asia, it will not be long before the economic indices of the country will begin to leap higher. In recognition of his developmental work translated in grassroots social and economic changes, the world has named Muhammed Yunus; fondly called the father of micro credit, and Grameen Bank as the winners of 2006 Nobel Peace Prize (Godwin 2011).

With the proliferation of cooperative societies in Nigeria today and the concept of self employment

ground, youths will now be empowered and dependency no doubt be on the decline. Even banks and financial institutions are approaching these co-operatives societies to lodge their savings with promises of attractive interest rates (Godwin 2011).

Ever since people have come together to do business as a co-operative; these have been driven by political and ethical values. It is for this reason that co-operatives are often described as values-led businesses (Godwin 2011).

Co-operative enterprise has been described as people-oriented sustainable development. Underlying this idea are some basic philosophical concepts.

- Fundamental respect for human beings and a belief in their capacity to improve themselves through mutual self-help.
- That democratic producers applied to economic activities are feasible, desirable, and efficient.
- That democratically controlled business make a contribution to the common good (Owojuyigbe 1998).

From the foregoing it can be seen clearly that, the concepts of co-operatives contain the following ingredients:

- A duly registered association of persons.
- With a common bond interest.
- Members voluntarily join together to achieve a lawful common social and economic end.
- For a fair share of risks and benefit.
- In accordance with accepted co-operative principle (Owojuyigbe 1998).

a) Statement of Research Problem

The co-operative societies are formed with the idea of mutual co-operation. Every co-operative society is formed to render service to its members rather than to earn profit.

Generally it is seen that co-operative societies do not function efficiently due to lack of managerial talent. The members or their elected representative are not experienced enough to manage the society. (i.e 'again,') because of limited capital they are not able to get the benefits of professional management.

The gains to the Nigerian economy during the pre-oil era were largely due to positive effects arising from general acceptance by the people of cooperative movements. Unfortunately, those attractions no longer exist today as they have been eroded away with the petroleum becoming the dominant commodity and the mainstay of the economy.

Despite these numerous benefits of the cooperative societies, many cooperators seem not to gain or reap substantially from being membership of various co-operative societies in terms of capital formation and the improvement of their welfare status. The questions now are: what are socio-economic characteristics of these cooperators, to what extent have the cooperators benefited from joining a co-operative society, what are problems confronting the members in achieving the stated objective of the cooperative society?

b) Objectives of the study

The broad objective of this study to assess the impact of co-operative societies in the enhancement of capital formation of members in Nigeria.Specific objectives are to:

i. identify the socio-economic characteristics of the cooperators in the study area;
ii. identify the uses of funds of co-operative societies;
iii. determine to what extent co-operatives have benefited members in financing their investments;
iv. identify problems militating against the effectiveness of co-operative societies; and
v. offer suggestions and recommendations on how to improve the cooperative societies towards enhancing the capital formation of members.

c) Research hypothesis

H_o: co-operative societies have no effect on member's welfare.

H_1: Co-operative societies have effect on member's welfare.

d) Significance of the study

It is becoming very apparent that people still find it difficult or almost impossible to raise capital for their respective business transactions. This analysis would have at the end made a critical analysis of the various methods of raising capital with particular reference to co-operative society with the main intention of highlighting the prospect and trends of co-operative societies in Nigeria as it affect capital formation. It is hoped that the result or findings from this study will contribute to knowledge in the area of capital formation as well as a contribution to policy framework with respect to cooperative society in Nigeria.

II. Literature Review

a) Historical development of co-operative societies

Co operation as a form of individual and societal behaviour is intrinsic to human organization. The history of modern co-operative forms of organizing dates back to the agricultural and industrial revolution of the 18th and 19th centuries. The status of which was the 'first co-operative' is under some dispute, but various milestones in the history may be identified.

In 1761, the Fenwick weavers' society was formed in Fenwick, East Ayrshire, and Scotland to sell discounted oatmeal to local workers. Its services expanded to include assistance with savings and loans,

emigration and education. In 1810, Welsh social reformer Robert Owen, from Newtown in mid-Wales, and his partners purchased New Lanark mill from Owen's father-in-law and proceeded to introduce better labour standards including discounted retail shops where profits were passed on to the employees. Owen left New Lanark to pursue other forms of co- operative organization and develop co-op ideas through writing and lecture. Co- operative communities were set up in Glasgow, Indiana and Hampshire, although ultimately unsuccessful. In 1828, William king set up a newspaper, The cooperator, to promote Owen's thinking, having already set up co-operative store in Brighton.

The Rochdale society of equitable pioneers in 1844, is usually considered the first co-operative enterprise, used as a model for modern co-operative societies, following the 'Rochdale principles'. A group of 28 weavers and other artisans in Rochdale, England set up the society to open their own store selling food items they could not otherwise afford. Within ten years there were over 1,000 co-operative societies in the United Kingdom.

In 1844, co-operators in Rochdale realized a more productive, sustainable way of running a retail co-operative for the benefit of its members and the local community. Like other co-operatives, they were formed to meet the needs of members, in this case, the need for unadulterated, wholesome food, sold in honest weights. In addition, they put in place a set of values and principles to guide their activities, and the Rochdale Equitable Pioneers Society went from strength to strength. Very quickly, other existing societies adopted the Rochdale principles and new co-ops set up in the same manner. The Derby Co-operative Society was registered in 1854 and was one of the earliest in the Midlands.

The Rochdale Principles are a set of ideals for the operation of cooperatives. They were first set out by the Rochdale Society of Equitable Pioneers in Rochdale, England, in 1844, and have formed the basis for the principles on which co-operatives around the world operate to this day. The implications of the Rochdale Principles are a focus of study in co-operative economics. The original Rochdale Principles were officially adopted by the International Co-operative Alliance (ICA) in 1937 as the Rochdale Principles of Co-operation. Updated versions of the principles were adopted by the ICA in 1966 as the Co-operative Principles and in 1995 as part of the Statement on the Co-operative Identity.

Other events such as the founding of a friendly society by the Tolpuddle Martyrs in 1832 were key occasions in the creation of organized labour and consumer movements.

The introduction of modern cooperative business into Nigeria dates back to the year 1935 following the acceptance, by the Colonial Administration, of Mr. C.F. Strickland's Report on the prospects of cooperatives in Nigeria. After seventy-four years of operation, the cooperative movement in Nigeria can boast of a membership of more than five million persons distributed in more than thirty-six thousand cooperative societies. Unfortunately, cooperative businesses in Nigeria are still contending with problems that have hampered their development. One such problem is the lack of access to investment credit.

From the report of the workshop held on 10th-11th November 2008 during the 8th International Cooperative Alliance (ICA) Africa regional assembly at the international conference centre, Abuja. Mr. Tom Tar – The Executive secretary of cooperative Federation of Nigeria, in his introduction of the movement in Nigeria, said the cooperative Federation of (CFN) was formed in 1945 and registered in 1967.

In Nigeria it would be recalled that towards the end of the First World War (1914-1918). Some European living in Lagos colony and in parts of western Nigeria organized a kind of consumer society to take care of their own needs.

He traced the background of cooperatives in Nigeria to the traditional savings and loans system. He added that following that agitation by the Agege cocoa planters union in 1907, the study for establishment of formal cooperation was commissioned in 1934. This was followed by the enactment of cooperative in 1935. The early move was in agriculture and later shifted to marketing following the shift in the Nigerian economy from agriculture to crude oil. He gave the scope of cooperative activities in Nigeria as covering: On population, he said there are about 5million family members covering 20 million households. Total number of registered cooperative societies is about 50,000.

b) Basic principles of co-operative societies

Cooperatives worldwide generally operate using the same principles as adopted in 1995 by the Intern Cooperative Alliance.The principles are part of a cooperative statement of identity, which also includes the definition of a cooperative and a list of cooperative values.

A. Voluntary and Open Membership: Cooperatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.
B. Democratic Member Control: Cooperatives are democratic organizations controlled by their members, who actively participate in setting their policies and making decisions. Men and women serving as elected representatives are accountable to the membership. In primary cooperatives, members have equal voting rights (one member, one vote) and cooperatives at other levels are organized in a democratic manner.

C. Member Economic Participation: Members contribute equitably to, and democratically control, the capital of their cooperative. At least part of that capital is usually the common property of the cooperative. They usually receive limited compensation, if any, on capital subscribed as a condition of membership. Members allocate surpluses for any or all of the following purposes: developing the cooperative, possibly by setting up reserves, part of which at least would be indivisible; benefiting members in proportion to their transactions with the cooperative; and supporting other activities approved by the membership.
D. Autonomy and Independence: Cooperatives are autonomous, self-help organizations controlled by their members. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their cooperative autonomy.
E. Education, Training and Information: Cooperatives provide education and training for their members, elected representatives, managers and employees so they can contribute effectively to the development of their cooperatives. They inform the general public — particularly young people and opinion leaders — about the nature and benefits of cooperation.
F. Cooperation among Cooperatives: Cooperatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional and international structures.
G. Concern for Community: While focusing on member needs, cooperatives work for the sustainable development of their communities through policies accepted by their members.

c) Types of cooperative societies

Cooperative societies are of various types depending upon their objects and nature of work. Some of the cooperatives have been formed to help consumers and other have been established to help producers. There are some societies which help the farmers in providing credit for the purchase of fertilizers and seeds etc. and some help them in the promotion of trade. Prof. Hafiz

Some of the important types of cooperative societies are:.

1. Producer's cooperative societies: The producer's cooperatives are established by the small producers. The members of the society produce goods in their houses or at common place. The raw material, tools money etc. is provided to them by the society. The output is collected by the society and sold in the market at the wholesale rate. The profit is distributed among the member in proportion to the goods supplied by each member.
2. Consumer's cooperative societies: Consumer's cooperatives are established to remove middlemen from the field of trade. These societies purchase foods at he wholesale prices and sell these goods to the members at cheaper rates than the market prices. However, the goods are sold to the non members at the market rates. The profit, if any, is distributed among the members in the shape of bonus according to their purchase ratio.
3. Marketing cooperative societies: The marketing cooperative societies are formed by the small produces for the promotion of trade. The two main objectives of these societies are, to sell the good at reasonable prices by eliminating middlemen and to make the ready for the product of the member. These types of societies are formed by the small agriculturalist and artisans. Theses societies collect the products of its members and make its grading and keep them in warehouses and sell them in the market at whole sale rate when the market is ready for these products. The profit is distributed among the member according to the ratio of goods supplied by them.
4. Credit cooperative societies: These cooperatives are formed for the financial help of the members. These societies provide loans to the members at low rate of interest. In rural areas these provide loans to the farmers for the purchase of seeds, fertilizers and cattle. In urban areas these societies provide loan to its members for the purchase of raw material and tool.
5. Farming cooperative societies: These solicits are formed by the by the small agriculturalist to get the benefits of larges scale forming. These societies provide help to the farmer for the improve method of cultivations by providing large scale forming tools such as tractors, threshers and harvesters etc.etc.
6. Housing cooperative societies: These societies are formed for the procurement of land for the construction on houses on homogeneous basis. These societies are formed by those members who are intended to construct their own home. These societies provide loan to the members for the construction of houses. These also purchase construction material in bulk and provide this material to its member at cheaper rates.
7. Insurance cooperative societies: Theses societies make contract with insurance companies for the purchase of different insurance policies for its member at lower premium. This society may take a group insurance policy for its members. The main object of the society is to minimize the risk of its member.
8. Transport cooperative societies: These societies are formed to provide the services of transport to its

members at lower rates. Welfare bus scheme is an example of this type of society. A pass is handed over to the member for traveling on approved routes.

9. Storage cooperative societies: These societies are formed for the provision of storage facilities to its member for perishable and non perishable goods at lower rates. These societies also provide grading and distribution services to its members.
10. Labour cooperative societies: These societies are formed by unskilled labour for selling their services at reasonable wage rate. This type of society makes a contract with different firm for the provision of labour to them.
11. Miscellaneous societies: Some other important societies, in addition to the major form of societies discussed above are, Processing cooperative societies, Fisheries cooperatives societies, Forestry and poultry forming etc.

d) Theoretical framework

The only known and recognized theory, which backed the activities of the co-operative, is the "theory of Democracy" but this theory of democracy was later categorized into:

a) The classical theory
b) The modern theory
c) Co-operatives and the classical theory

i. *Theory of democracy*

The principal objective of this theory is to make co-operative an easy and profitable organization in which their aims and objectives are achieved. The theory provides at least some of the materials required to enable us to make a realistic assessment of decision-making in retail co-operatives. An appraisals, however requires more than facts. If we desire to make some judgment about how democratic co-operatives really are, we need first of all a clear conception of the meaning of the term "Democracy". Although there is no agreed definition of democracy, even though a cursory study of the uses of the term by modern writers and politicians shows that there is no agreed meaning. Some equate it with the rule of the majority, others emphasis the importance of protecting the rights of the minority. Some regard it as a system, which maintains certain valued institution, such as freedom of speech and association, while others said a way, which totalitarian democracy.

Co-operative democracy could be view as the democratically control in the co-operative set-up, that is, democracy within co-operatives. The concrete elements in a co-operative democracy may of course, be different from those in a state democracy. For example, in a co-operative, the members take the place of the citizens and the Board of Directors take the place of the Government of the state. But these substitutions do not involve a change in the meaning of democracy. And any conclusions, which hold good democracy within the states, will apply equally well to democracy within co-operative societies.

ii. *The classical theory*

The classical theory was developed in the eighteenth centuries. In essence, it holds that democracy is a method of government, which realizes the common good by a system in which the people themselves decide political issues, the decision taken can be said to express the will of the people. So stated, the presumption is that all the people participate in decision making, the system is one of direct democracy. The physical and practical impossibility of everyone taking part in every decision in all save relatively small groups; is recognized and leads to the introduction of the notion of representation and thus of indirect or representative democracy. In this attenuated form, the people's will is not expressed, directly by themselves but indirectly through representatives who are elected by people and who meet periodically in assembly to carry out the will of the people. Representation on this view is an important device to enable democracy to be applied in large scale groups and small groups like co-operatives and trade union but it is nothing more than this: it changes the form but not the substance of democracy. Provided that the representatives do not attempt to substitute their wills for the people's will and regular periodical elections help to ensure this. Thus, democracy of co-operative is thus seen as an institutional arrangement for arriving at co-operative decisions realize the common goals by making the people itself decide issues through the election of representatives who assemble in order to carry out its will.

The first requirement of any theory is that its central concepts should be unambiguous. But the classical theory fails to meet this test. "The common good" is a much phrase, but its reference is selfdom clear. On analysis it is doubtful whether- it is something which can be "realized". It is not an objective like full employment for which precise criteria can be established.

The classical theory is also vulnerable to be changed as it ignores the problem of representations. It assumption that representation is merely a device to enable democracy to work in large-scale group is naïve. Representation is one of the most puzzling concepts in politics and nobody has, succeeded in explaining satisfactory how one person can represent another.

iii. *The modern theory*

The modern theory of democracy rejects the questionnaire assumptions of the classical theory and seeks to provide model, which embodies ideas having clear and unambiguous empirical references. The main emphasis of the classical theory is on self-government,

in the sense of government acting in the expressed interest of the people or at least a majority of them. It answers to the question. How DOES one ensure responsible government? Is through institutionalization of competition for leadership. Schumpeter has defined the modern democratic method as that "institutional arrangement for arriving at political decisions in which individuals acquire the power to decide by means of a competitive struggle for the people's vote. On this view, the main function of the people is not to make, or indirectly, the multitude of decision involved in government, but to make one big decision to produce, by means of periodic elections, either a government or an intermediate body, which in turn will produce a government

The model of democracy avoids the problem of representation since the problem arises only in the context of self-government. When the assumption that they themselves make the decisions is dropped, the representative need no longer be concerned about whether they reflect accurately the views of the electors: the right to make the decisions is theirs and due allowance is made for the exercise of leadership as distinct from the expression of the wills of other. The system works in such a way as to ensure that the interests of the government will not be neglected.

In short, the modern theory is both neater and empirical than the classical theory. Its relation to the older theory is well summered up. Democracy can mean government of the people by the people, by the people and for the people. The modern theory has been developed to explain, and perhaps also to justify, the working of western parties state system. The importance the theory attaches to parties has now been generally recognized by the ordinary citizen who is inclined to regard the existence of a legitimate opposition party as the very hall-mark of a democratic state.

iv. *Co-operative and the classical theory*

This is certainly true of co-operators. If the two theories of democracy are regarded as "Ideal types", the classical theory is more useful for analyzing the practice of retail co-operative government. In the early days of the movement, co-operatives approximated very closely to ideal direct democracies in which all the members meet together in terms of equality to make decisions. The representative executive body-"the Government" of the co-operative exercised only limited powers between general meetings and there was no sharp distinction between the execution and other member.

In some societies, the execution would be chosen by a system of rotation rather than election and it was common practice for ordinary members to attend executive meetings. Today, even in the smallest societies, the roles o f the executive and the members are clearly differential but the element of direct democracy remains relatively pronounced. Over the years, the indirect representative element in co-operative government has markedly increased, but all representative bodies remain, in theory at least, directly accountable to the business meeting as well as accountable to the membership through the election procedures.

Other features of co-operative government underline its classical democratic character. Most obvious, perhaps, is the emphasis placed upon local democracy. Although the structure of the movement, based, as it autonomous local societies, seems to many observers ill-adapted to modern trading conditions, most active o-operative regard it as a landing of democracy.

In theory, of course, it is possible to envisage as some reformist co-operators do, a single natural co-operative society constructed according to the canons of representatives classical democracy. Those co-operators who see democracy as direct self-government by the members are, therefore, correct their point of view, in questioning the ideas of a normal society. The member, it is implied, ought to be interested in the government of his society and the more members who are interested, the more likely is the society to be a "genuine" co-operative.

e) Empirical review

Rainforest alliance (2006), opined that smallholders have lost their access to overseas markets and a major source of income. As one of the effective means of overcoming most of these obstacles to sustainable smallholder cocoa production, cooperative cocoa production in which farmers pull their resources together to increase agricultural productivity and enhance the economic and social status of member farmers has been suggested (Nweze, 2003). Interest in cooperative societies has grown widely in the study area (Unuigbe, 2005).At various times; Federal and State governments have endorsed cooperative societies as instrument for socio-economic transformation of rural areas Edo Cooperative Federation (ECF, 2002). Cooperative societies' increasing involvement in production and farm inputs distribution in Nigeria has been widely reported. These include marketing, processing, supply of farm inputs (seeds, fertilizers, chemicals and modern farm implements), consumer goods, credit and banking, insurance, warehousing, transportation, farm extension and relevant support such as research and publication (Alufohai and Ilavbarhe, 2000; FAO, 1993 and Nweze, 2003).

Adekunle and Henson (2007) he studied the effect of cooperative thrift and credit societies on personal agency belief: a study of entrepreneurs in osun state, Nigeria. He opined that little or no attention has been paid to the role of entrepreneurship and the

capacity of institutions like Cooperative Thrift and Credit societies to promote entrepreneurship.

Afolabi and Fagbero (1998), the informal source of credit is more popular among small scale farmers which may be due to the relative ease in obtaining credit devoid of administrative delay, non existence of security or collateral, flexibility built into repayment which is against what is obtained in the formal sources. Ojo et al (1993), observed that the institutional lending system has failed to meet the objective for which they were set up. According to him only 15 percent of the trading bank credit to agriculture has been covered. The major short comings of their transactions he observed are due to the inaccessibility of these funds to rural farmers as a result of the bureaucratic procedures and high service cost, which are very difficult for the farmers to meet.

Alufohai (2006) examined the sustainability rates of co-operatives and NGOs in farm credit delivery in Edo and Delta states in Nigeria. The subsidy Dependence Indices (SDI) and the capital formation rates were determined using both primary and secondary data obtained from 80 and 20 purposely selected cooperatives and NGOs respectively, based on their involvement in farm credit delivery. A well structured questionnaire was used to obtain the primary data from the 100 organizations selected from a comprehensive list from the ministry of commerce and industry as well as corporate Affairs Commission. Both descriptive and quantitative statistics as well as financial analysis were employed in analyzing the data. The results showed low capital formation rate of 0.1815 and 0.123 for cooperatives and NGOs respectively. Cooperatives had zero SDI having no subsidies throughout the period while NGOs had an SDI of 0.7642 which is considered too high for them to sustain the credit delivery function on the withdrawal of subsidies. Though with low loan volumes, the study showed cooperatives more likely to sustain the credit delivery function than the NGOs, but they may need to improve their capital formation rate.

Credit is considered as a catalyst that activates other factors of production and makes under-used capacities functional for increased production (Ijere, 1998). Thus farm credit plays a crucial role in agricultural and rural development as it enables farmers reap economies of scale, venture into new fields of production, employ new technologies and empower them to provide utilities for a widening market. Farm credit plays this role because it bridges the capital gap that exists in an agricultural production. Farm credit could obtained from either the formal sources which are the commercial banks and government owned institutions, or the informal sources which are the self-help-group (SHG) money lenders, cooperatives and Non-Governmental Organization (NGOs). However, Aryeetey (1997), stated that the informal rural financial sources in Africa perform better than the formal system because they have adapted to the high-risk environment. He therefore advised that the formal sector should learn from the informal institutions.

III. Research Methodology

a) Study Area

Ijebu Ode is one of the Local Government Areas in Ogun State located in South-Western Nigeria. The city is located 110 km by road north-east of Lagos; it is within 100 km of the Atlantic Ocean in the eastern part of Ogun State and possesses a warm tropical climate, With an estimated population of 222,653 (2007), it is the second largest city in Ogun State after Abeokuta. The largest city inhabited by the Ijebus, a sub-group of the Yoruba ethnic group who speak the Ijebu dialect of Yoruba, it is historically and culturally the headquarters of Ijebuland.

b) Sources of data

i. Primary sources Primary sources include data collected from questionnaire. Questionnaire was administered randomly to the members of cooperative society to gather information from members of staff of the society. The data collected most especially from primary data were analyzed using descriptive statistics and inferential statistics e.g Chi-Square and data collected from secondary data was analyzed using correlation analysis.

ii. Secondary data: This was collected from the statement of account of Temidere- co – operative and thrift- society, Ijebu-Ode Ogun State.

c) Method of data collection

The data was collected through random selection of the respondents from the list of co-operators corroborated with statement of account of Temidere- co – operative and thrift- society, Ijebu-Ode Ogun State. The total sampled were 50 respondents out of 75 members.

d) Scope of the study

The study was limited to Temidere- co – operative and thrift- society, Ijebu-Ode Ogun State. Data was obtained from the Temidere- Co – operative and thrift- society on the socio-economic characteristics of the cooperate members which include age, sex, marital status, household size etc. Though, emphasis was solely on their thrift and credit functions. The society was chosen because it is a fairly big establishment, well recognized in Ijebu-ode and a registered organization.

e) Method of data analysis

Structured questionnaires were distributed to the respondents that are made up of the members of Temidere - co – operative and thrift- society and was corroborated with secondary data sourced from their statement of account. For the purpose of this study,

data collected was analyzed using descriptive statistics, Chi-Square analysis and correlation analysis. This was used to test the hypothesis which states that cooperative societies have no effect on member's welfare.

i. *Descriptive statistics*

These were used to capture specific objectives one, two, three, four and five.

ii. *Inferential statistics*

These were used to test the hypothesis that cooperative societies have no effect on member's welfare.

Chi-Square formula:

$(0\text{-}E)^2/E$

Where;

0= observed frequency

E= expected frequency

iii. ***Correlation Analysis:*** *This was used to test the objective 3.*

Pearson's Correlation Formula: The formula for correlation is as stated below;

$$r = \frac{\sum(X-\overline{X})(Y-\overline{Y})}{\sqrt{\sum(X-\overline{X})^2 \sum(Y-\overline{Y})^2}}$$

Where; X and Y are independent and dependent variables respectively.

IV. Results and Discussion

a) Socio-economic characteristic of the respondents

Table 1 showed that the majority (78%) are males while females constitutes of 22 percent. The implication of this result is that the majority of the in co-operative society members are males. The age of the majority (44%) of those in the co-operative range from 31-40 years, followed by age range 51-60 (26%) and the least being age range 41-50 (8%). The result implies that most of the respondents are in their active age. Majority (80%) of the respondents are married, and (20%) of the respondents are single. This might have being the reason for joining the cooperative as a way of augmenting the marriage responsibilities. Also, half (50%) of the respondents have number of household ranging from 1-3, followed by 4-6 number of household with (30%) and the least with (20%) which is 7-9 number of household. This further confirms that the respondents are married.

Similarly, table 1 shows that (52%) of the respondents practice Islam while (48%) practice Christianity. The implication is that majority of the cooperators are Muslim.

High proportion of the respondents (38%) are WASCE/GCE holders, followed by HND/B.Sc holders which is (24%), and the least is OND/NCE holders which is (24%).The implication is that majority of the co-operators are fairly educated. Table 1shows that (58%) of the respondents are businessmen, followed by artisans which is (24%) and the least (18%) of the respondents are civil servants. This shows that majority of the co-operators joined to augment their businesses.

Table 1 : Socio-economic characteristics of the respondents.

Characteristics		Frequency	Percentage (%)
Gender	Male	39	78
	Female	11	22
Age (yrs)	21-30	11	22
	31-40	22	44
	41-50	4	8
	51-60	10	20
Marital status	Single	10	20
	Married	40	80
Household size (Number)	1-3	25	50
	4-6	15	30
	7-9	10	20
Religion	Islam	26	52
	Christianity	24	48
Educational qualification	WAEC/GCE	19	38
	OND/NCE	09	18
	HND/BSc	12	24
	Others	10	20
Occupation	Civil Servant	09	18
	Artisan	12	24
	Business Man	29	58

b) Loan Disbursement/ Administration

Table 2 shows the range of loan awarded by the co-operative society. The result shows that majority collected between ₦20,000-₦100,000 and the least between ₦581,000-₦660,000 with 2%. This shows that the maximum loan collected by the respondents is 660,000, while the minimum loan collected by the respondents is 20,000. Majority of the respondents (40%) make use of surety (Others), followed by 30% with landed property and the least (2%) of the cooperators used their personal/inherited building.

Table 2 also shows that majority (94%) of the respondents spent the loan collected on businesses while loan spent on payment of children by the co-operators is (6%). The implication is that most of the loan collected by the co-operators is spent augment their businesses. The financial assistance constitutes the most (60%) benefits derivable from joining co-operative society and the least is support by members in time of needs with (6%). This shows that the benefit received by being a member of the co-operators is financial assistance by co-operative society. Higher proportion (84%) of the cooperators agreed that co-operative society increase their capital formation.

Diito, table 2 shows how much co-operative society grant to empower members to own their businesses. The result shows that ₦20,000-₦100,000 (60%), ₦181,000-₦260,000 (22%). This shows that the minimum loan collected to empower co-operators own business is ₦20,000 while the maximum loan collected to empower co-operators own business is ₦660,000. The table also shows majority of the loan collected by co-operators to own their own business ranges from ₦20,000-₦100,000. The result also shows that majority (98%) agreed that it plays a leading role in poverty reduction. This implies how co-operative society contributes to ameliorating the poverty rate of its members and the society in general.

Table 2 : Loan Disbursement/ Administration.

Characteristics		Frequency	Percentage (%)
Amounts of loan disbursed	20,000-100,000	28	56
	101,000-180,000	4	8
	181,000-260,000	11	22
	261,000-340,000	4	8
	421,000-500,000	2	4
	581,000-660,000	1	2
Collateral for loan disbursement	Landed property	15	30
	Building	4	8
	Car/Motorcycle	11	22
	Others	20	40
Moratorium (years)	1-2	48	96
	3-4	2	4
How the loan was spent	Business	47	94
	Payment of school fees	3	6
Benefit of being a member	Friendship	4	8
	Support by members in there needs	3	6
	Financial assistance	30	60
	All of the above	13	20
Does cooperative society increase your capital formation	Yes	42	84
	No	8	16
Does Cooperative society play a leading role in poverty reduction	Yes	49	98
	No	1	2

c) Welfare of members

Table 3 shows how the welfare of members is emphasized in the cooperative society. The result revealed that 78% of members agreed that welfare is an important consideration in co-operative movement. Monitoring of income and expenditure of members has (38%), followed by advice on how to improve their business which was (24%), and the least being (2%) was ensuring that every member engage in one business or another. This implies that monitoring of income and expenditure of members is how co-operative society impact on members with a view to improving their welfare status.

Table 3 : Distribution of respondents based on attainment of welfare objectives.

Characteristics		Frequency	Percentage (%)
Is welfare of members employing	Yes	39	78
	No	11	22
How welfare was observed	Indifference	11	22
	Business improvement	12	24
	Advance on loan spending	5	10
	Education	2	4
	Monitoring of business	20	40

d) Forms of business enterprises invested

Table 4 shows that though there are various businesses invested on, but most co-operators invested on transport with 16 percent followed by fish farming/cosmetics trading with 12 percent among others.

Table 4 : How the loan collected was spent.

		Frequency	Percentage (%)
Forms of Business/enterprises	Building material	1	2
	Buying of motor tyres	3	6
	Carpentry work	1	2
	Cement trading	3	6
	Compressor	2	4
	Drinks	1	2
	Electronics	3	6
	Education	1	2
	Farming	1	2
	Fish farming	6	12
	Kerosene	2	4
	Motorcycle cycle	3	6
	Plumbing material	1	2
	Refrigerator	1	2
	Rental services	1	2
	Foodstuff	1	2
	Tailoring	4	8
	Cosmetics trading	6	12
	Transportation	8	16
	Wood selling	1	2
	Total	50	100

e) Problems encountered.

Table 5 shows that most of the cooperators agreed that capital was the most serious problem facing co-operative societies with particular reference to Temidere cooperative society. This results could imply that inadequate capital is a major challenge confronting Nigeria, a case of developing economy.

Table 5 : Problems encountered being a cooperative members.

Characteristics		Frequency	Percentage (%)
Problem	Capital	18	36
	Leadership	8	16
	Unity among members	7	14
	Poor attendance	17	34

f) Hypothesis testing that co-operative has no significant effect on members' welfare

Table 6 shows the results of the Chi-Square test which determine the hypothesis that co-operative have no significant effect on members' welfare. The result shows that co-operative societies has a significant contribution to members welfare at $p<0.01$. Hence, our null hypothesis was rejected. By implication, the acceptance of alternative hypothesis (H1) which indicates that co-operative societies have effect on member's welfare was accepted. Therefore, it can be inferred that cooperative society plays a significant role in capital formation which essentially is an ingredients to poverty reduction and socio-economic development of the country.

Table 6 : Chi Square Test Statistics.

	benefit you receive in your membership	does co-operative society play a leading role in poverty reduction	is welfare of members emphasized
Chi-Square	20.880_a	46.080_b	15.680_b
Df	3	1	1
Asymp. Sig.	.000	.000	.000

g) Correlation matrix

Table 7 shows the results of the correlation matrix of the secondary data collected from the statement of account of Temidere cooperative and thrift society, Ijebu-Ode on the amount of deposit by the cooperators and the amount of loan given out by the cooperative society. The result shows that there is a significant relationship between loan and amount deposited at 10% probability level. The implication is that the total amount deposited enhances the capital available to cooperators, hence will eventually contribute to the level of loan administration and capital formation.

Table 7 : Correlations.

		Lndeposit	lnloan
lndeposit	Pearson Correlation	1	.990**
	Sig. (2-tailed)		.000
	N	10	10

Correlation is significant at the 0.01 level (2-tailed).

h) Summary of research findings

The results of the research findings show that majority of the respondents (cooperative members) are males, still in their active age and married, with children ranging from 1-3, practice Islam, fairly educated and high proportion being in their private businesses. Majority of the respondents are self employed (sole proprietors) in their various businesses and they are mostly in the management position of their businesses and the loan collected by the co-operators ranges from ₦20,000-₦100,000, using surety (others) as their collateral and being given a moratorium of 1-2 years on the loan collected. Majority of the loan collected is spent on their various businesses, the co-operators enjoy the benefit of financial assistance by the co-operative society, which increases the capital formation of the co-operators.

The major way by which co-operative society increase co-operators capital formation is by granting credit services, the co-operative society gives timely loan to co-operators which empower members to own their own business. Most of the loan collected by the co-operators ranges from ₦20,000-₦100,000, co-operative society offer better services to members to increase their income by charging low interest rate on the loan collected.Co-operative society helps to improve business entrepreneurial, they play a leading role in poverty reduction and emphasizes on the welfare of its members by monitoring the income and expenditure of members. The problem mostly faced by co-operative society is the problem of capital. the correlation matrix shows the high positive relationship between amount of deposit by the cooperators and the amount of loan given out by the cooperative society. This implies that the amount of loan given out from the deposited funds have great inlfuence on the cooperators. This however, supports the earlier argument in table 6 that cooperative society improved the welfare of members though capital formation for investment purposes".

V. Conclusion

Based on the research findings, it was concluded that co-operative societies have effect on member's welfare and the role of co-operative society in poverty reduction and capital formation cannot be overlooked in the development process of any country particularly the less developed countries like Nigeria. Thus, in order to enhance capital formation through the co-operative society, the following policy issues are raised for consideration: The government should assist co-operative society to improve their capital base through the annual budget of the country. That is, substantial amount of money should be allocated to the co-operative society like the other sectors of the economy. There is need for co-operative research and organization of symposium and public lectures with a view to enhance the efficiency of co-operative movement in Nigeria.

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Economic Efficiency of Freshwater Artisanal Fisheries in Ijebu Waterside of Ogun State, Nigeria

By Kareem, R.O, Idowu, E.O, Ayinde, I.A & Badmus, M.A
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Abstract - This study is on the impact of co-operative societies on capital formation using a case study of Temidere-co-operative and Thrift-society, Ijebu-ode, Ogun state. The objectives are to: identify the socio-economic characteristics of the cooperators in the study area; identify the uses of funds of co-operative societies; determine to what extent co-operatives have benefited members in financing their investments; identify problems militating against the effectiveness of co-operative societies; and offer suggestions and recommendations on how to improve the cooperative societies towards enhancing the capital formation of members. The study adopted a non parametric method of analysis which involved Chi-Square method, descriptive statistics and correlation analysis to achieve the stated objectives.

Keywords : gross margin analysis, B-C ratio, economic efficiency, stochastic production frontier, and artisanal fisheries.

GJSFR-D Classification : FOR Code: 070403, 070401

Strictly as per the compliance and regulations of :

Economic Efficiency of Freshwater Artisanal Fisheries in Ijebu Waterside of Ogun State, Nigeria

Kareem, R.O [α], Idowu, E.O [σ], Ayinde, I.A [ρ] & Badmus, M.A [ω]

Abstract - This study was on analysis of economic efficiency of artisanal fisheries in Ijebu Waterside of Ogun State, Nigeria. The objectives were to: determine the profitability of the artisanal fishery enterprises; estimate the technical, allocative, and economic efficiency of artisanal fisherfolks and determine the factors influencing the technical, allocative and economic efficiencies of artisanal fisheries in the study area.

A multistage sampling technique was used to select a total of 400 fisherfolks from the study area. Primary data were collected using structured questionnaire administered on artisanal fisherfolks and data collected included production inputs and output prices. The data collected were analyzed using both descriptive and inferential statistics. Gross margin analysis was used to determine the profitability of artisanal fishery enterprise. Stochastic production frontier model was used to estimate the technical, allocative and economic efficiencies of artisanal fishery system and the factors influencing the technical, allocative and economic efficiencies of the fishers.

The gross margin analysis revealed that fisherfolks earned N7,471,857.15 per annum. The cash flow showed net returns of N7,447,464.99 per annum with an average of N620,622.08 per month. The maximum likelihood estimates of the parameters for the technical efficiency of the fisherfolks revealed that number of fishing gears, outboard engine, litres of kerosene used and quantity of bait used were found to be significant variables in the fish catch level ($P<0.01$). The inefficiency function of the sampled fisherfolks revealed that age of the fisherfolks, household size, gender and mode of operation were found to be significant factors determining the level of efficiency with a mean technical efficiency of 0.77. The mean allocative efficiency was found to be 0.91 while the mean economic efficiency was 0.70. It was concluded that there was a significant difference in the level of profitability and that inefficiency existed in the use of fishing inputs among the fisherfolks.

Keywords : gross margin analysis, B-C ratio, economic efficiency, stochastic production frontier, and artisanal fisheries.

I. Background to Study

Fishing is one of the oldest livelihood income-generating activities of man since the world was created (Christopher *et al*., 2003). The history of fishing industry in Nigeria dates back to the pre-colonial era where basically small-scale fishing (artisanal) has been a major source of food for the inhabitants of coastal and riverine areas. It also provides employment and economic benefit to those engaged in artisanal fishery activity. Artisanal fisheries utilize open access resources in which the only human intervention is the harvesting of fish stocks (Ajenifuya, 1998).

Fish is also a good source of sulphur and essential amino acids such as lysine, leucine, valine and arginine. It is therefore suitable for supplementing diets of high carbohydrates contents. It has high content of Polyunsaturated (Omega III) fatty acids, which are important in lowering blood cholesterol level and high blood pressure. It has also been implicated to have decreased the risk of bowel cancer and reduces insulin resistance in skeletal muscles (Kudi *et al*., 2008).

The fishery industry in Nigeria can be grouped under three broad categories: artisanal, industrial fishery and fish farming or aquaculture:Artisanal fishery is composed largely of traditional fishermen who are about half a million in number scattered all over the country. Artisanal fishing is carried out with the use of traditional dugout boats (canoes) and other gears (traps). On a comparative basis, it is labour intensive and requires relatively low capital investment. It can thus, be described as a small-scale industry. Artisanal fishing activities are mostly in the shallow continental shelf (coastline), lagoons, creeks, rivers, lakes and reservoirs (Ajao, 2006). Industrial fishery involves the use of large boats (trawlers) because operations are in the distant water (that is, mostly marine and deep sea). Therefore, it requires bigger and better equipped vessels, in contrast to the canoes used for artisanal fishery This distant water vessels are generally expensive and require high level organization with efficient shore-based facilities (such as berths for the trawlers and cold rooms for storage of products). Consequently, industrial fishery tends to be capital intensive.

According to Farrel (1957), efficiency implies an efficient utilization of resources in the production process. However, resource productivity is definable in terms of individual resource inputs or in terms of a combination of them. For instance, labour productivity is defined as the ratio of total output to labour inputs. Similarly, with respect to land, capital, water and

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management productivities can each be defined as the ratio of total output to inputs of land, capital, water and management respectively.

Allocative efficiency is another frequently used measure of efficiency which is defined as the ability of a farm to equate marginal value product and marginal cost (Dhungana *et al*., 2004). In other words, a farm is allocatively inefficient, if it utilizes the inputs in optimal proportions, given the observed input prices, and hence does not produce at minimum possible cost (Coelli *et al*., 2002 and Abay *et al*., 2004). The product of technical and allocative efficiency provides yet another efficiency measure, namely the overall economic efficiency.

Knowledge of the efficiency level at both the firm and fleet level and its determinant factors are valuable information for understanding the problems of fisheries subsector of agriculture. However, such information would include measures of total economic efficiency. Technical efficiency can be measured by different techniques (e.g. Färe *et al*. 1994), but given the stochastic nature of fishing, the stochastic frontier approach has so far been advocated in the literature (Kirkley, *et al*., 1995).

Thus, the allocatively efficient level of production is where the farm operates at the least-cost combination of inputs. Moreso, a firm is allocatively efficient if it was able to equate the value of marginal product (MVP) of each resource employed to the unit cost of that resource. Therefore, allocative efficiency measures, quantifies how near an enterprise is, to using the optimal combination of production inputs when the goal is maximum profit (Richetti and Reis, 2003).

Although, a number of studies have been carried out on efficiency in livestock and crops production in Nigeria, most of such studies dwelled on technical efficiency with only a few dealing with the critical issue of allocative efficiency (Okoruwa *et al*., 2001; Agbamu and Fabusoro, 2001; Ajibefun *et al*., 2002; Ojo, 2003; Ogunyinka and Ajibefun, 2004).

Moreso, researches conducted (Ogundari and Ojo, 2009; Kareem et al., 2008) have observed that the relative technical, allocative and economic efficiencies of the fishing industry has significantly declined in many countries in less developed countries, Nigeria inclusive. This decline in efficiencies also requires public policy that will reverse the short comings in this subsector of agriculture.

Some studies have been conducted on fisheries economics worldwide and in Nigeria, which include the following: Crutchfield and Zellner, (1962), Bromley, (1962), Sagua, (1976), Uboma *et al*., (1982), Williams and Awoyomi (1998), Ajao, *et al*., (2004), Ajao *et al,* (2005).The methodological approach adopted by majority was the ordinary least square (OLS) (Adeogun, 2010; Frederick *et al*.,1985) while some adopted data envelopment analysis (Ajao *et al,* 2004;, Ajao *et al.* 2005), and benefit-cost ratio analysis (Alfred-Okiya (1986)).The most recent study conducted used stochastic production frontier approach to estimate economic efficiency of fish farm in Lagos state which is basically on cultured fishery system (Adeogun, 2010).

Moreso, there have been several studies that have analysed the efficiency of fishery sector in Nigeria (Ajao, 2006 and Adeogun, 2010), most of them have focused on fish farming aspect. The knowledge of economic efficiency of artisanal fisheries in the study area is not only of significant importance for policy makers, but it also provides a missing link especially on the concept of technical, allocative and economic efficiency. It equally creates awareness concerning inefficiencies in artisanal fisheries, and an insight into possible improvement in the determinants of these inefficiencies in the study area.

Economic efficiency comprises both technical and allocative efficiency and it is the product of technical and allocative efficiency (Rahman, 1994). The measurement of technical efficiency/inefficiency indicates to what extent resource-savings can be made or output increases without increasing the input-use levels. This is a critical issue in developing countries where resources are meager and opportunities for developing and adopting better technologies are dwindling (Ali and Chaudhury, 1990).

Despite the rapid development and widespread use of stochastic frontier approaches in assessing efficiency in many industries, such studies on artisanal fisheries are scanty in the study area and Nigeria in general. Thus, implying that, there is inadequate empirical information on the economic efficiency of artisanal fishery in the study area which is expected to serve as knowledge base for expanding output of fishery enterprise as a way of increasing local fish production in the state and the country in general.

a) Description of Ogun State and the fishery system

Ogun State is one of the eight coastal states in Nigeria with about 15 kilometers of Nigeria's coastline having numerous rivers, streams and inland waterways (freshwater).These support varied fishing activities prevalence among the coastal inhabitants. Research reports have however shown that artisanal fishery is the main economic activity of the coastal population of the study area since there are limitations for alternative sources of livelihoods. Despite these numerous rivers, fish production in the state is grossly inadequate to meet the demand of the citizenry. Hence, the need for proper knowledge of the efficiency that will improve their source of livelihood is very essential. The knowledge of economic efficiency of artisanal fisheries in the study area is not only of significant importance for policy makers, but it also provides a missing link especially on the concept of technical, allocative and economic efficiency.

In an attempt to solve the problem of bridging the fish demand and supply gap, the understanding of the knowledge of technical, allocative and economic efficiency is very essential. Thus, the specific objectives are to: describe the socio-economic characteristics of the artisanal fisherfolks in the study area; determine the profitability of artisanal fisheries enterprises; estimate the technical, allocative and economic efficiency of the artisanal fisherfolks; and determine factors influencing the technical and allocative efficiency of artisanal fisheries in the study area.

II. Research Methodology

The study was carried out in Ijebu Waterside of Ogun State using multi-stage sampling technique. The first stage will be purposive selection of 16 villages known for enhanced fishery activities out of the 22 villages in the area. In each of the sixteen selected villages, 25 fishermen will be randomly selected from the list of fisherfolks to make a total of four hundred (400) fisherfolks.

Primary data was collected using structured questionnaire on artisanal fisherfolks in the study area from there recent fishing trip to enhance the reliability of the data. Types of data collected included socio-economic characteristics (such as age, sex, household size, and years of experience), fishing gear, size of canoe, capacity of the outboard engine, number of crew members, quantity of fuel used, and access to credit etc. Data collected was analyzed using descriptive statistics, gross margin analysis and stochastic production frontier model.

III. Analytical Techniques and Empirical Model Specification for the Study

a) Gross margin

A typical gross-margin framework is defined as:

$$\text{Gross margin (GMi)} = \text{TRi} - \text{TVCi} = \Sigma PiQi - \Sigma CijXij \quad (1)$$

Where; TR represents total value of different fish species caught (i.e fish catches) in naira (N) for ***i-th*** fisherfolk, TVC represents total variable costs involved in catching different fish species in naira for ***i-th*** fisherfolk, Pi represents price per kg of each fish specie, Qi represents the quantity of the different fish species caught by the ***i-th*** fisherfolk, Cij represents a unit cost of ***j-th*** input used by the ***i-th*** fisherfolk while Xij represents the quantity of ***j-th*** variable input used by the ***i-th*** fisherfolk.

b) Stochastic Production frontier

In this study, the Cobb-Douglas functional form was chosen because of the ease it provides in computation and interpretation. This study adopted this approach and estimated the stochastic frontier production and the inefficiency model in one step using the Frontier 4.1 software. Stochastic frontier analysis was used to estimate the technical, allocative and economic efficiencies of artisanal fishermen.

Therefore, the stochastic frontier catch function for artisanal fisherfolks in the study area is implicitly specified by:

$$Q = f\,(LNXi;\ \beta i)\ \exp(vi-ui) \quad (2)$$

The equation 2 is thus linearised as stated below:

$$LNCL = \Phi o + \Phi 1LNFSGR + \Phi 2LNVESSEL + \Phi 3LNGRTHP + \Phi 4LNCREW + \Phi 5LNFUEL + \Phi 6LNKERO + \Phi 7LNOIL + \Phi 8LNBAIT + \Phi 9LNFOOD + \Phi 10LNBATRY + \Phi 11LNMISC + vi - \mu l \quad (3)$$

Where;

CL = Catch level (or fish catch) in kg;

FSGR = Length of fishing gear in meters

VESSEL= Size of vessel/canoe in meters

GRTHP =Capacity of outboard engine (Horse power)

CREW =Number of crew/skippers per canoe per fishing trip

FUEL=Fuel (petrol) in litres

KERO= Kerosene used in litres

OIL=Amount of oil used in the fish expedition

BAIT=Number of baits used in the fish expedition

FOOD=Kilogram of food used in the fish expedition

BATRY=Number of battery used for torch-light during the fish expedition

MISC=Number of miscellaneous items which include plastic container, hand paddler etc)

Φo =Constant terms

LN=Natural logarithm;

vi and ui are as earlier defined

A priori 1: $\Phi 1, \Phi 2, \Phi 3, \Phi 4, \Phi 5, \Phi 6, \Phi 7, \Phi 8, \Phi 9, \Phi 10$,and $\Phi 11 > 0$

c) Determination of allocative efficiency

Cobb-Douglas allocative function model: This was used to estimate the allocative efficiency of fisherfolks (objective 3). The allocative efficiency model for this study as adopted by Kareem (2009) and Ogundari and Ojo (2009) is explicitly linearized below:

$$LNTV = \Phi o + \Omega 1LNCFSGR + \Omega 2LNCVESSEL + \Omega 3LNCGRTHP + \Omega 4LNCCREW + \Omega 5LNCFUEL + \Omega 6LNCKERO + \Omega 7LNCOIL + \Omega 8LNCBAIT + \Omega 9LNCFOOD + \Omega 10LNCBATRY + \Omega 11LNCMISC + vi\ \mu l \quad (4)$$

Where,

TV=Total value of catch receipts from selling catches and the values of catches consumed (N);

CFSGR=Depreciated value of fishing gear (N)

CVESSEL=Depreciated value of vessel/canoe (N)

CGRTHP=Depreciated value of outboard engine in Naira per horse power (N /HP)

CWAGE=Expenses on crew members (N /trip)

CFUEL =Expenses on fuel (petrol) per week (N /litre)

KERO=Expenses on litre of kerosene used (N /litre)

OIL=Expenses on oil used in the fish expedition (N /litre)

BAIT=Amount spent on bait used in the fish expedition (N /kg)

FOOD=Expenses on food used in the fish expedition (N /kg)

BATRY=Expenses on battery used for torch-light during the fish expedition (N /week)

MISC=Amount spent on miscellaneous items which include plastic container, hand paddler etc (N)

Φo represents the constant term

LN denotes natural logarithm;

vi and ui are as earlier defined

Note: N1.00=150.00USD (i.e One Naira is equivalent to $150.00)

A priori 2 : $\Omega 1$, $\Omega 2, \Omega 3, \Omega 4, \Omega 5, \Omega 6, \Omega 7, \Omega 8, \Omega 9, \Omega 10$, and $\Omega 11, >0$

d) Determination of economic efficiency

The objective three was estimated through the product of the technical and allocative efficiency. The overall economic efficiency following Farell (1957) was obtained as:

$$EE = TE \times AE \qquad (5)$$

Where,

EE = Economic efficiency

TE=Technical efficiency

AE =Allocative efficiency

The **inefficiency model** can be explicitly defined as:

$$\mu i = \delta o + \sum_{n=1}^{7} \delta ni\, Z\, ni + \sum_{n=1}^{2} \delta nDni \qquad (6)$$

where: Zni represents farmer's specific variables (such as education (years of schooling) age (years), sex/gender (1 for female, 2 for male), experience (years in fishing), trip (no of day in fishing expedition), Household size (number of people eating in the same pot), distance (distance from the fisihing village), credit (Dummy- dummy variables where, 1 = yes and 0 = otherwise and mode of operation (manually operated or motorized operated vessel).

e) Input elasticity

The price output elasticity for inputs included in the regression as variable inputs are of interest in the model, because elasticities are necessary for the estimation of the degree of responsiveness of change in output as a result of change in input (Abdula and Eberlin, 2001). Hence, given the specification of the derivative of the Cobb-Douglas stochastic frontier model, the output elasticities (Ep) with respect to the inputs are thus computed using the expressions in the equation below:

$$\varepsilon p = \frac{\partial \ln Yi}{\partial \ln Xi} = \beta 1 \qquad (7)$$

Where; ep = elasticity of production, and other variables are as defined earlier.

f) Hypotheses test

The test statistics is needed to test for the presence of inefficiency effects among the fisherfolks. Appropriate testing procedure is the likelihood ratio (LR) test. The statistics associated with this hypothesis is defined as:

$$LR = (-2/n[L(Ho) - L(Ha)]) \qquad (8)$$

Where, L(Ho) is the log-likelihood value of the restricted model while L(Ha) is the log-likelihood value of the unrestricted model. The test statistics LR has an approximately mixed Chi-Square ($\chi 2$) distribution with degree of freedom equal to number of parameters specified to be zero in the null hypothesis. When estimated LR is lower than corresponding tabulated Chi-Square (for a given significance level), the null hypothesis is accepted, vice-versa. Thus, we assume that the test of hypothesis are conducted so that the size are a=0.05. If the $\chi 2$ statistics exceeds the 95*th* percentage point for the appropriate $\chi 2$ distribution, then the null hypothesis involved is rejected.

IV. Results and Discussion

a) Gross margin analysis of an average fisher for in the study area.

The results of gross margin analysis of an artisanal fisher in the study area is presented in table 2. The table shows the total revenue accruable per year from the sales of different fish species, at the rate of N 325.00 per kilograme amounting to N11,230,375.00 (Eleven million, two hundred and thirty thousand, three hundred and seventy five naira) per annum. The table further shows the gross margin accruable to an average fisher was N7,471,857.15 (Seven million, four hundred and seventy one thousand, eight hundred and fifty seven naira and fifteen kobo) and total variable costs was N 3,758,517 (Three million, seven hundred and fifty eight thousand, five hundred and seventeen naira only) per annum. The variable costs involve the cost of wage paid to crew members, expenses on fuel (petrol), kerosene, oil, bait, food and maintenance/ services.

Table 2 also shows that total fixed costs were N24, 392.16 (Twenty four thousand, three hundred and

ninety two naira and sixteen kobo only) per annum. The total fixed cost involves the depreciated costs of fixed assets like fishing gear, vessels, outboard engine and miscellaneous items (paddle, aluminum/plastic boxes etc) using straight line method. The cash flow however, gave a net return of N 7,447, 464.99 (Seven million, four hundred and forty seven thousand, four hundred and sixty-four naira and ninety-nine naira kobo) per annum with an average of N 620,622.08 per month (Six hundred and twenty thousand, six hundred and twenty-two naira and eight kobo. This results show that the artisanal fishery business is highly profitable (Abowei and Hart (2008) and Anene *et al.* (2010) who reported a net revenue of N161, 444.52/month in Oguta, Imo State, Nigeria.

The benefit-cost ratio as a measure of profitability was estimated at 2.97. This implies that for every N1.00 invested in artisanal fishery enterprise, N2.97 would be realized. Also, the rate of return on investment which is also known as return to capital was also estimated to be 196.9 percent. This implies that for every investment by the fisherfolks, about N196.00 is benefitted. This therefore suggests that artisanal fishery enterprise is a profitable business.

Table 2 : Gross margin analysis of the average fisher in the study area.

	Items	Output (kg)	Price (kg)	Total (N)
A.	**Revenue**			
	Sales of different fish species	51320	325.00	11,230,375.00
	Fish (plus quantity consumed, Processed and stored)			
	Variable Costs			Annual Expenditure
	Wage			5,504,070. 00
	Fuel			20,624.5
	Kerosene			8,870.0
	Cost of oil			9, 234.0
	Cost of bait			2, 389.5
	Cost of food			7, 776.0
	Cost of maintenance/servicing			1, 200.00
B.	**Total Variable Cost**			**3,758,517.85**
C.	**Gross Margin (A-B)**			**7,471,857.15**
	Fixed costs (Depreciated value)			
	Fishing gear			2456.82
	Vessel			6921.00
	Outboard engine			14890.00
	Miscellaneous (Aluminum/plastic box)			83.82
	Paddle			40.00
D.	Total fixed cost			24,392.16
E	**Total cost**			3,782,910.01
F	Net returns/NFI (C-D)			7,447,464.99
	Net return per month			**620,622.08**
	Profitability index			
	Benefit-cost ratio (A/E)			**2.97**
	Rate of returns on investment (F/E)			**196%**

Source: Data analysis, 2010.

N.B: Maintenance/Servicing includes the costs of servicing fishing gear, vessel/boat, and outboard engine etc.

b) Maximum likelihood (ML) estimation of Cobb-Douglas catch function and inefficiency function

The maximum likelihood estimates of the parameter in the Cobb-Douglas production function as defined by equations (2,3 and 4), given the speculations for the technical inefficiency effects defined by equation (6), were obtained using a one-stage estimation procedure of frontier 4.1c (Coelli, 1994).

The ML estimates of the parameters in the Cobb-Douglas production function with their corresponding standard errors are presented in table 3.The factors affecting technical efficiency can be interpreted by the magnitude, algebraic sign and significance of the estimated coefficient. The positive coefficients of the parameters estimated showed positive relationship with the output. This means that a percentage increase in the positive parameters estimated would lead to a percentage increase in the fish catch level while negative estimate coefficients showed a negative relationship with the level of output. For instance, a percentage increase in the size of vessels used would lead to percentage increase in catch efficiency. Thus, any variable that is significant is an indication of the relative importance of the variables and its policy implication in the determination of catch efficiency.

Among the eleven catch variables considered in the estimation of the technical efficiency model of the fisherfolks (Table 3), number of fishing gears, vessels, and battery used were found to be positive, while amount of fuel used, kerosene, bait and number of miscellaneous items were found to be negative. However, only gear, engine and surprisingly, number of battery were found to be significant at 5 percent probability level. This implies that the more these production variables are used in the production, it would lead to a more proportionate increase in the output of fish catch.

Table 3 also shows the estimated technical efficiency model and inefficiency function of the sample fisherfolks. The results showed education, age, number of trips, gender and mode of operations to be positive while years of experience, household size and gender were found to be negative. A negative sign means that the variable increases efficiency while positive coefficient means a decrease in efficiency level. The negative coefficient of the years of experience for instance has influence on catch efficiency. This implies that with increase in the number years in fishing, the fisherfolks tend to be more efficient. This agrees with the findings of Ajibefun and Daramola (1999). It should be noted that the signs of the coefficients in the inefficiency model are interpreted in the opposite way. However, age, household size, distance, gender, and mode of operation were found to be significant determinants of the level of efficiency of the fisherfolks.

As revealed in table 3, sigma squared (σ^2) of 0.078. This however implies a variation in the level of technical efficiency. Moreso, it shows the correctness of the specified distribution assumption of the composite error term. The gamma (γ) value of 0.011 shows the amount of variation resulting from the technical inefficiencies of the fisherfolks.

The log likelihood function is often used to determine the differences between the restricted and unrestricted models while the likelihood Ratio (LR) test is used to determine the goodness of the model using the table of Kodde and Palm (1986). However, the value shows the rejection of the null hypothesis that (Ho:$\beta1=\beta2\ldots\beta11 = 0$ and Ho:$= \delta1 = \delta2\ldots.\delta9 =0$) and the acceptance of the alternative hypothesis, which specifies the significance of the variables as a determinant of the efficiency level in the study area.

The mean technical efficiency (TE) is estimated to be 0.77, indicating that the realized output could be increased by about 23 percent by adopting the practices of the best fisherfolks.

Table 3 : Estimated catch efficiency model and inefficiency function of the sampled fisherfolks.

Variable	ML Estimation
Catch function	
Intercept	7.014(7.242)*
Ln Gear	0.108(3.08)*
Ln Vessel	0.068(0.664)
In Engine	0.187 (3.74)*
Ln Crew	0.083(0.980)
Ln Fuel	-0.002(-0.146)
Ln Kero	-0.039(-1.2)
Ln Oil	0.005(0.656)

Ln Bait	-0.074(-1.226)
Ln Food	0.072 (0.772)
Ln Battery	1.052 (3.807)*
Ln Miscellaneous	-0.046(-0.597)
Inefficiency function	
Intercept	1.202(-1.895)*
Ln Edu	0.007(0.303)
Ln Age	0.678(4.307)*
Ln Exp	-0.041(-0.622)
Ln Trip	0.037 (0.368)
Ln Hhsize	-0.434(-4.304)*
Ln Dst	-0.172(-1.498)**
Ln Gender	0.057(0.155)
Ln Credit	0.629(3.558)*
Ln Mo	0.071(-1.112)
Diagnosis statistics	
Sigma square ($\sigma 2s = \sigma 2u + \sigma 2v$)	0.078 (11.204)
Gamma $\gamma = \sigma 2u/\sigma 2s$	0.011(0.316)
Log Likelihood Function	-64.853
LR Test	89.727
Number of Observations	400
Average TE	0.77

Source: Data analysis, 2010.

*significant at 5-percent probability level

**significant at 10-percent probability level

Values in parentheses are t-statistics

N.B: ($P<0.01=2.58$; $P<0.05=1.64$; $P<0.10= 1.28$)

c) The maximum likelihood estimates of the allocative efficiency model and inefficiency function of the sampled fisherfolks

The maximum likelihood estimates of the Cobb-Douglas production function for the allocative efficiency is presented in table 4. The results of table 4 show that many of the coefficients of the allocative function were found to be positive. The positive variables are costs of gear, fuel (petrol), kerosene, oil and bait while cost of food, battery and cost of miscellaneous were negative. Though, despite the positive coefficient of the variables, none was found to be allocatively significant.

The inefficiency function shows all the estimated variables to be negative. It should also be noted that a negative sign of the parameters in the inefficiency function means that the associated variables have positive effect on allocative efficiency, while a positive significant variables indicate the reverse. For instance, the negative estimates of the level of educational attainment showed that fisherfolks with greater years of schooling were less allocatively inefficient. This is inline with the findings of Abdulai and Huffman (2000). The estimated coefficient of age variable was also negative implying that younger operators in artisanal fishery enterprises tend to have higher level of efficiency (or less inefficient). The likely reason is that the people of such age are likely to be more agile and aggressive in pursue of higher level of efficiency (Ajibefun *et al.*, 2003). The finding is also in conformity with Battle *et al.*, (1996) who found that the coefficient of years of experience in fishing was also negative showing that, with increase in number of years in fishing, fisherfolks tend to be more efficient. Moreso, the coefficient of the number of trips being negative indicates that the more the number of times fishers go for fishing expedition, the more they will more allocatively efficient. This interpretation also holds for household size, distance covered during fishing, gender and mode of operations as factors affecting farmers' efficiency level.

The results of the diagnostic statistics show sigma squared to be 0.92. This implies that there is wide

variation in the level of allocative efficiencies. Thus, there are ample opportunities for these fisherfolks to raise their levels of efficiency. The results of the gamma (0.99) show the magnitude of the variance associate with the allocative frontier model. This indicates that the percentage variation in output of the fisherfolks is due to differences in allocative efficiency. The mean allocative efficiency of 0.908 suggests that about 10 percent is forgone due to inefficiency in the input-price mix of the fishfolks (table 4).

Table 4 : Estimated allocative efficiency and inefficiency function of the fisherfolks.

Variable	ML estimates
Allocative function	
Intercept	7.617 (7.623)*
Ln Gear	0.001 (0.00095)
Ln Vessel	0.001(0.0011)
Ln Engine	0.005(0.049)
Ln Crew	0.993 (1.2305)
Ln Fuel	0.003(0.025)
Ln Kero	0.001(0.0012)
Ln Oil	0.0043(0.10)
Ln Bait	0.002(0.0021)
Ln Food	-0.004(-0.0044)
Ln Battery	-0.861(-0.904)
Ln Miscellaneous	-0.003(-0.0029)
Inefficiency function	
Intercept	-0.038(-0.0379)
Ln Edu	-0.074(-0.7625)
Ln Age	-0.145(-0.1623)
Ln Exp	-0.115(-0.1242)
Ln Trip	-0.167(-0.1958)
Ln Hhsize	-0.062(-0.0630)
Ln Dst	-0.051(-0.0515)
Ln Gender	-0.026(-0.0260)
Ln Credit	-0.008(-0.0082)
Ln Mo	-0.015(-0.01523)
Diagnosis statistics	
Sigma square ($\sigma 2s = \sigma 2u + \sigma 2v$)	0.927(1.130)
Gamma $\gamma = \sigma 2u/\sigma 2s$	0.999(72.553)*
Log Likelihood Function	290.108
LR Test	1303.893
Number of Observations	400
Average AE	0.908

Source: Data analysis, 2010.

Values in parentheses are t-statistics

*significant at 5-percent probability level

N.B: (P<0.01=2.58; P<0.05=1.64; P<0.10= 1.28)

d) MLE estimates of the firm specific variables influencing economic efficiency indices

The results of table 5 show the economic efficiency indices of the sample fisherfolks on the firm specific variables. It should be noted that the economic efficiency was derived from the product of the technical and allocative efficiencies of the production variables and then regressed against the firm specific variables. Most of the firm specific variables considered in the model have negative coefficients implying that they contributed to the explanation of economic efficiency of the fisherfolks in the study area. The positive coefficient for experience and number of trips are somewhat unexpected, though the year of experience is significant. This result is in line with the finding of Squires *et al*. (2002) who found out that fishing experience of captains often provides better knowledge about the location of fish, weather pattern, currents and tides, bottom conditions and how best to catch fish contributed to the economic efficiency. However, negative sign of other variables indicate positive impact on economic efficiency (inefficiency) of the fishefolks in the study area. Similarly, the results showing the negative coefficient of the formal education also conforms to Squires *et al*. (2002) who opined that formal education of the captains (crew member) can improve the literacy and cognitive skills which may reduce economic inefficiency by increasing the ability of captain to adopt technical innovation. The results further revealed that age of the fisherfolks, experience household size , distance from the ports to the fishing ground and method of technology adopted were significant at both 5 percent and 10 percent level.

The sigma square is -0.317 and significant at 5 percent probability level. The Average economic efficiency estimate is 0.82 showing high level of economic efficiency in the study area.

Table 5 : MLE estimates of the firm specific variables influencing economic efficiency indices.

Variable	ML estimates
Inefficiency function model	
Intercept	-0.193(12.16)*
Ln Edu	-0.193(-0.460)
Ln Age	-0.159(1.758)*
Ln Exp	0.00829(2.53)*
Ln Trip	0.048(0.907)
Ln Hhsize	-0.132(-2.12)*
Ln Dst	-0.0777(-1.43)**
Ln Gender	-0.064(-0.46)
Ln Credit	-0.020(-0.714)
Ln Mo	-0.0248(-6.15)*
Diagnosis statistics	
Sigma square ($\sigma^2s = \sigma^2u + \sigma^2v$)	-0.317(8.46)*
Gamma $\gamma = \sigma^2u/\sigma^2s$	0.97(139.2)*
Log Likelihood Function	260.56
LR Test	120.39
Number of Observations	400
Average Economic Efficiency	0.82

Source: Data analysis, 2010.

Values in parentheses are t-statistics

*significant at 5-percent probability level

**significant at 10-percent probability level

N.B: (P<0.01=2.58; P<0.05=1.64; P<0.10= 1.28)

e) Frequency distribution of the efficiency indexes/estimates of the sampled fisherfolks in the study area

The frequency distribution of the estimated efficiency levels of the fisherfolks is presented in table 6. The economic efficiency was derived from the product

of technical and allocative efficiencies. The economic efficiency index ranges between 0.41 (minimum efficiency) and 0.94 (maximum efficiency). About 31 percent of the respondents have economic efficiency index ranging between 0.81 – 0.90, followed by economic efficiency index of 0.51 – 0.61 with 27.8 percent. About 22.0 percent have efficiency index ranges of between 0.10 – 0.50 and the least being efficiency index range of 0.91 – 0.99 with 2.0 percent of the respondents.

However, the predicted mean economic efficiency index is 0.70 with standard deviation of 0.146. This indicates that on the average, fisherfolk produced about 70 percent of the potential frontier output level, given the present state of technology and input prices. Thus, 30 percent of the economic efficiency potentials have not been realized. Therefore, the possibility of increasing fish output by an average of 30 percent can be achieved in the short run by adopting the practices of the best fishers.

Table 6 : Frequency distribution of efficiency indexes/estimates of the sampled fisherfolks in the study area.

Efficiency levels	No. of farmers	percentage	Mean	Min.	Max.	Standard deviation
Technical Efficiency						
0.40 – 0.50	6	1.5				
0.51 – 0.60	118	29.5				
0.61- 0.70	41	10.2				
0.71 – 0.80	27	6.8	0.77	0.45	0.99	0.166
0.81 - 0.90	95	23.2				
0.91 - 0.99	113	28.2				
Allocative efficiency						
0.81 - 0.90	189	47.2	0.91	0.85	0.99	0.031
0.91 – 0.99	211	52.8				
Economic efficiency						
0.40 – 0.50	50	12.5				
0.51 – 0.60	11.1	27.8				
0.61- 0.70	19	4.8	0.70	0.41	0.94	0.146
0.71 – 0.80	88	22.0				
0.81 - 0.90	124	31.0				
0.91 - 0.99	8	2.0				

Source: Data analysis, 2010.

f) Test of hypothesis of the parameters of stochastic production frontier and technical inefficiency sources (factors).

The hypothesis which specifies that there is no inefficiency effect among the artisanal fisherfolks across the fishing technology in the study area is presented in table 7. The result shows that the LR statistics (log ratio statistics) of one sided error of both MPT and MT are greater than the critical value of the Kodde and Palm (1986). Hence, the decision was to reject the null hypothesis (Ho) and accepted the alternative hypothesis (H1) that there is observed inefficiency among the fisherfolks among the fishing technologies.

The Cobb Douglas production function estimation also showed that variables considered in MPT and MT contributed to the fish catch level. This decision was however, based on χ2-Square critical value. It should be born in mind that the test statistics (LR) has an approximately mixed Chi-Square distribution with the degree of freedom equal to the number of parameters specified to be zero in the null hypothesis. Thus, when the estimated LR is lower than the corresponding tabulated Chi-Square, the null hypothesis is accepted, vice-versa (Ogundari and Ojo, (2009). However, the acceptance of the alternative hypothesis revealed the significance of those variables as determinants of the efficiency level in artisanal fishery level of efficiency in the study area.

Table 7 : Generalized likelihood ratio test of hypotheses of parameters of the catch frontier and technical inefficiency sources.

Null hypotheses	Fishing technology			
	MPT	MF	critical value	Decision
Production function is Cobb-Douglas (i.e Ho:βo = β1…β11 and δo=δ1…=δ8=0	36.85	27.02	18.3	Reject Ho
LR statistics (test of one sided error) (i.e Ho: No inefficiency effect)	199.12	532.74	16.27*	Reject Ho

Source: Data analysis, 2010.

Note: *This value is obtained from Table 1 of Kodde and palm (1986, p.1246).

g) Summary of findings

The results of the gross margin analysis of an average fisher revealed that an average fisher accrued N7,471, 857.15 per annum. The total variable cost was N 3,758,517 while the total fixed cost was N 24, 392.16 per annum. The cash flow accrued a net returns of N7, 447,464.99 per annum with an average of N620,622.08 per month. This results is however not surprising because the coastal inhabitants are in the remote area of the state which does not allow any enforcement of government regulation with respect to fishing activies. The results of the maximum likelihood estimates of the parameters in the Cobb-Douglas production function for the catch efficiency of the sampled fisherfolks revealed that number of fishing gears, outboard engine, litres of kerosene used, quantity of bait and battery were found to be significant variables in the fish output determining technical efficiency.

The inefficiency function revealed that age of the fisherfolks, household size, gender and mode of operations were found to be significant factors determining the level of technical efficiency of fishers with the mean TE of 0.77. The results of the maximum likelihood estimates of the Cobb-Douglas production function for the allocative efficiency of an average fisher revealed that only the wage paid to crew members was found to be significant at 5 percent level. This therefore answers the questions of factors influencing allocative efficiency of the artisanal fisherfolks in the study area. The inefficiency function of the model showed that all the variables were negative. The mean allocative efficiency was found to be 0.91. The results of the factors determining economic efficiency of the artisanal fisherfolks revealed that most of the variables considered in the model have negative coefficients and significant at both 5 percent and 10 percent levels. For instance, age, experience, household size, distance to the fishing ground and the mode of technology adopted were all found to be significant.Thus, implying that they positively influence the level of economic efficiency of the fisherfolks in the study area. The results of the frequency distribution of economic efficiency estimates of the sampled fisherfolks showed the mean economic efficiency to be 0.70.

The results of the hypothesis of the parameters of the stochastic production frontier and inefficiency function showed the null hypothesis (Ho) being rejected and alternative hypothesis accepted. The implication of this is that, there was an observed inefficiency among the fishers in the study area.

h) Conclusion

The cash flow accrued a net returns of N7, 447,464.99 per annum with an average of N620, 622.08 per month. Moreso, The results of the study concluded that age, experience, household size, distance to the fishing ground and the mode of technology adopted were all found to be significant variables influencing the level of economic efficiency of the fisherfolks in the study area. Similarly, the mean economic efficiency of the fisherfolks was 0.70 which indicates that fishers could still raise the efficiency level to the peak of frontier line by about 30 percent through optimum use of inputs.

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Examining the Cocoa Farmer- Purchasing Clerk Relationship in Ghana

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Abstract - Cocoa cultivation is a major activity in Ghanaian agriculture supporting the livelihood of over 400,000 farm-families and their dependents. Cocoa marketing centers are farmers' first point of call to obtain money for their dry cocoa beans. Using survey methods, the study set out to investigate the nature of the relationship between farmers and purchasing clerks in 20 cocoa communities in the western, Ashanti and Volta regions. Evidence of abuse of farmers via scale adjustment, under invoicing, cheating on bonus payment and the conditioning of farmers to mortgage their farms remain steadfast in their conviction that cocoa is critical to their livelihood and their positive attitudinal disposition towards the cocoa enterprise remains strong. This however cannot be taken for granted. Concerted and urgent action needs to be taken to protect farmers from those bent on milking them.

Keywords : *cocoa. ghana, purchasing clerks, livelihood, malpractices.*

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Examining the Cocoa Farmer- Purchasing Clerk Relationship in Ghana

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Abstract - Cocoa cultivation is a major activity in Ghanaian agriculture supporting the livelihood of over 400,000 farm-families and their dependents. Cocoa marketing centers are farmers' first point of call to obtain money for their dry cocoa beans. Using survey methods, the study set out to investigate the nature of the relationship between farmers and purchasing clerks in 20 cocoa communities in the western, Ashanti and Volta regions. Evidence of abuse of farmers via scale adjustment, under invoicing, cheating on bonus payment and the conditioning of farmers to mortgage their farms remain steadfast in their conviction that cocoa is critical to their livelihood and their positive attitudinal disposition towards the cocoa enterprise remains strong. This however cannot be taken for granted. Concerted and urgent action needs to be taken to protect farmers from those bent on milking them.

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I. Introduction

Cocoa cultivation is a major activity in Ghanaian agriculture supporting the livelihood of over 400,000 farm- families and their dependents and many millions along the cocoa value chain. Cocoa marketing centers are farmers' first point of call to obtain money for their dry cocoa bean. Purchasing clerks who are agents of licensed buying companies are supposed to facilitate the exchange of dry cocoa beans in the various communities ensuring they are of the best quality (Anthonio and Aikins, 2009). Looking at benefit that both farmers and purchasing clerks enjoy from each other, a mutual relationship was expected. However, farmers' have concerns including scale adjustment, under recording of bean weight, non-payment of bonus or under-invoicing in respect of bonus payment among others (GoG, 1956; Beckman, 1976; Baah *et al,* 2009; Arnold, 2006; Norde and Duursen, 2003; RSCE, 2009). Interventions to address some of the problems have included the introduction of the Akuafo Cheque and the liberalization of the internal marketing of cocoa. It has been suggested that these constraints may negatively impact on farmers output and towards cocoa cultivation. The objective of this study was to examine the nature of the relationship between purchasing clerks and farmers, identify the factors that influence the relationship and its consequences on farmer's morale and attitude towards the cocoa enterprise.

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II. Methodology

The study employed social survey research methodology characterized by surveys which are social systematic, structured and based around variables and the method of analysis relies on comparisons across groups (Marsh, 1982; Denscombe, 1998). Farmers in three cocoa regions were interviewed using questionnaires which were preceded by focus group discussion.

a) Study areas

The western, Eastern and Volta regions were purposively selected for the study because they represent varying degree of intensity of cocoa cultivation activities in Ghana. It was therefore expected that the dynamics of the relationship between farmers and purchasing clerks will vary. Two cocoa districts (Hohoe and Jasikan) in the volta region, two in the Western region (Juabeso and A sankragwa) and one in the Eastern region (East Akim) were randomly selected for the study.

b) Questionnaire survey

The outcome of the focus groups discussions informed the development of the questionnaire which was designed to obtain information on farmer socio-economic characteristic, goals, farm management practices, sources of information and relevance. The questionnaires were pre-tested on 25 purposively selected cocoa farmers at Trotro, near Akim Tafo in the East Akim district. The respondents for the survey were selected from a total of thirty-two cocoa communities using simple random method with the list of the operational communities of the Cocoa Swollen Shoot Virus Disease control unit (CSSVDCU) of the Ghana Cocoa Board in the district serving as the sampling frame made up of a list of farmers selling to all the LBCS present in the community. The sampling size (N=300) was determined using methods suggested by Casley and Kumar (1988). Twenty purchasing clerks were interviewed on issues raised by farmers enhancing triangulation.

c) Data analysis

Quantitative data were analyzed using the Statistical Product for Service Solution (SPSS Version 16) software including univariate and bivariate analyses.

III. Results and Discussion

a) Focus Group discussions

The following issues emerged from the group discussions with farmers;

i. *Inter-dependency between farmers and purchasing clerks*

Farmers acknowledged the role of purchasing clerks (PCs) in their lives. They mentioned the provision of technical information on cocoa, provision of loans to pay for school fees, farm maintenance and emergencies such as funerals. Purchasing clerks exert considerable influence over farmers. In many of the communities, they own the taxi and *trotros* which are the main means of transport. Farmers intimidated that prior to the internal liberalization of cocoa marketing, purchasing clerks often treated them shabbily but competition from multiple buyers have earned them respect from PCs. Without farmers there will be no PCs. Farmers believe that PCs were better off in the relationship. They cannot *consume* their cocoa but give it to the PCs.

ii. *Corruption*

The issue of pervasive corruption in the internal marketing of cocoa re-echoed throughout the interactions with farmers. Farmers believe that they are being cheated continually by PCs via scale adjustment and bonus under-payment. Experience help farmer to determine roughly the weight of bag of cocoa before being sent to the PC .It was always disappointing for them when they arrive at the cocoa shed only to realize that the scale has been adjusted downwards sometimes by as much as 15kg. The contended that most PCs hire laborers to re-dry their cocoa beans or hire security guards whom they pay personally. Farmers believe that PCs get to pay these workers from them via scale adjustment. With respect to underpayment of annual bonuses, farmers were relatively unconcerned because they explained that the bonus is unexpected money each year so they have to be contended with whatever they get. It appears to the case of illiterate farmers being taken advantage of by PCs. It is relatively more difficult issue to ascertain because farmers do not know how the bonus is computed in the first place. Farmers said that they expect these abuses to continue and had little faith in governmental action remedying the situation.

iii. *Attitudinal changes*

Have all these abuses and other malpractices dented farmers' faith and confidence in the cocoa system? Amazingly, farmers responded in the negative. They contend that they are literarily 'stuck' in cocoa cultivation and hence they just have to stomach whatever constraints there was in the system .Nevertheless, they stated that these negative perceptions in the cocoa sector were likely to put off young people from entering the cocoa sector .Whilst older farmers may not have any alternative livelihood options, the same cannot be said about the youth. They are adventurous and often leave rural environment for the cities and elsewhere.

iv. *Inefficiencies in the internal marketing of cocoa*

Farmers contended that the internal marketing of cocoa has always been froth with irregularities since cocoa came into Ghana, indicating that whilst governmental interest may be necessary to safeguard their interest, the absence of a strong, truly representative farmers' organization means that farmers have little leverage in these matters. They contended that having many buying companies have not eliminated corrupt practices and that the malpractices are institutionalized but only the PCs are singled out for criticism. They mentioned that these malpractices have been known for years but very little has been done to address them.

b) Interactions with purchasing clerks

The purchasing clerks interacted with admitted nearly all the complaints of the farmers. They do adjust scales, however, they claim that they have been forced to indulge in these practices by the system. They explained that a lot of operational cost including labour for further drying of the cocoa beans at the sheds, labour for loading of the beans into the trucks and payment for security at the shed are pushed to PCs though no funds are allocated to cover these cost. How do the PCs cover these costs? Do they pay from their meager commissions? No! They pay for them via the extra cocoa beans by adjusting the scales. They have no choice!

They were quick to mention the many vital services they offer farmers including soft loans, information provision, technical assistance and putting their private vehicles to the disposal of the entire farming community among others. When queried on how they came by the wealth which enables them to provide these services, they were not forthcoming with responses. They were also not forthcoming on the allegation that their bosses (District officer) demanded of them many bags of cocoa each season which they make good by cheating farmers.

c) Questionnaire survey

i. *General Farmer features*

Ghanaian cocoa farmers like farmers elsewhere are not a homogenous group; they differ on many counts such as sex, martial status, class and category of farmer, farm size and yield among others. Table 1 provides insight into the key features of the sampled farmers. The sample was largely male farmers. This perhaps reflects the reality that cocoa farming in Ghana is a male dominated activity. The increasing role of women in cocoa cultivation is however acknowledged

(Baah and Asamoah, 2003).With respect to age, more than the sample (52.2%) was less than 50 age category. This is refreshing given that most studies (for example MASDAR, 1998; MMYE, 2008; Baah et al, 2010) expressed concerns about the old age of cocoa farmers. Farmer educational level has often been associated with adoption of research recommendations (Matthews-Njoku, 2003; Matthew-Njoku and Asiabaka, 2003). Therefore there is more contact between the two. The sample was relatively educated with over 74 percent being educated to at least the primary level (Table1)

Table1 : General framers features (N=300).

Feature	Categories	Percent of farmers reporting
Sex	Male	88.0
	Female	12.0
Age in years	20-29	5.0
	30-39	18.0
	40-49	24.0
	50-59	25.0
	60 and above	28.0
Educational level	No formal education	25.3
	Primary	12.0
	Junior High school/Middle school	51.7
	Secondary school	6.0
	Vocational /Technical school	3.0
	Tertiary level education	6.7
Marital status	Married	89.7
	Single	2.0
	Divorced	4.3
	Widowed	3.7
	Separated	0.3
Farmer categories	Owner-operator	83.0
	Abunu tenant	9.0
	Abusa tenant	7.0
	Annual labourer	1.0

Source: Survey data

Cocoa farmers traditionally have many children to provide the much labour and marriage a natural step towards this. Consistent with this expectation, nearly 90 percent of the sample was married. Cocoa farmers traditionally have many children to provide the much needed labour for farm operations. The mean number of children was 5.85 (the median was 5.5; the mode was 5 and the range, 30). Cocoa farming is labour intensive and the low incomes of most farmers mean that they cannot afford to hire labour hence the reliance on the family labour (Baah, 2006; Boahene, 1995; Asante,1998; Abenyaga and Gockowski, 2001). The farmers were categorized on the basis of their relationship with the land on which they operate and most (83.3%) were owner- operators.

Farmers' organizations offer great potential as channels for information delivery and exchange and as platform for demanding policies and service that will enhance the attainment of their objectives (Baah, 2008). There are many farmers' associations in the cocoa sector in Ghana furthering the interest of members and guided by the main objective of assisting members to acquire farm inputs to improve the productivity of their farm holdings. In this study however, very few farmers (12.5%) belong to any association. Farmers attribute this to previous negative experiences with farmer associations engulfed in corruption and other administrative malfeasances.

a. *Farm Characteristics*

Cocoa farms in Ghana are generally small in the range of 2-3 ha per farm household (MASDAR, 1988; MMYE, 2008; Baah et al, 2010). For the sample in this study, the mean farm size was slightly higher at 3.5 acres skewed by the size of farms in the Western region (Table 2).

Table 2 : Size of cocoa farms (in acres).

	Region			
Statistic	Eastern	Western	Volta	Overall
N	69	200	30	299
Mean	4.98	10.6	4.78	8.73
Median	4	8	3	6

Mode	4	10	3	4
Standard Deviation	3.61	8.93	6.21	8.19
Range	17.5	49	34	49.5
Minimum	0.5	1	1.0	0.5
Maximum	18.0	50	35	50
Standard Error	0.43	0.63	1.13	0.47

Region

Statistic	Eastern	Western	Volta	Overall
N	69	200	30	299
Mean	4.98	10.6	4.78	8.73
Median	4	8	3	6
Mode	4	10	3	4
Standard Deviation	3.61	8.93	6.21	8.19
Range	17.5	49	34	49.5
Minimum	0.5	1	1.0	0.5
Maximum	18.0	50	35	50
Standard Error	0.43	0.63	1.13	0.47

Source: Survey data

One –way analysis of variance (ANOVA) did not reveal significant differences in cocoa farm sizes of farmers across region (F=0.640), across districts (F= 0.2289), between male and female farmers (F=0.877), or farmer age categories (F=0.702). Farmers managed on the average 2.59 cocoa farms (mode = 2.0; median =2.0; standard deviation = 1.545; variance=2.397; range =10). The minimum was 1.0 and the maximum was 11.0.The difference in the number of farms managed by farmers were not significant across the cocoa district (F=0.228) or region (F=0.640). With respect to yield of dry cocoa beans, the mean across region was a paltry 187.64 kg/ha. The modal value of 694.1kg/ha is well above the often-quoted national average of 400kg/ha (MMYE, 2008; Baah et al, 2010). The median value was 282.3 kg/ha.

b. *Key problems of farmers*

Farmers indicated that their main problems were inadequate access to institutional capital (14.5%) and high cost of inputs (27.4%). These problems are mentioned in virtually all socio- economic studies in the cocoa sector in Ghana (for instance, MASDAR, 1998; MMYE, 2008; Baah et al, 2010). Perhaps the high risk associated with cocoa farming tends not to excite banks in providing credit to farmers. Whilst the advent of rural banks appears to be addressing the problem, it remains farmers' key constraint to the proper maintenance and investment on their farms. These problems are perhaps so pervasive across the regions such that the study did not find any significant differences between farmers in the three regions with respect of these problems.

c. *Farmers' marketing problems*

Farmers' response to question of constraints in the marketing of cocoa makes interesting reading. Scale adjustment by purchasing clerks (PCs) is the main constraint of farmers (Table 3). It was said that the scale is adjusted by as much as 12kg! Most farmers feel that they have been cheated by a PC in one way or another. These abuses are not recent development. Much has been documented by Beckman (1976). Table 4 indicates that farmers have lived with these marketing abuses in the cocoa sector for some time.

Table 3 : Main marketing constraints of cocoa farmers.

CONSTRAINT	FREQUENCY	PERCENT
Scale adjustment	206	68.7
Under payment for cocoa beans	13	4.3
Delay by PC in paying farmers	20	6.7
Cheating on bonus payment	31	10.3

Source: Survey data, 2010

Table 4 : Timelines of abuses of farmers by PCs.

Year Of First Abuse by PC	Frequency	Percentage
Earlier than 1990	29	9.9
1990-2000	85	29.0
After 2000	125	42.7
Not applicable	54	18.4
YEAR OF MOST RECENT ABUSE BY PC		
YEAR	FREQUENCY	PERCENTAGE
2003-2005	12	4.1
2006-2008	204	69.6
2009 and beyond	23	7.8

Source: Survey data

d. *Features of cocoa marketing*

Farmers sell their cocoa beans to a number of Licensed Buying Companies (LBC) in the cocoa communities. The companies that the sampled farmers sell their cocoa tool are showed in Table 5 and indicate that the Produce Buying Company Limited is still the dominant cocoa buyer with over half the respondents selling to them. The reasons why farmers sell to a particular LBC are indicated in Table 6.

Table 5 : Licensed Buying Companies to whom farmers sell their cocoa.

LBC	Number of farmers	Percent
PBC LTD	160	53.3
KUAPA KOOKOO	25	8.3
ARMAJARO	38	12.7
AKUAFO ADAMFO	23	7.7
COCOA MERCHANTS	4	1.3
FEDCO LTD	13	4.3
OLAM LTD	1	.3
ADWUMAPA	17	5.7
TRANSROYAL	5	1.7
SIKA ABA	1	.3
OTHER(S)	13	4.3
Total	300	100.0

Table 6 : Why farmers sell to particular LBC.

Reason	Number of farmers	Percent
It is the only LBC	39	13.0
They pay promptly	190	63.5
The PC does not cheat	19	6.4
I trust them	52	17.3
Total	299	100.0

With regards to payment for farmers' cocoa at the various cocoa sheds operated by the LBCS, cash payment is the order of the day (over 84% of farmers) despite the existence of the Akuafo cheque system. Farmers said that they prefer cash payment because of the many difficulties they go through in the process of clearing their cheques at the banks. The liberalization of the internal marketing of cocoa was meant among others to remove inefficiencies in the market including malpractices or abuses meted out to farmers. Nearly

half of the sample of farmers thought that the process has either increase these abuses or it has not brought any changes at all.

The relationship between PCs and farmers is centered on the marketing of cocoa, a process which involves the farmers bringing his or her cocoa to a PC in exchange for money. However, the relationship is not that simple as the description appears to suggest. It is complex relationship impinged upon by many factors and considerations. For instance the PC in many cocoa communities is a financial pillar to the community providing *soft* and '*hard*' loans for farmers to meet critical pressing needs such as payment of ward school fees, funerals and hospitalization. However, many farmers resent PCs for their perceived *milking* of them through various schemes including *conditioning* them to mortgage their farms for loans, refusal to pay for cocoa delivered to them, cheating on bonus payment or provision of hard loans (with very high interest rate).

Cheating on bonus payment is perceived by more that half of the sample (59.3%) to be widespread. This is not helped by the fact that most farmers leave their cocoa passbooks in the custody of PCs and have on idea of the *total quantity of beans* they sold to the PC in the year. The bonus is usually is a percentage on the total volume of cocoa sold in a year. The absence of institutional credit for farmers leaves room for Sherlock lenders to exploit farmers' vulnerability with respect to the need for capital to meet household needs and farm maintenance. The situation *conditions* farmers to accept loans with very debilitating terms including mortgaging their cocoa farms. There is the general perception amongst farmers that the abuses by PCs are due in part to pressure from their superiors (the District Officers were often cited by farmers). Farmers mentioned that District Officers of LBCs demand bags of cocoa from PCs who in turn steal from them. More that half of the sample believed that the practice was widespread. Some PCs suggested that this was indeed the case.

e. *Farmers' perceptions of Government response to constraints*

Farmers said that they have lived with these marketing abuses since they entered into cocoa cultivation. Only 32.7 percent of respondents indicated that they believe that the government was addressing these challenges that farmers face. Perhaps farmers' continued narration among themselves and to the media of these abuses and the very ubiquitous nature of them dwarfs any governmental action or policies to addresses them in the sight and perception of farmers.

f. *On farmers' attitudes*

Besides monetary returns, what motivates farmers to commit resources to cocoa production? Studies have shown that farmers' objectives include the meeting of the subsistence needs of their families, the search for capital to invest elsewhere, provision of inheritable property to next of kin and the use of cocoa as security for old age (MASDAR, 1998; Osei-Bonsu, Baah and Afrifa, 2001). If farmers hope to achieve these objectives, it is expected that they would hold favorable attitudes towards cocoa cultivation to be sufficiently motivated to work towards their goals. Investigation into the role of attitudes in the decision-making processes of farmers in relation to cocoa in this study was prompted by the general perception that farmers' attitudes stand in the way of efforts to achieve higher cocoa productivity. Many workers in the cocoa sector posit that cocoa cultivation in Ghana will move forward if farmers were encouraged to change their attitude towards cocoa as a business enterprise. Indeed, attitudinal disposition of farmers was listed as a constraint in a major review of the downward trend in Ghana's cocoa output in the 1990s and in recent times (COCOBOD,1995; Baah and Garforth, 2008). Attitudes cannot be measured directly but could be inferred from responses to attitudinal statements (Baah and Garforth, 2008). Farmers responses to a number of attitudinal statements in relation to the constraint enumerated earlier and low it affects their relationship to cocoa are presented in Table 7.

Table 7 : Farmers' responses to attitudinal statements.

ATTITUDINA STATEMENT	DISAGREE		DO NOT KNOW		AGREE	
	F	%	F	%	F	%
Many cocoa farmers are frustrated their being continually cheated by PCs	108	36.0	15	5.0	177	59.0
Cocoa farmers are not receiving What is due them for their cocoa Beans because of cheating by PCs and this may discourage Many from working hard	63	21.0	20	6.7	217	72.3

The loss of income due to Cheating does not encourage The youth to go into cocoa Farming	178	59.3	17	5.7	105	35.0
Because of abuses in the cocoa Marketing system, I will not Encourage my children to be Cocoa farmers	216	72.0	14	4.7	70	23.3
Being a cocoa farmer is 'hell' because you will never receive your due because of marketing malpractices	152	50.7	18	6.0	130	43.3
Many farmers are leaving Their cocoa farms to seek Their fortunes elsewhere Because of these abuses	220	73.3	8	.7	72	24.0

Farmers' reactions to the attitudinal statements were mixed (Table 7). It was refreshing that farmers were not deterred by the abuses in the marketing system with respect to encouraging their wards to take to cocoa farming. Most of them (72.0%) disagreed with statement 4 in Table 7. Nevertheless, most farmers expressed concerns about the abuses meted out to them by the PCs to the extent of them impinging negatively in their attitudinal disposition towards cocoa. Has farmers' attitude towards the cocoa enterprise changed negatively because of their experiences with purchasing clerks? Most farmers (84.3%) responded in the negative. Using the Mann-Whitney test, no significant differences were found with respect to this attitudinal disposition between male and female farmers ($U=0.4545.5$, $N1=264$, $N2=35$, $P=0.806$, two- tailed) nor with respect to membership of farmer organization ($U=3874.0$, $N1=31$, $N2=268$, $P=0.330$, 2-tailed). Farmers overall attitude towards the cocoa enterprise because of their relationship with the PCs was not influence by sex ($\chi^2=0.386$, $df=3$, $P=0.515$), age category of farmers ($\chi^2=0.984$, $DF=18$, $P=0.984$), level of education ($\chi^2=0.984$, $DF=6$, $P=0.070$), region of residence ($\chi^2=0.239$, $df=2$, $P=0.629$) or district of residence ($\chi^2=06.279$, $DF=3$, $P=0.099$).

IV. Conclusions and Recommendations

Cocoa farmers are striving to sustain an over a century old enterprise in Ghana. They face a myriad of problems including poor access to institutional credit. Farmers expect to be rewarded for their hard work by way of full payment from their cocoa. However, this study had revealed that they face many challenges trying to sell their cocoa. Purchasing clerks are increasingly becoming farmers' bane. The blatant cheating of farmers of their hard won incomes should be stopped. Fortunately, farmers remain steadfast in their conviction that cocoa is critical to their livelihood and their positive attitudinal disposition towards the cocoa enterprise remains strong. This cannot be taken for granted. Concerted and urgent action needs to be taken to protect farmers from this bent on *milking* them. Purchasing clerks benefit more than farmers in the marketing relationship between them.

The study recommends that the monitoring of the activities of the Licensed Buying Companies by COCOBOD security service should be stepped up to ensure that those who engage in nefarious activities highlighted in this study are reprimanded. Scale adjustment appears to be the main malpractice perpetuated by purchasing clerk which is of much concern to farmers. In the not too distant past, there were weighing stones of various weights at the cocoa sheds. Farmers used them to check if the scales had been tampered with. They have just been re-introduced and it is hoped that they will address the problem. Output of cocoa by famers in this sample was very low; therefore, intensification models of cocoa cultivation should be brought to the attention of farmers with all the assistance they may need to put them into practice.

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Tables: Tables should be few in number, cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g. Table 4, a self-explanatory caption and be on a separate sheet. Vertical lines should not be used.

Figures: Figures are supposed to be submitted as separate files. Always take in a citation in the text for each figure using Arabic numbers, e.g. Fig. 4. Artwork must be submitted online in electronic form by e-mailing them.

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Even though low quality images are sufficient for review purposes, print publication requires high quality images to prevent the final product being blurred or fuzzy. Submit (or e-mail) EPS (line art) or TIFF (halftone/photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Do not use pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings) in relation to the imitation size. Please give the data for figures in black and white or submit a Color Work Agreement Form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution (at final image size) ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs) : >350 dpi; figures containing both halftone and line images: >650 dpi.

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27. Refresh your mind after intervals: Try to give rest to your mind by listening to soft music or by sleeping in intervals. This will also improve your memory.

28. Make colleagues: Always try to make colleagues. No matter how sharper or intelligent you are, if you make colleagues you can have several ideas, which will be helpful for your research.

29. **Think technically:** Always think technically. If anything happens, then search its reasons, its benefits, and demerits.

30. Think and then print: When you will go to print your paper, notice that tables are not be split, headings are not detached from their descriptions, and page sequence is maintained.

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33. Report concluded results: Use concluded results. From raw data, filter the results and then conclude your studies based on measurements and observations taken. Significant figures and appropriate number of decimal places should be used. Parenthetical remarks are prohibitive. Proofread carefully at final stage. In the end give outline to your arguments. Spot out perspectives of further study of this subject. Justify your conclusion by at the bottom of them with sufficient justifications and examples.

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Informal Guidelines of Research Paper Writing

Key points to remember:

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- Write your paper in the form, which is presented in the guidelines using the template.
- Please note the criterion for grading the final paper by peer-reviewers.

Final Points:

A purpose of organizing a research paper is to let people to interpret your effort selectively. The journal requires the following sections, submitted in the order listed, each section to start on a new page.

The introduction will be compiled from reference matter and will reflect the design processes or outline of basis that direct you to make study. As you will carry out the process of study, the method and process section will be constructed as like that. The result segment will show related statistics in nearly sequential order and will direct the reviewers next to the similar intellectual paths throughout the data that you took to carry out your study. The discussion section will provide understanding of the data and projections as to the implication of the results. The use of good quality references all through the paper will give the effort trustworthiness by representing an alertness of prior workings.

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Mistakes to evade

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In every sections of your document

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· Keep on paying attention on the research topic of the paper

· Use paragraphs to split each significant point (excluding for the abstract)

· Align the primary line of each section

· Present your points in sound order

· Use present tense to report well accepted

· Use past tense to describe specific results

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An abstract is a brief distinct paragraph summary of finished work or work in development. In a minute or less a reviewer can be taught the foundation behind the study, common approach to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Yet, use comprehensive sentences and do not let go readability for briefness. You can maintain it succinct by phrasing sentences so that they provide more than lone rationale. The author can at this moment go straight to

shortening the outcome. Sum up the study, with the subsequent elements in any summary. Try to maintain the initial two items to no more than one ruling each.

- Reason of the study - theory, overall issue, purpose
- Fundamental goal
- To the point depiction of the research
- Consequences, including definite statistics - if the consequences are quantitative in nature, account quantitative data; results of any numerical analysis should be reported
- Significant conclusions or questions that track from the research(es)

Approach:

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- A conceptual should situate on its own, and not submit to any other part of the paper such as a form or table
- Center on shortening results - bound background information to a verdict or two, if completely necessary
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- Shield the model - why did you employ this particular system or method? What is its compensation? You strength remark on its appropriateness from a abstract point of vision as well as point out sensible reasons for using it.
- Present a justification. Status your particular theory (es) or aim(s), and describe the logic that led you to choose them.
- Very for a short time explain the tentative propose and how it skilled the declared objectives.

Approach:

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- If use of a definite type of tools.
- Materials may be reported in a part section or else they may be recognized along with your measures.

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- Simplify - details how procedures were completed not how they were exclusively performed on a particular day.
- If well known procedures were used, account the procedure by name, possibly with reference, and that's all.

Approach:

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What to keep away from

- Resources and methods are not a set of information.
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- Leave out information that is immaterial to a third party.

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The principle of a results segment is to present and demonstrate your conclusion. Create this part a entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Carry on to be to the point, by means of statistics and tables, if suitable, to present consequences most efficiently.You must obviously differentiate material that would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matter should not be submitted at all except requested by the instructor.

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- Sum up your conclusion in text and demonstrate them, if suitable, with figures and tables.
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- Present a background, such as by describing the question that was addressed by creation an exacting study.
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Approach

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- Give details all of your remarks as much as possible, focus on mechanisms.
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- Try to present substitute explanations if sensible alternatives be present.
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Topics	Grades		
	A-B	**C-D**	**E-F**
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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