PrOpCom

Making Nigerian Agricultural Markets Work for the Poor

Monograph Series # 34

Ofada Rice Production, Processing and Marketing Cost Survey

By

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December 2007

DFID Department for International Development

Funding for this programme is provided by the United Kingdom's Department for International Development (DFID)

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Forward

This report which relates to the production and processing cost survey cutting across Ogun, Ekiti and Osun states addresses systemic issues within the Ofada Rice Value Chain, one of five commodities that PrOpCom is working on as a means of demonstrating the effectiveness of the concept of Making Markets Work for the Poor (M4P) in poverty reduction. We would at this point, like to take this opportunity to thank our local associates, Bola Adedoyin, Bayo Shittu, Bimpe Ogunleye, Sola Adegbesan, the staff and management of RBS Consulting for their inputs in the execution of this assignment and in making this report possible

Under a contract with DFID-Nigeria, Chemonics International along with other members of its consortium is working with UK-DFID/Nigeria and the Government of the Federal Republic of Nigeria (GON) to stimulate economic growth through the restructuring of its agricultural commodity market for increased effectiveness and efficiency for pro-poor outcomes. The choice of addressing poverty through agricultural commodity markets was informed by the sector's contribution to the nation's gross domestic product (GDP) and its position as the largest employer of labor. A key component of this effort centered on the selection of agricultural commodities that are widely patronized by the poor and which when restructured through specific systemic interventions, have the greatest potential for drastic poverty reduction taking into consideration, the United Nations Millennium Development Goals.

As one of the Program's deliverables this study examined the cost component of the Ofada Rice Value Chain, isolated key issues and suggested the ways forward for pro poor market outcomes. In so doing the report focused primarily on actions that the program (PrOpCom) could to undertake so as to provide the rural poor with access to markets and thereby generate rural employment options for sustainable livelihood. The report also provides an overview of identified key drivers of change, change agents and their motivations for getting involved in the PrOpCom intervention processes and Program. In addition to the above, the report isolated a number of systemic issues within the value chain of interest starting from the point of production to that of consumption, and made a number of M4P concept-influenced suggestions. We are convinced that through a diligent and articulate execution of the proposed suggested interventions which cuts across commodity lines and are cross cutting in nature, the effectiveness and efficiency of the M4P concept would be demonstrated and ultimately become the acceptable e poverty reduction approach in Nigeria and else where.

Table of Contents

List of Tables

Summary

This study which commissioned by DFID_PrOpCom was designed to study in depth the production and processing cost profile of rice in Ekiti, Ogun and Osun states which are known for rice production in Southwestern Nigeria. In so doing a total of 92 successful interviews were held with stakeholders across the commodity value chain and this took place in Igbemo LGA (Ekiti State), Obafemi Owode LGA (Ogun State) and Oriade LGA (Osun State). Before the commencement of the assignment, a stakeholders' analysis workshop was organized and which was attended by fourteen participants spanning the rice value chain. This process provided us the opportunity of understanding the operations and relationship driving the value chain. Following this seven survey instruments were designed to capture information from the seven stakeholder groups within the chain. The instrument after modifications and corrections was approved by the client for field execution. Shortly before this a number of experienced field interviewers with extensive exposures in industrial research and in rice production as well as process were recruited, briefed, trained and allowed to dry run the survey instruments among themselves and again with 30% of the respondents to field test the survey instruments. Based on their experience, slight modifications were effected on the instruments and there after administered. Following field work, the instrument having been subjected to field level editing, were further edited in the office from which coding frames were developed. Following these, the questionnaires were coded and the data thereon entered into the computer using a pre programmed SPSS and MS Excel software. Before the commencement of analysis, the entries were subject to editing and thereafter analyzed and reported both in graphical and contextual format. In getting to this stage a number of challenges were confronted on the field, the biggest of them been the absence of uniformity in measuring standards within and across the entire sample area thus resulting in multiply back-checking, conversion and recalculation of obtained data, so as to have uniform standards of measurement for comparism. The outcomes of these processes certainly surfaced a number of issues which any Government interested in the welfare of its citizens and the long term sustainability of its economy cannot ignore.

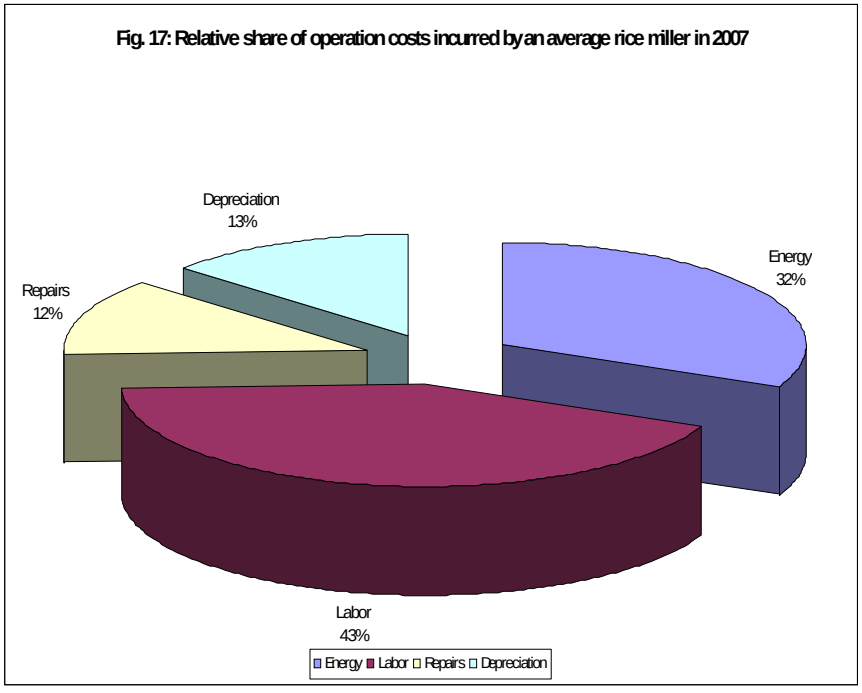
It was observed that the supply end of the rice value chain is dominated by the aged and uneducated with small and fragmented farms measuring less than 2 hectares. These farmers generally depended on manual labor and hardly use labor saving inputs even with the dwindling supply of farm labor and the attendant increases in cost of labor. This practice which was confirmed to be a reverse to old farming practices was informed by the lack of confidence in the quality and efficacy of the agrochemicals in the local farm inputs market. Besides it was observed that a significant chunk of the farmers in sampled area (over 72%) have no access to land but rent small parcels of land yearly in support of their operations. This accounts for the fragmentation of farmland holdings which cannot be developed because of the short rental period, thus manual crop cultivation and limited demand for agro chemicals and other related services. Interestingly and from the outcome of the waterfall analysis of the value chain, it was observed that 40% of the cost of paddy rice production is attributable to labor costs, a significant portion of which (over 55%) is being expended on bird scaring, a negative cost item that yields no return but secured investment. Bird infestation seems a prominent problem among farmers across the sampled area mainly because of their small and fragmented holdings which with more than adequate trees in between that serves are nesting and resting points for birds while in flight. It is quite interesting to note that bird scaring was

never considered an issue in Thailand for this reason, yet the labor component of the production cost profile was higher (60%).

The value addition end of the chain to a large extent seems dominated by farm family households (particularly in Ogun state which is close in proximity to the huge undersupplied markets in Lagos) from farm-gate to point of consumption. This scenario is slightly different in Osun State where the value chain seems to function reasonably well and relatively competitively. The supply end of the chain is largely gender sensitive: farming is for the males within the household while value addition (artisanal processing, finished rice wholesaling and retailing) is for the females. However, the milling component, retailing, and input supply are dominated by the young and able with at least high school education.

The production cost of Ofada paddy rice on a typical rice farm in 2007 ranged from N84,914.46 in Ekiti state to N106,878.28 in Osun state. Figures 14a-d summarize the distribution of the per hectare Ofada paddy rice production costs across various variable factors. Talking specifically about returns to Ofada Paddy Rice Production and with specific reference to sampled rice farmers from Ekiti state, available evidence (Table 15) suggests that if all factors (including family and hired labor) were valued at the prevailing market prices, a typical Ofada paddy rice farmer in the state operated at a loss between 2005 and 2007. This probably explain a situation where most Ofada rice producing farmers in the state reported they had to undertake the processing of rice paddy into finished rice directly or by other household members. Ofada rice farming systems and operation costs in Ogun state is not substantially different from what obtains in Ekiti state. The rate of return (net income as a percentage of total cost) recorded on paddy rice production between 2004 and 2007 by an average Ofada rice farmers in the state was estimated at between 11.4 per cent in 2004 and 25.1 per cent in 2006 (Table 16) due largely to the market opportunities prevailing in Lagos. On the other hand the improved production practices and bigger farmland size in Osun state probably explained the relatively higher yield of paddy rice recorded by an average Ofada rice farmer in Osun state (2.25 tons/ha in 2007 as against 1.58 ton/ha in Ekiti and 1.80 tons/ha in Ogun) and lower labor cost share as earlier presented (Table 17) summarized the implications of this mode of operation on profitability of Ofada paddy rice production in Osun state.

It is quite interesting to note that Ofada paddy rice of Osun state origin, commanded much higher prices than what obtains in other study locations. While most farmers in Ogun and Ekiti had to, for one reason or another, undertake direct processing of their paddy rice, most farmers in Osun state (about 91%) reported that they normally sell their paddy rice to paddy



merchants, which was noticeable only in Osun state. On the average Ofada paddy rice farmer earns around 20 per cent return on his/her investment (ranging from 18.3% in 2007 to 26.8% in 2006) Table 17 provides further details on this.

Talking about rice milling services and as shown on Table 26, an average rice miller in the study area charged an average of N6, 089.77 per ton for rice milling services in 2007 (up from N4, 919.41 in 2004), and milled an average of 56 tons of paddy rice in that year (up from 27 tons in 2004). Comparing activities of rice millers across study locations, we observed that service volume is higher among sampled rice millers in Osun state (about 52 tons/year in 2007) and lower in Ekiti state (about 25 tons/year in 2007) than what obtains in Ogun state (about 44 tons/year in 2007). It was observed that the cost of milling is high and this was attributed to the miller's high recurrent expenditure on labor and power generation/supply which accounted for well over 70% of his operating cost. This figure is rather high, stifling, and contributes to the inability of Ofada rice to compete in the local market.

Having taken a close look at the sample location rice value chain, the outcome of which necessitated the examination of the Thailand rice industry, the source of most of the rice imported by Nigeria. In so doing emphasis was place on upland rice which is what is largely produce in our sample location. Though the production practices, yield and cost profile are quite similar, Thailand's rice bulking industry seems better organized as it is driven by the export market. Government involvement in the trade as a means of stemming rural unemployment is rather significant and rightly so, rice been a major export commodity and main source of employment in that country. While the commending the rice bulking industry in Thailand, there is a number of issues associated with it involving fair trade practices. Farmers generally have limited inputs in how their products are priced as they are generally fixed by the millers and exporters. This is quite unlike Nigeria where farmers are in a position to negotiate prices of paddy and finished rice. These not withstanding, there are certainly a lot of lessons learning opportunities for the Nigerian Government from the Thailand industry particularly, on issues relating to land resources allocation and management. It would also be interesting for Nigeria to understand how Thailand has been able to subsidize its rice industry through inputs while using the industry to stimulate rural unemployment, mitigate poverty among its citizens, and still maintain and or increase its market share of the global rice trade.

Finally the most critical issue surfaced by this study tends to pint in the direction of land use and allocation. The current approach, whereby government retail land to farmers seems questionable and unsustainable. It is quite interesting to note that a chunk of the available arable land have been allocated to government institutions with many of them exploiting less than 5% of their holdings. It was therefore suggested that PrOpCom engages governments in the sampled states on policy issues relating to land use and allocation with hope of leasing land to farm estate developers who would sub-let part of their developed farmland holding to farmers interested in them. Government stands to gain a lot from so doing as it would generate revenue from rents paid on land, on the commodities produced and traded thereof as well as from the wealth created through farming and related activities. Just as government institutions are holding on to massive land areas which they are unable to exploit, so are several rural communities guilty of same. An innovative

approach whereby communities and government co-manage and allocate land to farm estate developers and share the revenue generated therefrom with such land reverting back to the community after the lease period, could go along way in addressing the issues associated with the demand and payment of compensation on acquired land which often government is unable to meet. It is believed that by so doing the service markets for agriculture would emerge, become vibrant and responsive to market demand while creating other up and down stream commercial opportunities in the sector. For this to happen PrOpCom could look at the possibility of engaging government through its Facilitation Fund in stimulating awareness, policy reform as well as in proper legislations that protects investment on allocation land and its management. Until this issue is addressed along with others suggested in Section 7 of this report, it could be difficult moving forward.

1. Background

The Department for International Development of the United Kingdom (DFID) funded Promoting Pro-Poor Opportunities in Commodity and Service Markets (PrOpCom) principal goal is to improve Nigerians livelihood through the facilitation of the economic growth of the local agro industrial commodities and service market. The agro commodity sector is recognized as the largest source of livelihood for well over 65% of the nation's economically active population.

Though other livelihood development programs have focused mainly on providing human and material support in getting beneficiaries engaged in one trade or the other, the "Making Markets Work for the Poor" (M4P) approach is radically and substantially different in its poverty reduction intervention approach. The M4P conceptual approach to economic growth focuses predominantly on the identification and isolation of the various organic or systemic bottlenecks within a market system and seeks to address them. The philosophy informing this is premised on the belief that once these issues were isolated and addressed, the market was likely to function more efficiently, effectively and in a sustainable manner.

As expected the UK-DFID PrOpCom program going by its mandate is deploying the M4P socio-economic development paradigm in the executions of its program. In so doing, it is currently working to facilitate change in the Ofada Rice Commodity and Value Chain with the hope of demonstrating the effectiveness of the M4P development paradigm in poverty reduction. The choice of Ofada rice in so doing is informed by its unique position in Nigerian rice market and society. Increasingly for the elite in the country, Ofada rice plays an important role in celebrations and to some extent, it represents a sense of "being Nigerian." However the development and deepening of the chain are challenged by a number issue. Recent studies have shown that there are a number of significant cost disadvantages in the local production and processing of this primary produce. This is particularly true of the cost of labor associated with the production and processing of rice in Nigeria, which tends to make the produce uncompetitive in the local and global markets.

As an example, a recent study by the FGN MSME project, suggested that while Nigerian farm labor costs about the same as in Thailand, the productivity of Nigerian labor is so much lower. In effect, the challenge is not necessarily cost of labor but what is seemingly responsible for the weaker productivity within the Rice labor market in the country. This notwithstanding, there is need to first isolate all the cost elements associated with Rice production and processing in the location of interest and thereafter isolate issues and come up with interventions that could address the issue of high cost of labor as well as labor productivity in the most strategic operations within the value chain. This report therefore represents the outcome of the survey RBS Consulting Limited conducted in respect of the topic of interest. It is our hope that you find this report educative and responsive to your needs and desire.

2 The Broad Aim of Assignment

This study aims to obtain actionable information on the cost structure of the Ofada Rice Value chain from production to processing with the hope of deploying same in insolating systemic issues militating against the Nigerian rice competitiveness in a global market.

3 Standard Action of Assignment

PrOpCom will use the outcome of this study to begin to develop and refine the strategies of reducing production and processing cost within the chain while improving quality, efficiency, effectiveness and productivity.

4. Survey Implementation Approach

Design/Pre field Phase

A number of meetings and email exchanges took place for the purpose of obtaining clarity on the service expectations of the client in terms of inputs, outputs, quality and measurement standards, their definitions, etc. Thereafter a contract was executed by both parties.

Survey Instruments Development

In addressing this assignment, the entry point was the isolation of the relationship between the various stakeholders within the value chain and this was done through interactive stakeholders' analysis and consultative process. Therefrom, an insight into the operations and cost headings of each of the various stakeholder groups were isolated and mapped out. The outcome of this process led to the preparation and development of seven survey instruments which were shared with the client for their comments, corrections and additions in anticipation of obtaining approval for field execution.

Sensitization, Briefing and Training Workshop for RBS Field Team

Following a no objection for fieldwork to commence, a sensitization, briefing and training workshop was organized for the purpose of getting the office and field team updated on what the project is all about. This activity focused on the input and output expectations of the client, quality control, ethics of practice and conducts, quality standards and their definitions, respondent selection processes, entry mechanisms, questioning style and techniques, coding, and data entry among several others. Thereafter, the approved survey instrument was dry run and perfected for field application.

Target Audience, Selection and Information Gathering Approach

A total of 92 successful interviews were conducted in the study. Table 1 presents the various categories of respondents that were interviewed on their operations and associated costs, and their distributions across the study locations / states.

Table 1: Distribution of Survey Respondents by Locations

Target Group	Respondents' location (state)			Total
	Ogun	Osun	Ekiti	
Farmers	10	6	6	22
Merchants In Paddy Rice	4	3	3	10
Artisanal Rice Processors	3	3	3	9
Millers	4	3	3	10
Fertilizers And Other Inputs Supplier	3	3	3	9
Merchants In Finished Rice	4	3	3	10
Packers	4	3	3	10
Others				

Total	32	24	24	80

Additional 12 respondents were sampled in Osun bring the total for the state to 36

Quality Control

The back-checking process involved visits to locations of interview for effective quality control and process observations. Two levels of back checking were engaged, one by RBS and another by an independent consultant recruited to back check our processes. The purpose of RBS back checking is to ensure that the interview took place and with the right key informant. To this effect, 20% of all interviews were physically back checked with positive feedback from both ends.

Following this, we engaged a two level editing (One at the Field and the other Post Field) of duly completed questionnaires before the commencement of the development of coding frames, coding of questionnaires and finally data entry into pre-programmed computer software (SPSS 13.0 and MS Access). Before the commencement of data analysis, we randomly selected 30% of the administered questionnaires and compared the entries with computer entries on them and thereafter commenced analysis using the packages previously mentioned.

Data Validation and Triangulation Feedback to the Client and Stakeholders

In feeding back the stakeholders, we invited 30 (30%) respondents across the trade group within the chain hoping that at least 20 (20%) will honor our invitation. Knowing fully well that level of education, knowledge as well as interest varies from one stakeholder group to another, our feedback processes depended largely on graphical illustrations showing trends over the past four years. In explaining these graphs, they were sequentially arranged and logically explained without loosing our audience. In so doing we focused on the symbiotic relationship among them and their implications for the operations of the stakeholders within the chain in a competitive local and global market. The feedback workshop was designed to promote the comprehension, internalization and ownership of the outcome of this study while stimulating thinking that could facilitate several change processes among individuals, organizations, as well as stakeholder groups within and across the chain.

4.1. Field Experiences, Coping Strategies and Lessons Learnt

Field execution of the survey instruments despite all the efforts put in place to make the user and respondent friendly proved a major challenge due to the absence of uniform standards of measurement within and across study locations. These not withstanding these challenges were to overcame and with good result. Before the commencement of the field work we had with the Ofada Rice stakeholders in our office and the issues relating to language and communication style were surfaced. It was observed that most of the farmers, processors and merchants had no formal education. With this in mind we recruited interviewers who could speak the local dialect of Yoruba.

Recruiting and convincing respondent on the purpose of this study equally proved a challenge as most of them claimed that they have had similar visits from different government agencies and NGOs with the promises of providing support which were not fulfilled. Though a number of them out rightly refused to be part of the interview, we were however able to convince majority of them through their village head. This approach we found quite helpful. The entry process involved paying homage to the

traditional leader who advice and support was solicited before the commencement of fieldwork in his domain.

The most daunting challenge on the field had to do with varying standards of measurement within and across the sampled locations for inputs, outputs and even in land measuring. In handling this issue, samples of the various units of measurement were obtained weight and or measured using metric standards. In so doing, every phase of the assignment was subjected to multiple back-checking, particularly during interview, field editing, editing and coding, editing of data and also at the point of analysis. Inspect of these challenges, we were able to successfully conduct 92 interviews instead of 80 which was the approved target. We had to repeat the Osun state interviews as we needed to validate their information which informed the repeat of this location interview using new respondents. Interestingly the earlier data obtained in this location was validated by the second field work. The issue of standardization is a very serious and needs to be address. Further details would be provided in Section 7 of this report.

5. Findings

5.1. General Profile of Respondents

This subsection presents the socio-economic profiles of various categories of individuals within the value chain of interest in the study area. The profiles relating to the gender, age, education and experience of the stakeholders are summarized on Table 2 as well as Figures 1a – d.

Table 2: Relative Distribution of Respondents by Personal Characteristics and Role in Ofada Rice Value Chain

	Respondents' Role in the Ofada Rice Value Chain							ALL RESPONDENTS
	Rice Farmers	Input Suppliers	Paddy Merchants	Rice Millers	Rice Processors	Rice Merchants	Packers	
Gender								
Male	87.0	90.9	27.3	100.0	20.0	16.7	41.7	58.9
Female	13.0	9.1	72.7		80.0	83.3	58.3	41.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Age Range								
20-25yrs							8.3	1.1
26-35yrs	4.3	27.3		27.3	20.0	25.0	16.7	15.6
36-40yrs	26.1	27.3		27.3	10.0	16.7	41.7	22.2
41-45yrs	17.4	27.3	18.2	18.2	20.0	8.3	33.3	20.0
46-50yrs	13.0	9.1	36.4	9.1	30.0	16.7		15.6
51yrs and above	39.1	9.1	45.5	18.2	20.0	33.3		25.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Level of education								
No formal Education	43.5	9.1	27.3		30.0	33.3	16.7	25.6
Primary Education	30.4		45.5	36.4	40.0	25.0	25.0	28.9
Secondary Education	21.7	54.5	27.3	54.5	30.0	41.7	33.3	35.6
Higher Education	4.3	36.4		9.1			25.0	10.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Years in operation								
Under 1yr					10.0			1.1
1-5yrs	4.3	27.3	9.1	9.1			25.0	10.0
6-10yrs	30.4	27.3	9.1	18.2	10.0	16.7	25.0	21.1
11-15yrs	17.4	18.2		36.4	40.0	33.3	41.7	25.6
16-20yrs	4.3	9.1	27.3	18.2	10.0	8.3	8.3	11.1
20yrs+	43.5	18.2	54.5	18.2	30.0	41.7		31.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

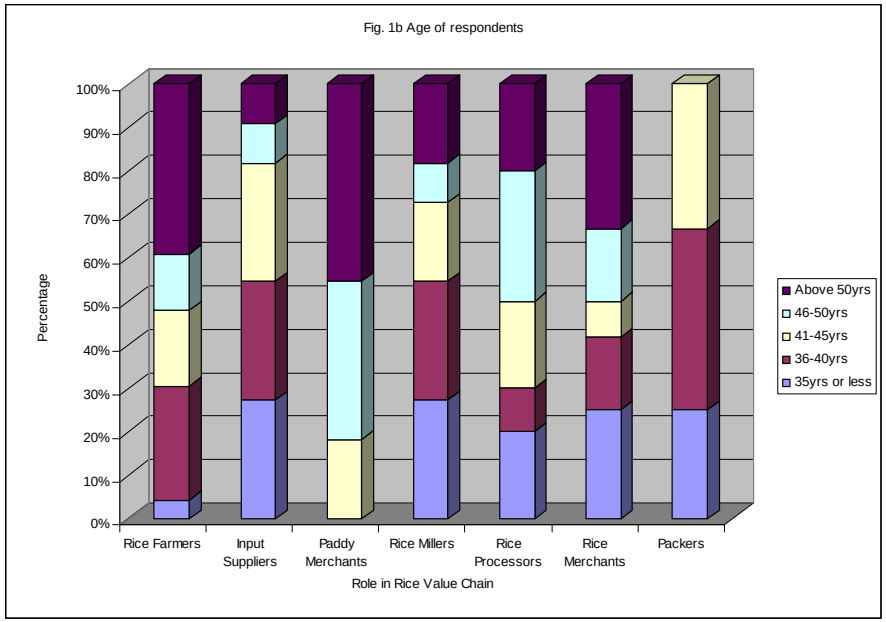


Fig. 1b Age of respondents
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage
Rice Farmers
Input Suppliers
Paddy Merchants
Rice Millers
Rice Processors
Rice Merchants
Packers
Role in Rice Value Chain
Above 50yrs
46-50yrs
41-45yrs
36-40yrs
35yrs or less

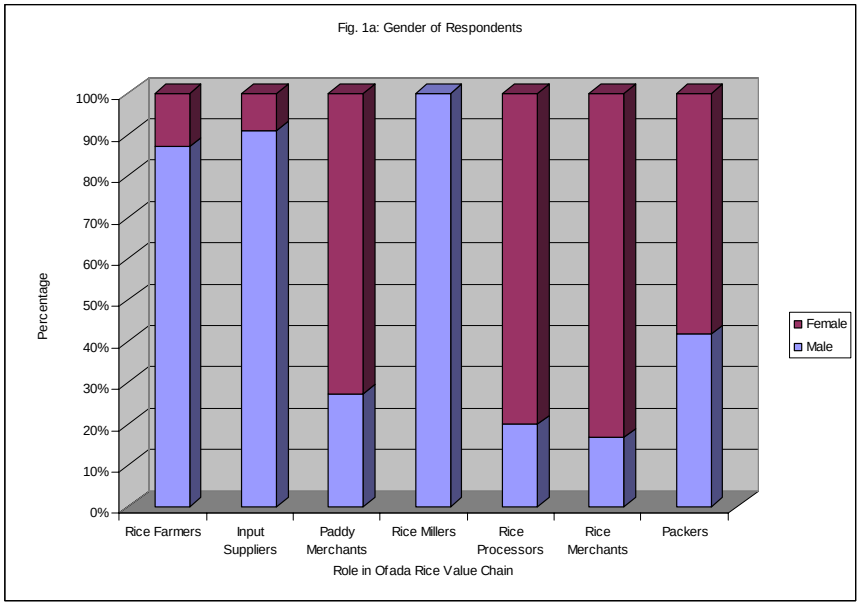


Fig. 1a: Gender of Respondents
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage
Rice Farmers
Input Suppliers
Paddy Merchants
Rice Millers
Rice Processors
Rice Merchants
Packers
Role in Ofada Rice Value Chain
Female
Male

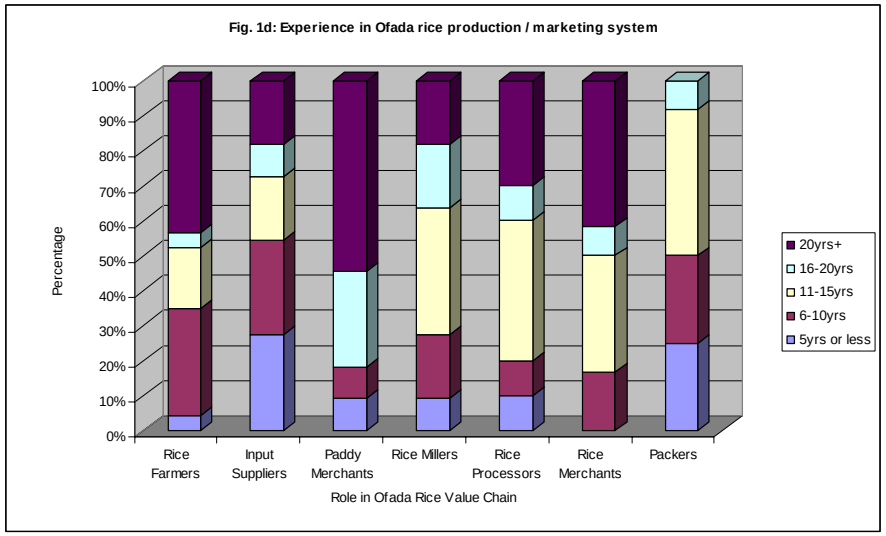


Fig. 1d: Experience in Ofada rice production / marketing system
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage
Rice Farmers
Input Suppliers
Paddy Merchants
Rice Millers
Rice Processors
Rice Merchants
Packers
Role in Ofada Rice Value Chain
20yrs+
16-20yrs
11-15yrs
6-10yrs
5yrs or less

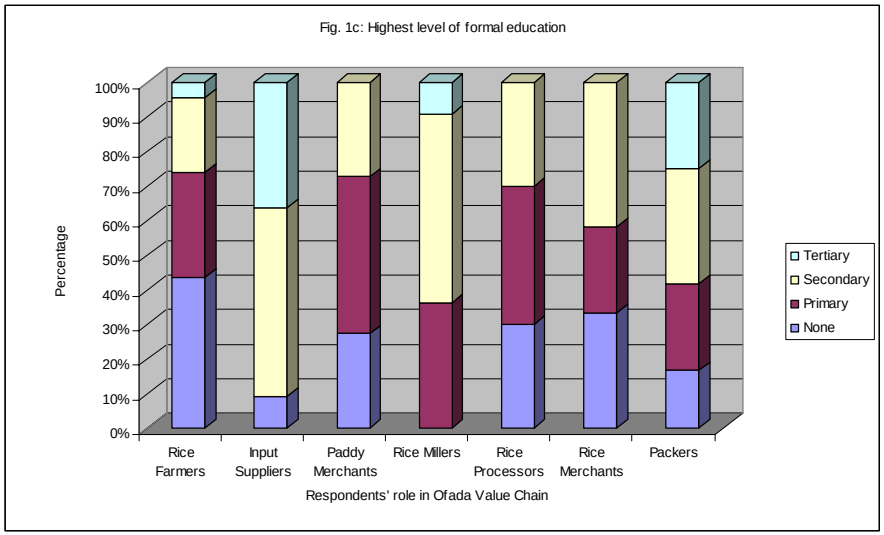


Fig. 1c: Highest level of formal education
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percentage
Rice Farmers
Input Suppliers
Paddy Merchants
Rice Millers
Rice Processors
Rice Merchants
Packers
Respondents' role in Ofada Value Chain
Tertiary
Secondary
Primary
None

Focusing on gender, the results suggest roles specialization across the Ofada rice value chain. The supply aspects of the chain seem male dominated. They account for 87 per cent of the farmers, 91 per cent of the input suppliers and 100 per cent of the rice millers. On the other hand women dominated the artisanal processing and product distribution aspects of the chain, accounting for 73 per cent, 80 per cent and 83 per cent of the stakeholders involved in paddy merchandising, artisanal rice processing and finished rice merchandising respectively.

Focusing on age distribution, the results suggest that while rice farming, paddy rice merchandising and artisanal processing are largely handled by the elderly (i.e. people over 40 years of age), input supply, rice milling, finished rice merchandising and packaging are predominantly handled by relatively younger service providers. Overall, it is worthy of note that youths (people less than 35 years of age) accounted for less than a fifth (16.7 per cent) of all participants in the rice value chain, whiled the aged (people older than 50 years) accounted for a quarter (25.6 per cent) of the stakeholders. This distribution reflects an aging population, and has implications on productivity in Ofada rice production.

Coming to education, majority (54.5 per cent) of all the respondents had no more than primary school education, with as much as a quarter (25.6 percent) of the stakeholders being without formal education. The highest rate of illiteracy (absence of formal education) was recorded among the farmers (44 per cent), finished rice merchants (33 per cent) and processors (30 per cent), while the highest incidence of post primary education was recorded among the input suppliers (90.1 per cent), rice millers (63.6 per cent) and packers (58.3 per cent). Meanwhile, most (about 68 per cent) participants in the value chain have been in the business for over 10 years. This shows that an average operator in the value chain is quite experienced in rice business, which to some extent, compensates for what he/she may lack in terms of formal education.

5.2. Business Operation Profile within the Ofada Rice Value Chain

As a background to the estimation of production, processing and marketing costs in the value chain of interest, this sub-section presents a profile of the various production and commercial activities (methods, technology, management, etc) within the chain. This is considered essential as no proper costing of the production and value addition processes can be done without a clear picture of processes involved. For ease of presentation, the results are organized under the main activity headings: Ofada rice farming, paddy rice merchandising, rice processing, finished rice packaging and marketing.

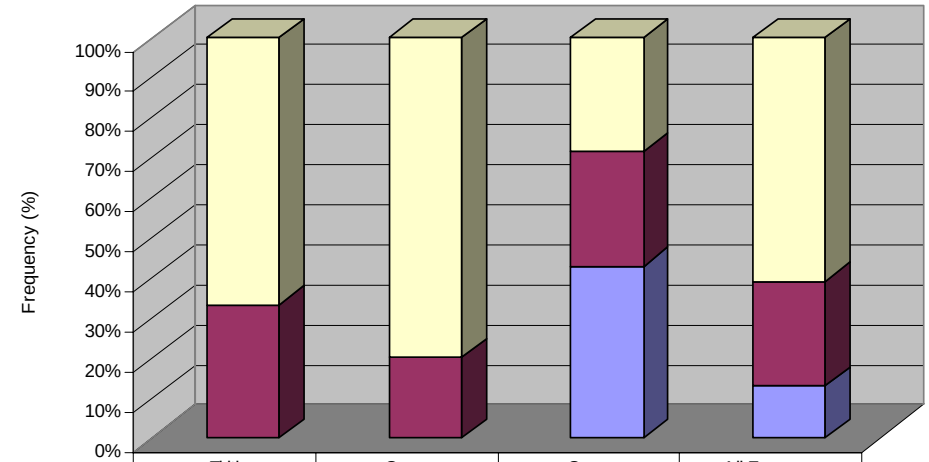
5.2.1 Ofada Rice Farming

In the course of this study, actionable information was obtained from a total of 23 randomly selected farmers in the study area. Presented below is some critical information on their production methods (technology) / cultural practices, resource (labor and materials) use and outputs as well as prices.

5.2.1.1 Farm Size

The survey data and subsequent interactions with the farmers revealed that most farmers in the study locations plant Ofada rice solely for the purpose of harvesting its grain for human consumption. Figure 2a presents the distribution of the sampled rice farmers by the area planted / harvested in 2007, while Figure 2b presents the trends in a typical Ofada rice farmer's farm size over the last four years (2004 – 2007) by study location.

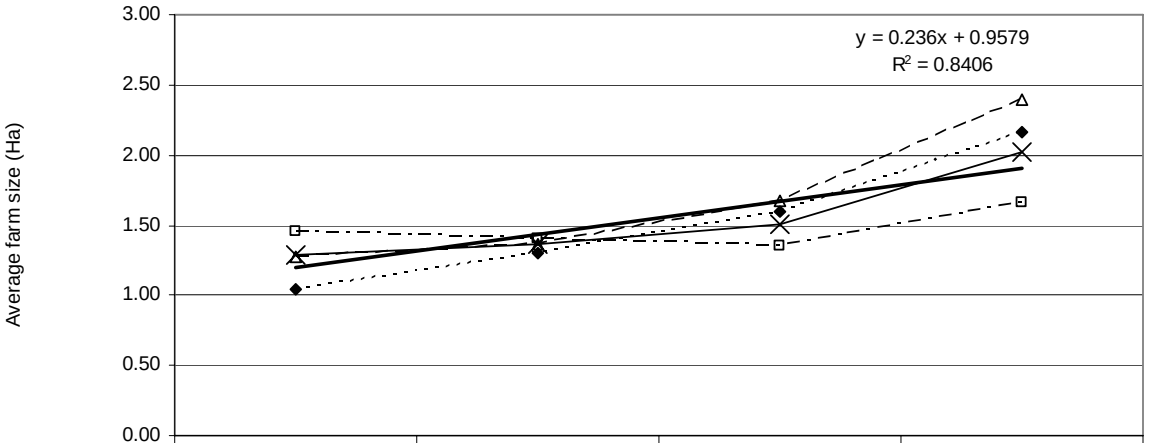
Fig. 2a: Distribution of Ofada rice farmers by farm size and location



	Ekiti	Ogun	Osun	All Farmers
Below 2Ha	66.70	80.00	28.60	60.90
2 -<4Ha	33.30	20.00	28.60	26.10
4Ha or more			42.90	13.00

Location

Fig. 2b: Trend in average size of a typical Ofada rice farm by study locations



	2004	2005	2006	2007
Ekiti	1.04	1.30	1.60	2.16
Ogun	1.45	1.40	1.35	1.67
Osun	1.28	1.36	1.68	2.40
All	1.29	1.36	1.51	2.03

Year

Evidence in Figures 2a and 2b suggest that Ofada rice production in the study area is predominantly carried out on small (and possibly fragmented and scattered) landholdings, with the majority (60.9 per cent of the sampled rice farmers) cultivating not more than two hectares. Figure 2b however, shows that there have been steady increases, over time, in the average area of land devoted to Ofada rice production by a typical rice farmer in all the study locations. Overall, average Ofada rice farm in the sample (and by extension the study area), is being expanded at an average of 0.2 hectares per year per farmer. Such expansion seems a response to the growing demand for Ofada rice in the country.

5.2.1.2 Production Methods

Land Acquisition

Land is traditionally acquired through inheritance and/or communal arrangement in south-western Nigeria. However, this is true of the privileged few. This study found that most rice farmers in the study area (67 per cent of the entire sample, 80 per cent of sampled farmers in Ogun state and 71 per cent in Osun state) claimed to have rented their farmland (Figure 3). The average annual rent per hectare ranges between N4, 200 in Osun state and N5, 217 in Ogun state (Table 3). Incidentally, the average annual rent on agricultural land rose from an overall average of N2, 415 in 2004 to N4, 698 in 2007. The import of the above evidence is that Ofada rice production in the study area (except for Ekiti state) is predominantly in the hand of the landless. Thus, it is imperative that this issue be given due consideration by the relevant authorities so as to ensure easy accessibility to farmland by the landless.

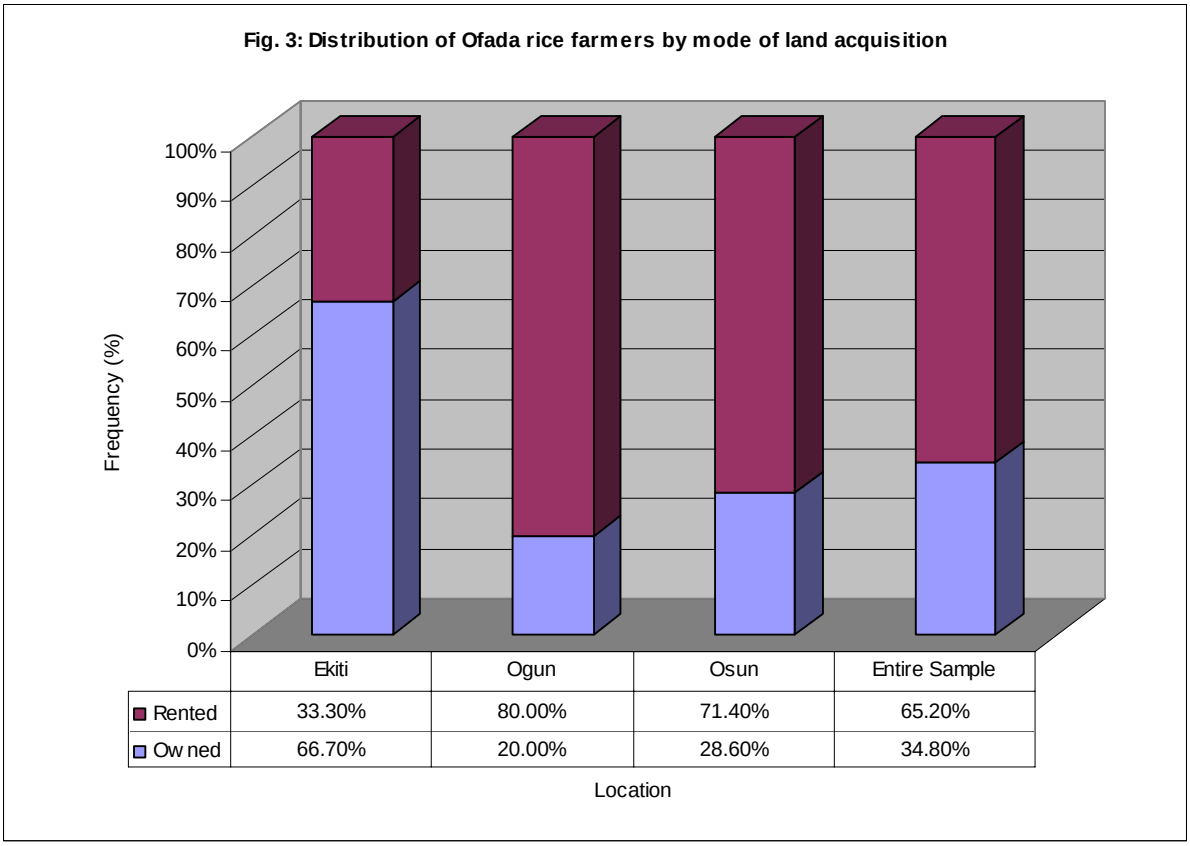


Table 3: Average Rent Paid Per Hectare of Leased Land in the Study Locations

Location	Rent per hectare of farmland used (N/Ha))			
	2004	2005	2006	2007
Ekiti	1500.00	1800.00	2050.00	4292.50
Ogun	2866.67	3850.00	4328.57	5216.67
Osun	1840.00	2480.00	3200.00	4200.00
Total	2415.38	2776.92	3671.43	4698.00

Land Preparation

Through this survey and subsequent interactions with the farmers, it was observed that farmland preparation in the study area is predominantly carried out using the manual slash and burn system. Only one (4.3 per cent) out of the 23 farmers sampled, reported the use of tractor through-out the 2004 – 2007 production seasons as shown on Table 4. In effect, most tillage operations like ploughing and harrowing are either not carried out at all, or were performed manually, which makes the operations of a typical rice farmer to be labor intensive.

Table 4: Distribution of Farmers by Methods of Land Preparation

Field Operation	Mode of operation	Location			Total
		Ekiti	Ogun	Osun	
Land clearing	Mechanized			14.3%	4.3%
	Manual - Slash & Burn	100.0%	100.0%	85.7%	95.7%
	Total	100.0%	100.0%	100.0%	100.0%
Ploughing	Not done	100.0%	20.0%	42.9%	47.8%

	Mechanized			14.3%	4.3%
	Manual		80.0%	42.9%	47.8%
	Total	100.0%	100.0%	100.0%	100.0%
Harrowing	Not done	100.0%	20.0%	71.4%	56.5%
	Manual		80.0%	28.6%	43.5%
	Total	100.0%	100.0%	100.0%	100.0%

Table 5a & b present the rental charges paid for tractor services over the 2004 – 2007 cropping season by the only farmer that employed tractor services in his land preparation. Note, however that the particular farmer's case was excluded from subsequent analyses, given that he operated a different production system

Table 5: Rental Charges Paid For Tractor Services

Year	2004	2005	2006	2007
Tractor Rental Rate (N/Ha) – Osun state	1, 000	1, 500	2, 500	3, 750

Note: Data as provided by the only farmer with mechanized operations in the sampled area (Osun state).

Table 5b: Average Charges for Equipment Leasing In the Study Area

Machine / Equipment	Supplier selling Product	No. available		Average rental rate (N/Ha/day)			
		Min	Max	2004	2005	2006	2006
Tractor	2	6	10	1775.00	1975.00	2100.00	2500.00
Planter	2	0	2	1500.00	2000.00	2500.00	3000.00
Sprayer	1	10	10	140.00	180.00	220.00	250.00

Seed Planting

Since the most common method of land preparation in the sampled locations is manual, one cannot expect rice planting operations to be mechanized except where a rolling injection planter is available. As expected, Figure 4 shows that all seeding is done manually, with broadcasting being the most popular in Ogun and Osun State (83% and 80% respectively). Broadcasting, however, seems not to be quite common in Ekiti State as most of the farmers claimed to have planted their rice fields through manual drilling. This is quite understandable, since most farmers in Ekiti state neither ploughed nor harrowed their land (See: Table 4). It is however, instructive to note that drilling seems much more efficient than broadcasting in terms of the quantity of seed used. This perhaps explains why the seeding rate by a typical rice farmer in Ekiti (73.7 kg/ha in 2007) was much lower than what obtains in Ogun state (92.7 kg/ha) and Osun state (186.3 kg/ha).

In the course of the post-survey data validation meeting held with representatives of the stakeholders, the farmers were asked to justify their seeding rate. It was observed that farmers in Osun and Ogun state resorted to broadcasting because it was found to be much easier and less labor intensive than drilling. Moving away from the subject of planting methods, it was noted and later clarified by farmers that they over-seed their farmland as they were not often sure of the viability of their seed, which in most cases originated from poorly preserved past harvests. Some farmers also noted that over-seeding to some extent, help in weed control, but often leads to stunted growth and poor harvest quality due largely to plant over population.

Fig. 4: Distribution of Ofada rice farmers by methods adopted in seed planting

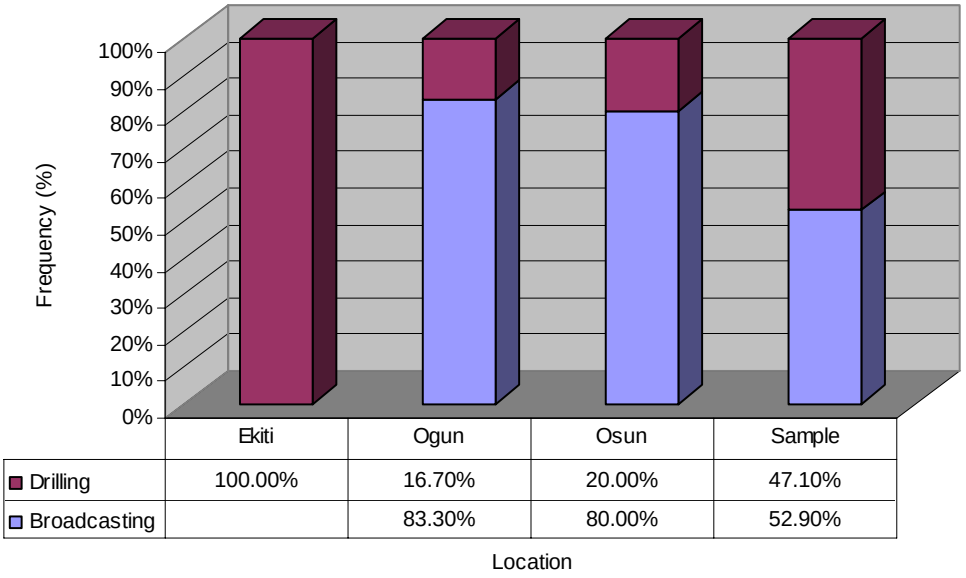


Table 6: Descriptive Statistics of Seeding Rates on Ofada Rice Farms

Location	Quantity of seed planted (Kg/Ha)			
	2004	2005	2006	2007
Ekiti	96.25	79.08	70.00	73.69
Ogun	124.58	121.73	117.71	92.71
Osun	170.83	170.83	187.50	186.31
Total	124.36	116.66	115.46	108.18

Fertilizer Application

Fertilizer application is one common approach to soil fertility management all over the world. As shown on Figure 5, majority (about 57 per cent) of farmers in the sample, and by extension the study area, are not using fertilizer. Those who use fertilizer apply an average of 236kg/ha of NPK 15-15-15 (See: Tables 7 and 8). Overall, the effective rate of fertilizer use on rice farms in the study area was found to be about 102.5 kg/ha applied once (during flowering stage and by broadcasting). Kindly see Figures 6a and 6b. Side dressing application is marginal, and is only being practiced by some rice farmers in Ekiti state, where planting is done in rows.

Fig. 5: Distribution of Ofada rice farmers by fertilizer usage

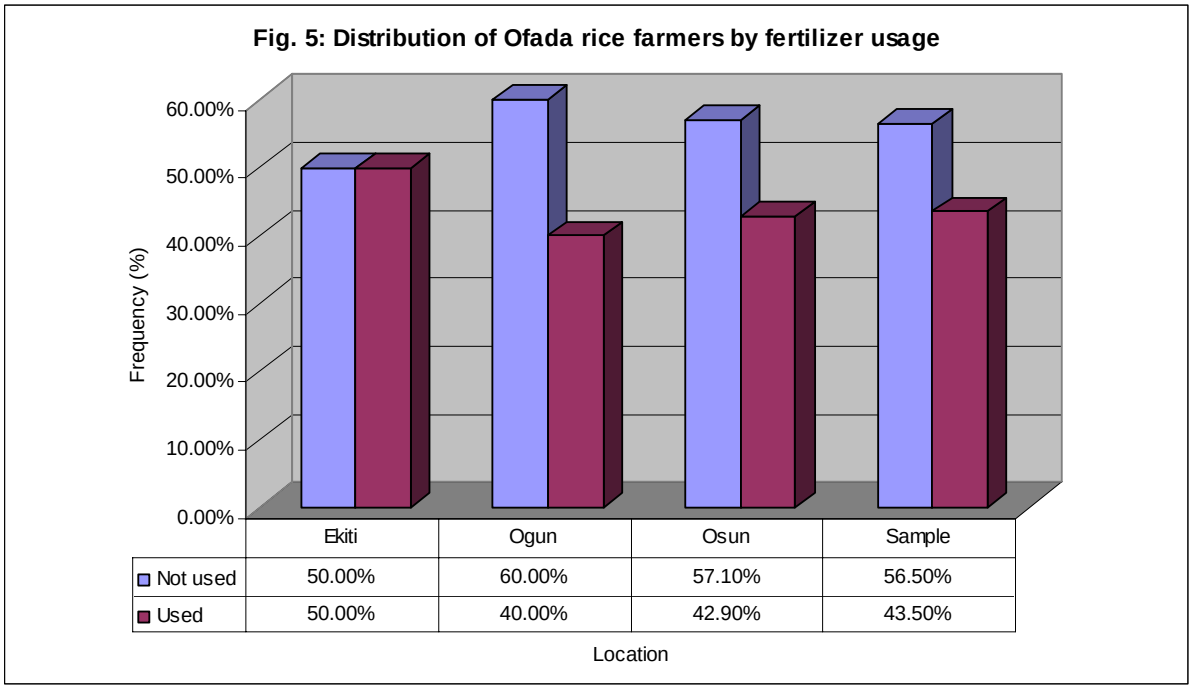
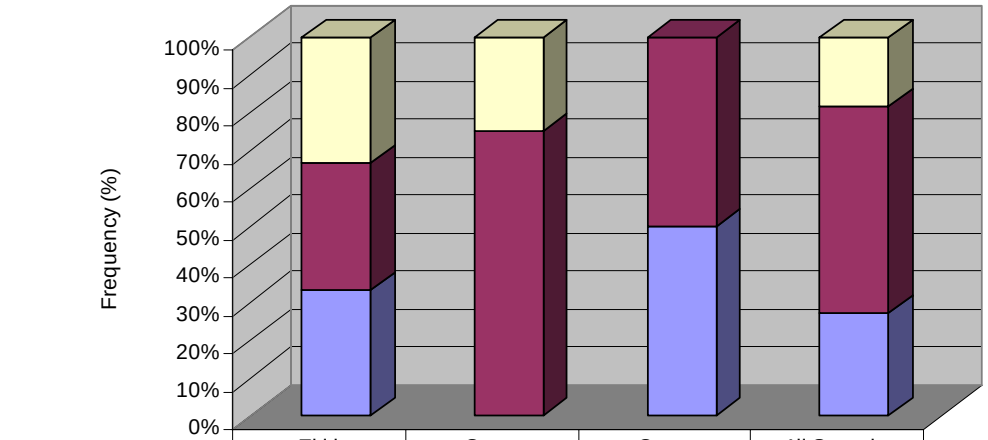


Table 7: Descriptive Statistics of Quantity of Fertilizer Used

	Quantity of fertilizer used (Kg/Ha)			
Location	2004	2005	2006	2007
Fertilizer users only				
Ekiti	200.0	191.7	200.0	220.8
Ogun	306.3	234.4	255.2	261.5
Osun	241.7	241.7	233.3	216.7
Total	255.0	223.8	232.1	235.8
Entire sample				
Ekiti	100.0	95.8	100.0	110.4
Ogun	122.5	93.8	102.1	104.6
Osun	103.6	103.6	100.0	92.9
Total	110.9	97.3	100.9	102.5

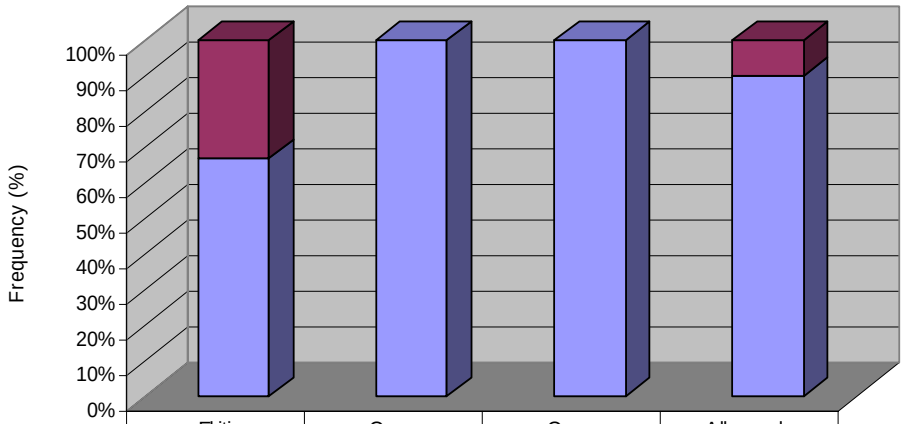
Fig. 6a: Distribution of fertilizer users by time of application



	Ekiti	Ogun	Osun	All Sample
Planting & flowering	33.30%	25.00%		18.20%
During flowering	33.30%	75.00%	50.00%	54.50%
Time of planting	33.30%		50.00%	27.30%

Location

Fig. 6b: Distribution of fertilizer using farms by application methods



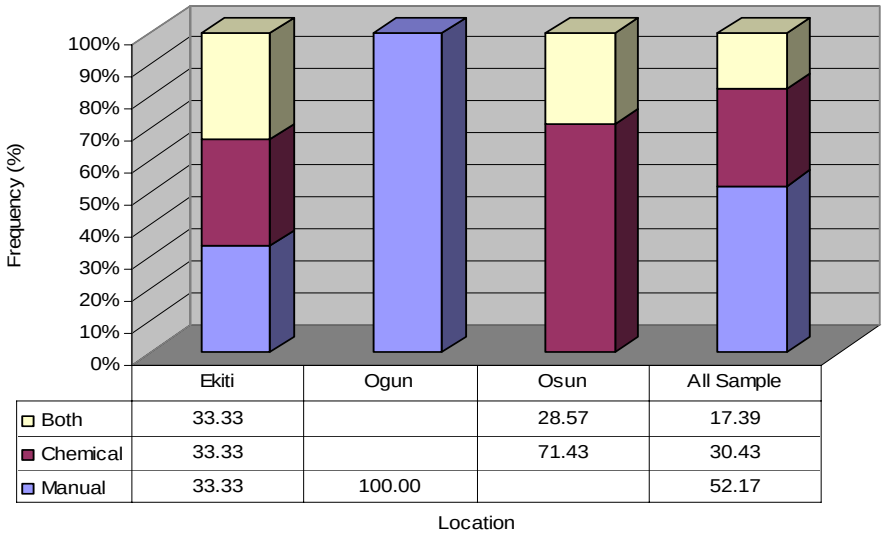
	Ekiti	Ogun	Osun	All sample
Broadcast & side treatment	33.30%			10.00%
Broadcast	66.70%	100.00%	100.00%	90.00%

Location

Weed Control

Apart from fertilization and pest control, weed control is one of the most critical operations whose effectiveness determines performance and operation costs on rice fields. Modern approach to weed control involves the use of both pre and post emergence herbicide which is the dominant practice in Osun State. However, in Ogun and Ekiti states, weed control is practically through manual weeding. Please see Figure 7 for details.

Fig. 7: Distribution of Ofada rice farms by methods of weed control



Talking in terms of the type/brand of herbicides generally used and going by the data provided on Table 8 it seems the most common herbicide is Paraquat branded as Gramozone and Weedoff which is a prohibited herbicide. In the course of the post-survey data validation meeting held with the stakeholders, it was observed that most of the rice farmers were either ignorant of the prohibition of the use of Paraquat or had to use this product because it is readily available and accessible in the markets. Farmers also reported that they found most of the agrochemicals in the Nigerian markets wrongly labeled and ineffective; both being the factors discouraging agro-chemicals usage by the Nigerian farmers. It is however, worthy to note that apart from some of these chemical being fake and/or expired products, poor knowledge of agrochemical handling and usage may also be contributing to the ineffectiveness of these chemicals.

Table 8: Distribution of farmers by type of Agro-chemicals Used

Agrochemical	Chemical Users		Specific brand user	
	Number	Percentage of all farmers	Number	Percentage of Chemical Users
Fertilizer	10	43.5		
• NPK 15-15-15			10	100
Herbicide	6	26.1		
• Gramozone			5	83.3
• Weed Off			1	16.7
• Touch down			1	16.7
Insecticide	1	4.3		
• Korate solution			1	100

Pest Control

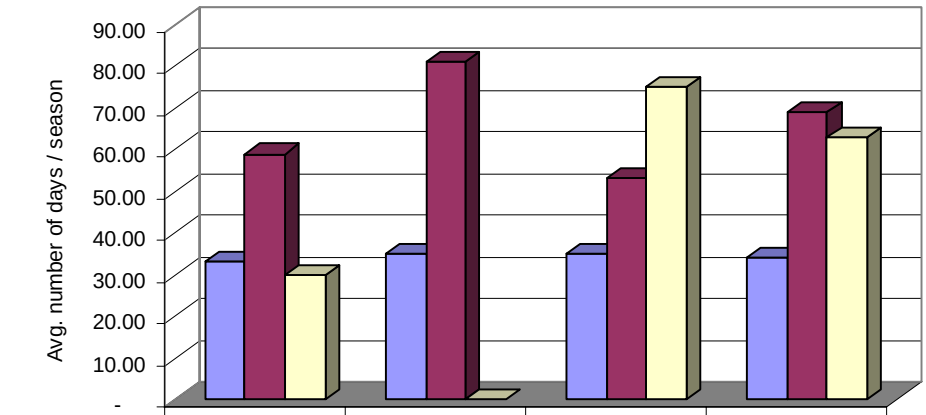
Pests' control, most especially the avian specie, has been one of the most challenging aspects of rice production. This study found, as summarized in Table 9, that birds and rodents present the biggest challenges to rice farmers in the study area. Birds often invade rice fields particularly at the milking stage to suck rice milk, causing significant yield losses when not properly controlled. Other pests like rodents may attack rice field at any stage, they seem to pose lesser challenges.

Avian pest control is predominantly by manual scaring while rodents are principally controlled by trapping. Both operations are labor intensive and very expensive in the study area. An average rice farmer provides both human and material resource in controlling bird for about 34 days and 69 for rodents. Birds' control is perhaps one of the most labor demanding operations on a typical rice fields kindly see Figure 8 and Table 10 for additional details.

Table 9: Methods used in pest control

	Number controlling pest	Percent controlling pest	No using specific method	Percentage using specific method
Birds (Avian)	22	100%		
• Manual Scaring			22	100.0
Rodents	20	87.0		
• Chemical Poisoning			1	5.0
• Capturing			19	95.0
Grasscutters	4	17.4		
• Capturing			4	100.0

Fig. 8: Distribution of farms by period covered by pest control mechanisms

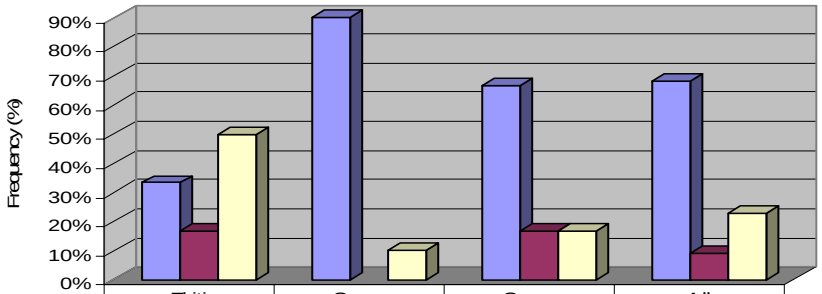


Harvesting, threshing, bagging and storage
These are the last set of farm operations on a typical rice field. The study observed that these operations are also handled manually across all the locations of interest.

5.2.1.3 Labor and Materials Usage on Rice Farms
Going by the evidence provided so far, it is clear that Ofada rice production in the study area is labor intensive. Therefore, a profile of labor usage vis-à-vis the sources (family or hired), magnitudes and associated wage rates across study locations is considered desirable, and is presented in this sub-section.

Although most field operations could be handled by both hired and family labor depending on the farmer's scale of operation, the study observed some kind of specialization / job differentiation across labor sources. As shown on Figure 9 and Table 10, land preparation, seeding and weed control (manual and chemical) are predominantly handled by hired labor, while pest control (most especially bird scaring operations) are almost exclusively handled by family members. Meanwhile, post-harvest operations are jointly handled by hired and family labor. The fact that bird scaring is almost exclusively handled by family members may not be unconnected with the fact that daily work hours on bird scaring is usually longer (typically 6am – 7pm daily) than what is usually offered by hired labor (8am – 4pm). Meanwhile, reliance on family labor for bird scaring could also be a cost saving / cash preservation strategy, since bird scaring typically covers an average of 34 days (Figure 8) and requires an average of 41 man-days of labor (Table 10). Use of hired labor for such a labor intensive operation, would require significant cash outlay, which an average household may not be able to offer.

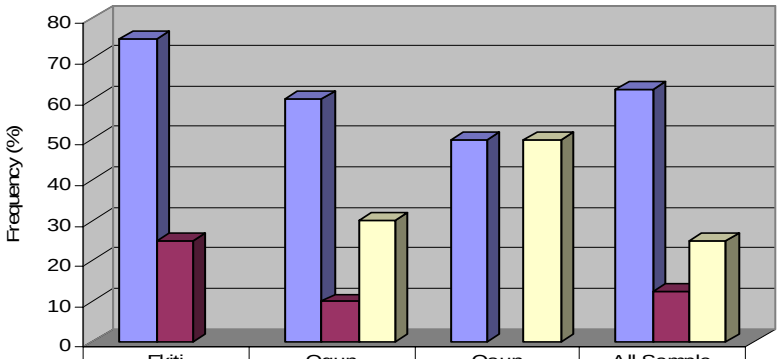
Fig. 9a: Sources of labour for land clearing



	Ekiti	Ogun	Osun	All
Hired	33%	90%	67%	68%
Family	17%		17%	9%
Both	50%	10%	17%	23%

Location

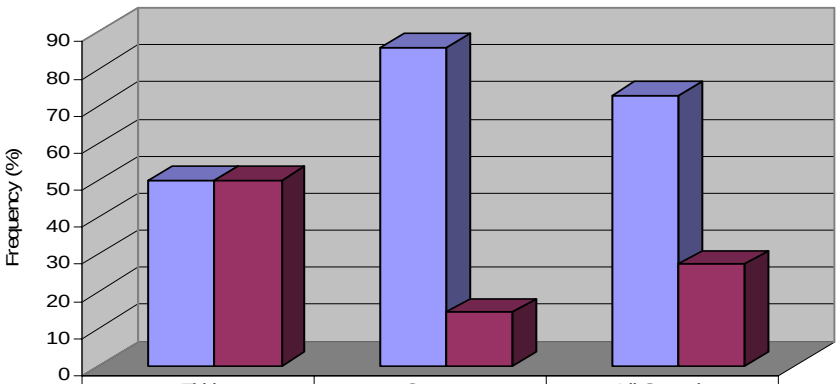
Fig. 9b: Sources of labour for manual weed control



	Ekiti	Ogun	Osun	All Sample
Hired	75	60	50	62.5
Family	25	10		12.5
Both		30	50	25

Location

Fig. 9c: Source of labour for chemical weed control



	Ekiti	Osun	All Sample
Hired	50	86	73
Family	50	14	27

Location

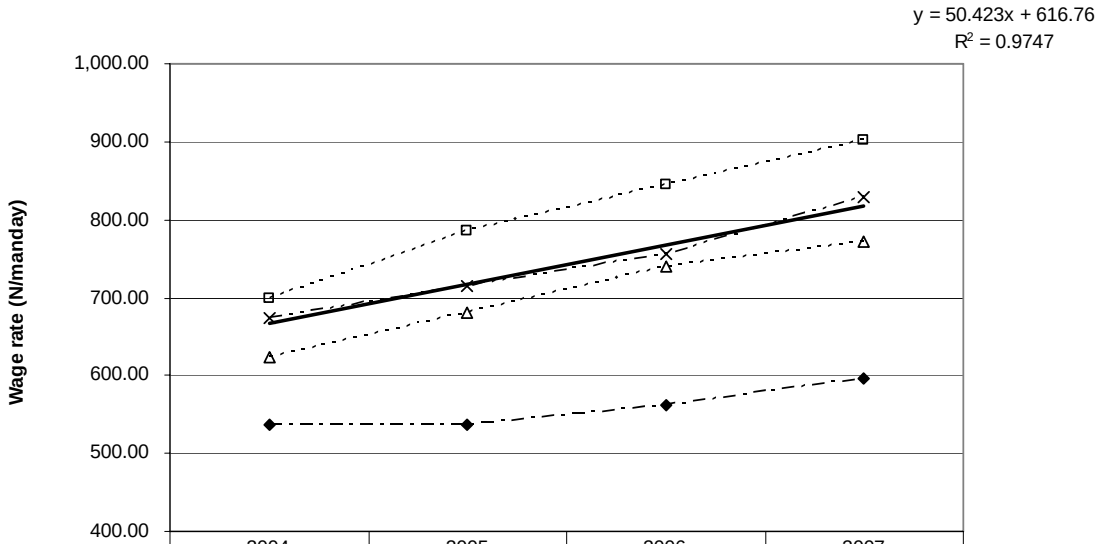
Table 10: Pattern of Labor Use on Ofada Rice Farms in the Study Area

	EKITI		OGUN		OSUN		ENTIRE SAMPLE	
	Avg. Man-days (2004–07)	**%**	**Avg. Man-days (2004–07)**	**%**	**Avg. Man-days (2004–07)**	**%**	**Avg. Man-days (2004–07)**	**%**
Field Operation								
Land Clearing (Family Labor)	1.21	1.16	2.73	2.78	1.57	1.64	1.98	2.01
Land Clearing (Hired Labor)	12.83	12.38	12.96	13.25	11.65	12.16	11.62	11.83
Sub-total (Land preparation)	**14.04**	**13.54**	**15.69**	**16.03**	**13.22**	**13.80**	**13.60**	**13.85**
Seeding (labor)	**7.18**	**6.92**	**4.21**	**4.31**	**5.63**	**5.88**	**5.53**	**5.63**
Manual Weeding Labor	9.60	9.26	11.18	11.43	6.20	6.47	9.61	9.79
Labor for Fertilizer Application	0.50	0.48	1.50	1.53	1.50	1.57	1.00	1.02
Labor for Herbicide Application	0.23	0.23		-	1.00	1.04	0.50	0.51
Avian Scaring Labor (Family estimates)	43.86	42.30	39.83	40.70	39.62	41.37	41.01	41.77
Rodent Control Labor (setting traps)	9.00	8.68	5.50	5.62	9.50	9.92	7.65	7.79
Sub-total (Field management)	**63.19**	**60.94**	**58.01**	**59.28**	**57.82**	**60.37**	**59.77**	**60.88**
Labor for Harvesting	6.97	6.72	6.43	6.57	7.70	8.04	6.97	7.10
Labor for Threshing on the Field (Family)	3.02	2.91	3.00	3.07	2.98	3.11	3.02	3.07
Labor for Threshing on the Field (Hired)	4.40	4.24	4.75	4.85	4.41	4.60	4.40	4.48
Labor for Cleaning and Bagging (Family)	3.01	2.90	3.02	3.09	3.02	3.15	3.01	3.07
Labor for Cleaning and Bagging (Hired)	1.88	1.81	2.75	2.81	1.00	1.04	1.88	1.91
Sub-total (Harvesting related)	**19.28**	**18.59**	**19.95**	**20.38**	**19.10**	**19.95**	**19.28**	**19.64**
Total Family Labor	**51.83**	**49.98**	**50.07**	**51.17**	**49.68**	**51.88**	**50.51**	**51.45**
Total Hired Labor	**51.86**	**50.02**	**47.78**	**48.83**	**46.08**	**48.12**	**47.66**	**48.55**
Grand total	**103.69**	**100.00**	**97.85**	**100.00**	**95.76**	**100.00**	**98.17**	**100.00**

The pattern of labor use is not substantially different across the three states: A typical rice farmer requires an average of 98.2 man-days of labor per hectare. The bulk (about 61 per cent) of this labor is often required for field maintenance operations, which is dominated by labor demand for bird scaring (on which about 42 per cent of all labor requirements are devoted). Land preparation, seeding and harvesting (including post-harvest primary processing) required 13.2 – 16.0 man-days, 4.2 – 7.2 man-days and 19.1 – 19.3 man-days of labor per hectare respectively depending on location (Table 10). The per hectare average man-days of labor requirements for a typical rice farm, which varies from about 96 man-day/ha in Osun state to 104 man-days/ha in Ekiti, and was supplied in almost equal proportion by hired labor (47.78 – 51.86 per cent) and family members (49.96 – 51.88 per cent).

Figure 10 presents the trend in average daily wage rates of hired labor employed on rice farms in the study area. Generally, wage rates are lower in Ekiti state and higher in Ogun state than the average in the entire study area, which is more closely approximated by Osun state figures. On the average, the daily wage rate has been rising at an average of N50.42 per annum. This is a clear indication that the cost of Ofada rice production in the study area, has been on a steady increase over-time due to rising wage rates. Therefore, if care is not taken to combat this trend, the sharply rising production cost of Ofada rice in the study area may further worsen Nigeria's comparative cost disadvantage in rice production.

Fig. 10: Average daily wage rate of hired labour by state

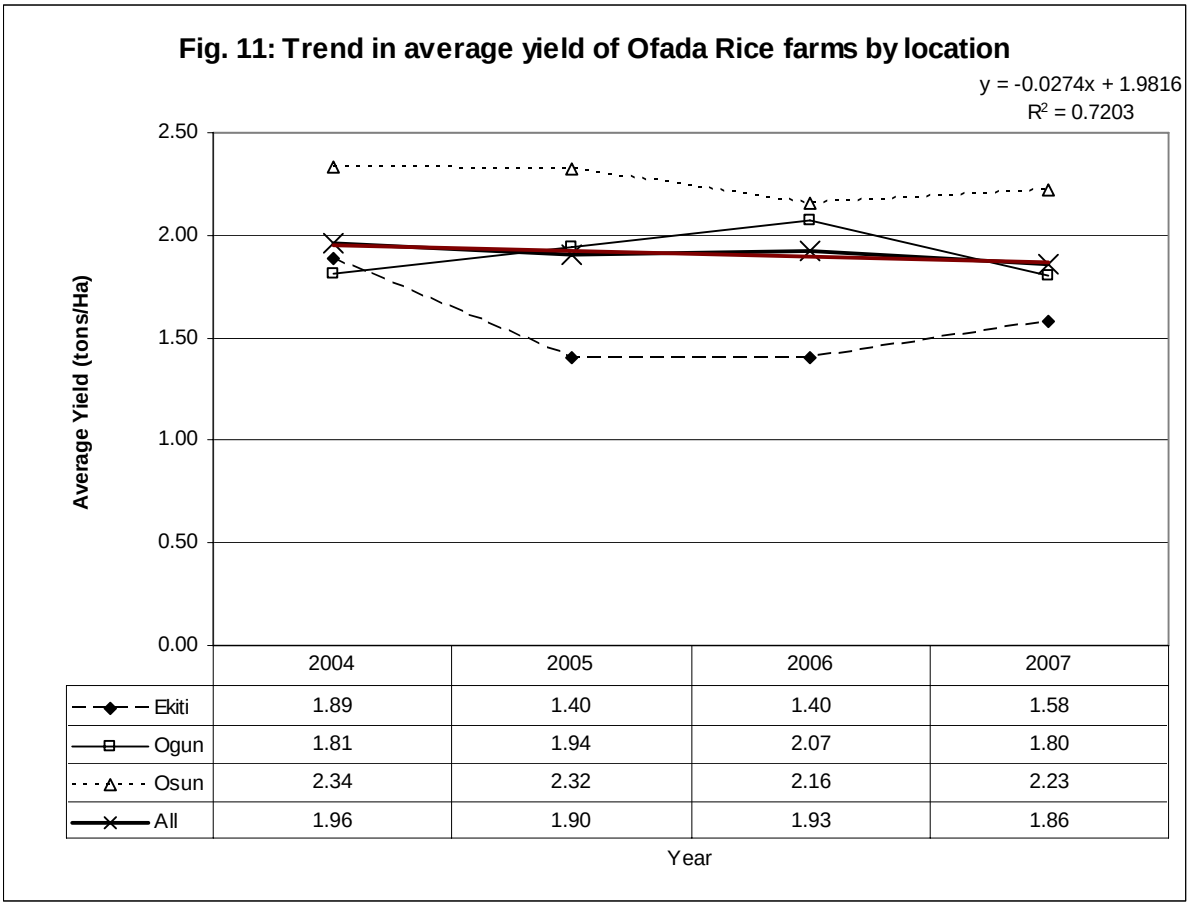


	2004	2005	2006	2007
Ekiti	537.50	537.50	562.50	596.92
Ogun	698.24	786.25	844.17	901.99
Osun	624.23	680.08	739.58	772.56
Average	673.89	714.16	754.82	828.41

5.2.1.4 Rice Outputs (ton/Ha)

Figure 11 present the trends in outputs of rice on an average farm in the three locations. It shows that rice yield is higher on an average farm in Osun state than what obtains in other locations, while lowest yield was recorded in Ekiti state. This outcome is most likely because an average farmer in Osun state tends to used more modern inputs than his counterpart in the other two states. Considering average output over time, Figure 11 shows that rice yield has been declining at an average of 0.03 tons/ha per year in recent times. This decline is not unlikely to be because of the declining use of modern inputs like fertilizer, tractor services, etc. just as continuous cropping, which is the dominant farming system in the study area, is expected to be associated with decline in yield over time, most especially, where little or no land improvements practice is embarked upon.

Fig. 11: Trend in average yield of Ofada Rice farms by location



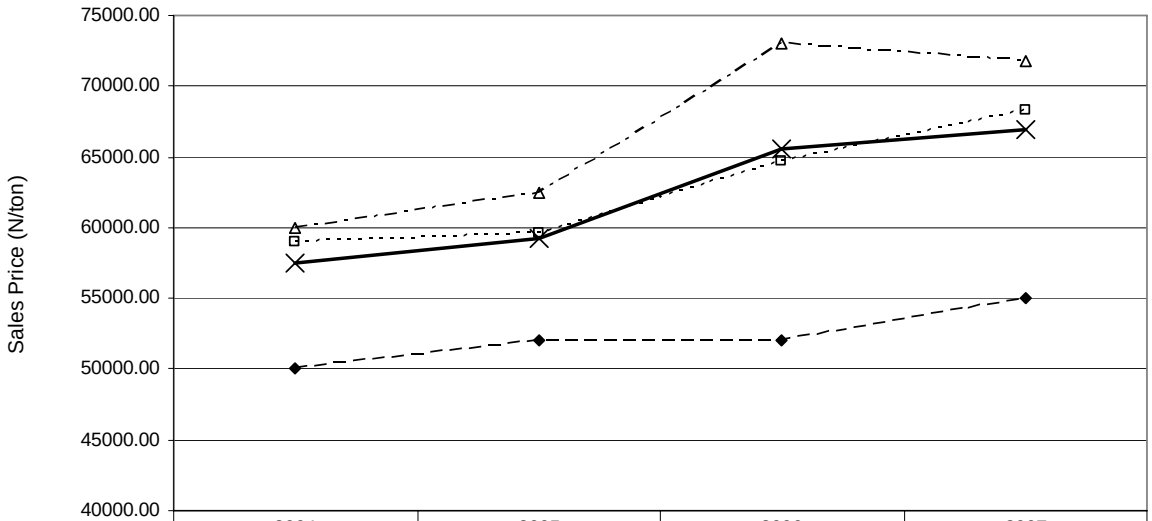
	2004	2005	2006	2007
Ekiti	1.89	1.40	1.40	1.58
Ogun	1.81	1.94	2.07	1.80
Osun	2.34	2.32	2.16	2.23
All	1.96	1.90	1.93	1.86

Note: Least square trend equation fitted to the overall average data (All samples) suggest average yield has been falling at an average of 0.03 tonnes/hectare/year in recent times

5.2.1.5 Selling Price of Rice

Figures 12a and 12b present the trend in selling prices of Ofada paddy rice and finished rice respectively across the study locations. While prices of paddy rice were generally higher in Osun state, prices of finished rice were generally higher in Ogun state than the average in the study area.

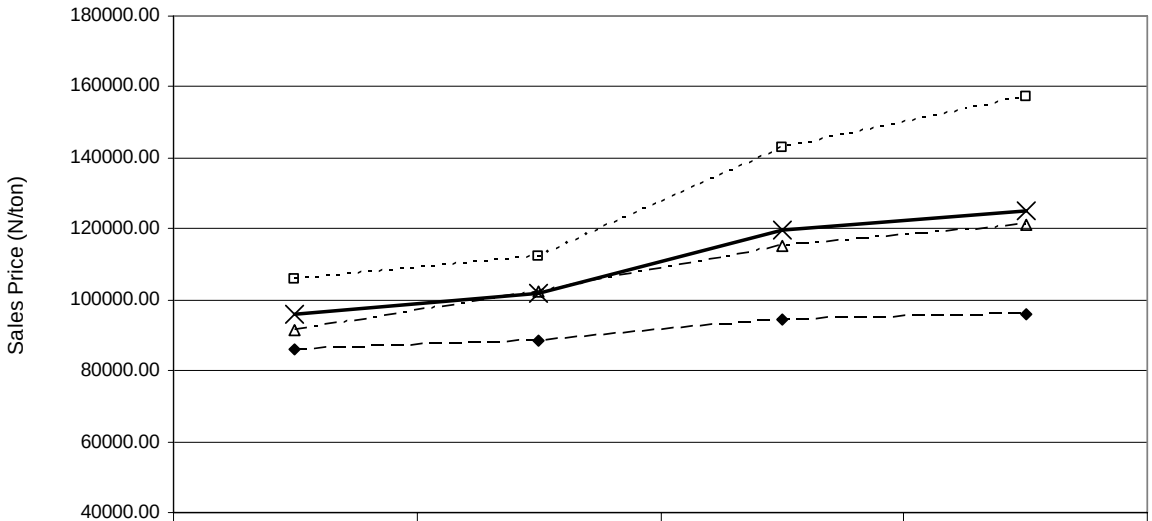
Fig. 12a: Trend in average price of Ofada rice paddy by location



	2004	2005	2006	2007
Ekiti	50000.00	52000.00	52000.00	55000.00
Ogun	59000.00	59666.67	64666.67	68333.33
Osun	60000.00	62500.00	73000.00	71750.00
All	57444.44	59222.22	65555.56	66888.89

Year

Fig. 12b: Trend in average price of finished Ofada rice by location

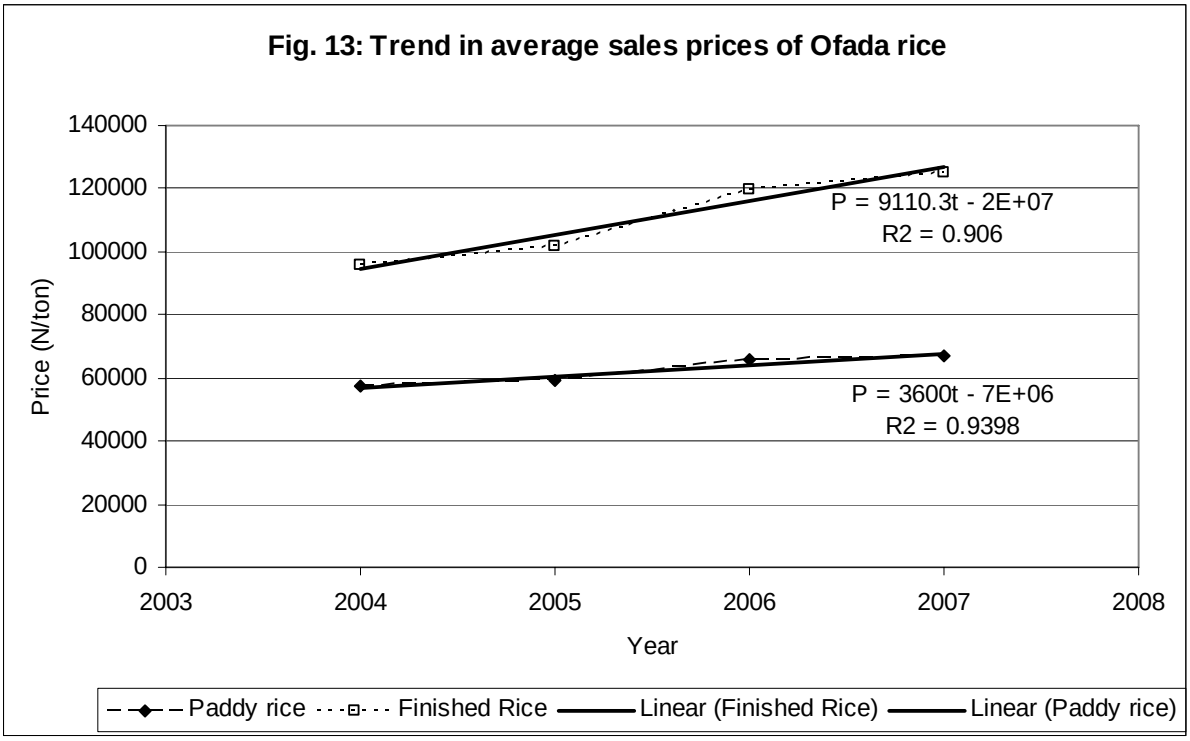


	2004	2005	2006	2007
Ekiti	86000.00	88500.00	94500.00	96000.00
Ogun	106000.00	112000.00	143091.00	157091.00
Osun	91666.67	102500.00	115000.00	121000.00
All	95750.00	101727.27	119871.25	125265.77

Year

The higher selling price of finished rice in Ogun state is not unlikely to be associated with the demand pressure arising from Ofada rice consumers in Lagos, which is very close to Ogun state. Interestingly, this study observed that Ofada rice prices are generally high and rising in the study area. As shown on Figures 12a and 12b, average price of Ofada paddy rice rose from N57,444.44 per ton in 2004 to N66,888.89 per ton in 2007. Similarly, the price of finished Ofada rice rose from an average of N95,750.00 per ton in 2004 to N125,265.80 per ton in 2007. As could be observed on Figure 13, least square trend line fitted to the average prices in the study area suggests price of Ofada paddy has also been rising at an average of N3,600 per ton / year just as that of finished Ofada rice has been rising at an average of N9,110 per ton/year in recent times. The average price in 2007 is much higher than the prevailing price of imported rice, which despite high import tariff as well as transport, freight and others import costs sell between N100,000 per ton and N120, 000 per ton. Thus, the current high price that short grain rice (Ofada) seems to be enjoying in Nigeria, appears artificial and may be unsustainable in the long run taking into consideration the possibility of government revising downwards, import tariff in line with the recent ECOWAS tariff policy. It is therefore imperative that the costs of Ofada rice production be critically examined with a view to identifying areas of production inefficiencies that could be addressed either in the short or long term.

Fig. 13: Trend in average sales prices of Ofada rice



5.4.1.6 Costs of Ofada Rice Production

Having presented all the observations associated with Ofada rice production, it is only but logical that this be presented in a format that presents a holistic picture of the cost structure of this value chain. This section presents the evidence in respect of per hectare production costs of Ofada paddy rice. As shown in Tables 11 – 14, the production cost of Ofada paddy rice on a typical rice farm in 2007 ranged from N84,914.46 in Ekiti state to N106,878.28 in Osun state. Overall, and over-time, the per hectare paddy rice production

cost in the study area rose from an average of N89, 038.19 in 2004 to about N98, 372.91 in 2007.

Table 11: Ofada Rice Production Hectare Budget (Ekiti State)

Operations	Production Year			
	2004	2005	2006	2007
Land Preparation (Manual)				
Land Clearing (Hired Labor)	7,363.75	6,777.88	6,496.88	8,082.00
Land Clearing (Family Labor estimates)	537.50	268.75	843.75	1,098.00
Cost of labor transportation	203.33	262.50	388.33	460.00
Sub Total	8,104.58	7,309.13	7,728.96	9,640.00
Planting				
Seed Procurement	8,932.00	8,066.16	8,568.00	8,990.18
Seed handling and transportation	42.50	70.00	87.50	117.50
Seeding (labor)	3,122.88	3,622.75	3,982.50	5,090.40
Transportation of labor	203.33	282.50	288.33	460.00
Sub Total	12,300.71	12,041.41	12,926.33	14,658.08
Fertilizer Application at Planting				
Fertilizer Procurement	4,071.00	4,213.28	3,992.00	4,689.62
Fertilizer Handling & Transport	70.00	100.00	100.00	125.00
Labor for Application	268.75	268.75	281.25	300.00
Sub Total	4,409.75	4,582.03	4,373.25	5,114.62
Herbicide Application at Planting				
Herbicide Procurement	125.00	-	234.38	466.67
Herbicide Handling & Transport	23.75	-	68.75	108.75
Labor for Application	53.75	-	56.25	300.00
Sub Total	202.50	-	359.38	875.42
Field Maintenance				
Manual Weeding Labor	5,805.00	5,375.00	4,950.00	5,280.00
Pest Control				
Bird Scaring Labor (Family estimate)	29,309.88	20,693.75	23,175.00	24,720.00
Bird Scaring Material	213.00	213.00	213.00	213.00
Rodent Control Labor	4,837.50	4,837.50	5,062.50	5,400.00
Rodent Control Materials	1,050.00	1,050.00	1,050.00	1,050.00
Sub Total	35,410.38	26,794.25	29,500.50	31,383.00
Harvesting				
Labor for Harvesting	3,848.50	3,816.25	4,083.75	3,822.00
Labor for Threshing on the Field (Hired)	2,451.00	2,246.75	2,739.38	2,394.00
Labor for Threshing on the Field (Family)	1,445.88	1,585.63	1,766.25	1,974.00
Labor for Cleaning and Bagging (Hired)	876.13	876.13	1,265.63	1,200.00
Labor for Cleaning and Bagging (Family)	1,628.63	1,650.13	1,653.75	1,800.00
Cost of Transporting Laborers	367.67	825.00	883.33	991.67
Costs of storage fumigants				
Cost of Transport Harvests to Barn	876.67	1,072.67	1,263.33	2,066.67
Cost of Transporting Storage Materials	675.00	900.00	700.00	2,115.00
Rental or Depreciation Barn	1,000.00	1,200.00	1,400.00	1,600.00
Sub Total	13,169.47	14,172.55	15,755.41	17,963.34
Total Production Cost Per Hectare	79,402.38	70,274.36	75,593.82	84,914.46

Table 12: Ofada Rice Production Hectare Budget (Ogun State)

Operations	Production Year			
	2004	**2005**	**2006**	**2007**
Land Preparation (Manual)				
Land Clearing (Hired Labor)	9,380.00	10,374.75	9,434.25	10,175.63
Land Clearing (Family Labor Estimate)	2,100.00	2,102.50	2,047.50	2,010.00
Cost of labor transportation	424.00	524.00	526.00	526.00
Sub Total	11,904.00	13,001.25	12,007.75	12,711.63
Planting				
Seed Procurement	5,830.34	6,329.96	6,944.89	5,469.89
Seed handling and transportation	103.75	102.50	119.38	116.25
Seeding (labor)	3,003.00	3,001.50	3,496.50	3,333.25
Transportation of labor	424.00	524.00	526.00	526.00
Sub Total	9,361.09	9,957.96	11,086.77	9,445.39
Fertilizer Application at Planting				
Fertilizer Procurement	6,690.25	5,213.78	5,386.00	6,712.98
Fertilizer Handling & Transport	251.25	251.25	363.75	457.50
Labor for Application	1,050.00	1,087.50	1,181.25	1,255.50
Sub Total	7,991.50	6,552.53	6,931.00	8,425.98
Herbicide Application at Planting				
Herbicide Procurement	-	-	-	-
Herbicide Handling & Transport	-	-	-	-
Labor for Application	-	-	-	-
Sub Total	-	-	-	-
Field Maintenance				
Manual Weeding Labor	8,841.00	8,069.25	8,764.88	8,232.63
Pest Control				
Bird Scaring Labor (Family estimate)	29,925.00	29,050.75	30,893.63	31,196.88
Bird Scaring Material	790.00	790.00	790.00	790.00
Rodent Control Labor	3,850.00	3,987.50	4,331.25	4,606.25
Rodent Control Materials	3,500.00	3,500.00	3,500.00	3,500.00
Sub Total	38,065.00	37,328.25	39,514.88	40,093.13
Harvesting				
Labor for Harvesting	3,251.40	3,826.11	4,556.97	4,506.10
Labor for Threshing on the Field (Hired)	3,523.44	4,301.18	5,766.23	5,233.92
Labor for Threshing on the Field (Family)	1,746.47	3,563.23	3,338.92	3,423.38
Labor for Cleaning and Bagging (Hired)	1,633.34	1,856.25	3,020.85	3,249.99
Labor for Cleaning and Bagging (Family)	2,199.57	2,532.75	2,537.51	3,304.16
Cost of storage fumigant	347.50	397.50	387.50	517.50
Cost of Transporting Laborers	516.10	581.57	741.29	838.17
Cost of Transporting Harvests to Barn	234.40	247.80	299.40	317.10
Cost of Transporting Storage Materials	45.00	47.50	56.25	50.00
Rental or Depreciation Barn	1250.00	1283.30	1550.00	1675.00
Sub Total	14,747.23	18,637.19	22,254.93	23,115.31
Total Product Cost Per Hectare	90,909.82	93,546.43	100,560.20	102,024.05

Table 13: Ofada Rice Production Hectare Budget (Osun State)

Operations	Production Year			
	2004	**2005**	**2006**	**2007**
Land Preparation (Manual)				
Land Clearing (Hired Labor)	8,356.25	8,648.75	8,608.63	7,121.75
Land Clearing (Family Labor Estimate)	981.25	1,175.63	1,197.13	1,090.38
Cost of labor transportation	1,478.57	1,550.00	1,845.00	1,874.29
Sub Total	10,816.07	11,374.38	11,650.75	10,086.42
Planting				
Seed Procurement	8,712.33	9,224.82	11,250.00	11,178.60
Seed handling and transportation	108.00	108.00	160.00	160.00
Seeding (labor)	3,868.75	3,932.50	4,033.63	4,064.13
Transportation of labor	1,478.57	1,550.00	1,845.00	1,874.29
Sub Total	14,167.65	14,815.32	17,288.63	17,277.02
Fertilizer Application at Planting				
Fertilizer Procurement	6,338.50	6,805.75	5,299.50	5,800.50
Fertilizer Handling & Transport	160.00	160.00	240.00	240.00
Labor for Application	937.50	1,031.25	1,143.75	1,143.75
Sub Total	7,436.00	7,997.00	6,683.25	7,184.25
Herbicide Application at Planting				
Herbicide Procurement	1,179.43	1,415.31	1,441.76	744.30
Herbicide Handling & Transport	212.40	219.00	279.00	200.00
Labor for Application	625.00	687.50	762.50	762.50
Sub Total	2,016.83	2,321.81	2,483.26	1,706.80
Field Maintenance				
Manual Weeding Labor	3,875.00	4,262.50	4,727.50	4,727.50
Pest Control				
Bird Scaring Labor (Family estimate)	25,468.75	26,710.56	26,664.63	33,443.25
Bird Scaring Material	1,092.85	1,092.85	1,092.85	1,092.85
Rodent Control Labor	5,937.50	6,526.50	7,243.75	7,243.75
Rodent Control Materials	3,125.00	3,125.00	3,125.00	3,125.00
Sub Total	35,624.10	37,454.91	38,126.23	44,904.85
Harvesting				
Labor for Harvesting	3,914.83	4,000.50	4,565.50	4,797.00
Labor for Threshing on the Field (Hired)	3,290.45	3,468.64	3,793.02	4,345.44
Labor for Threshing on the Field (Family)	1,971.34	2,385.19	2,652.58	3,129.51
Labor for Cleaning and Bagging (Hired)	575.00	600.00	625.00	650.00
Labor for Cleaning and Bagging (Family)	1,742.25	1,842.00	1,837.50	1,969.50
Cost of storage fumigant	800.00	850.00	1000.00	1100.00
Cost of Transporting Laborers	983.33	983.33	983.33	983.33
Cost of Transporting Harvests to Barn	2,475.00	2,400.00	2,600.00	1,966.67
Cost of Transporting Storage Materials	192.40	199.00	279.00	300.00
Rental or Depreciation Barn	1000.00	1200.00	1500.00	1750.00
Sub Total	16,944.60	17,928.66	19,335.93	20,991.45
Total Product Cost Per Hectare	90,880.25	96,154.58	100,795.53	106,878.28

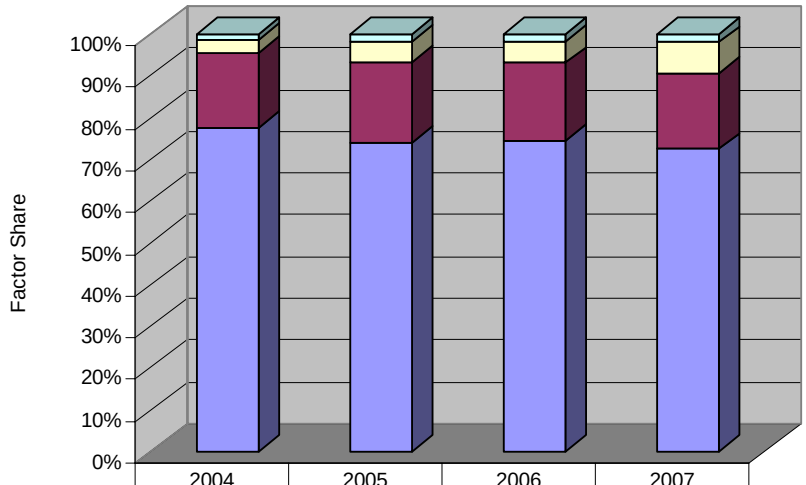
Table 14: Ofada Rice Production Hectare Budget (All locations)

Operations	Rice Production Hectare Budget (All Locations)			
	2004	**2005**	**2006**	**2007**
Land Preparation (Manual)				
Land Clearing (Hired Labor)	8,443.29	7,241.00	8,281.04	7,145.20
Land Clearing (Family Labor Estimate)	1,266.49	1,241.50	1,408.34	1,404.67
Cost of labor transportation	661.30	741.96	839.57	919.13
Sub Total	10,371.08	9,224.46	10,528.95	9,469.00
Planting				
Seed Procurement	7,900.59	7,816.22	9,291.07	9,137.96
Seed handling and transportation	90.59	96.47	123.82	129.41
Seeding (labor)	3,309.02	3,529.50	3,851.81	4,221.19
Transportation of labor	661.30	741.96	839.57	919.13
Sub Total	11,961.50	12,184.15	14,106.27	14,407.69
Fertilizer Application at Planting				
Fertilizer Procurement	5,290.29	4,512.16	4,481.82	5,194.66
Fertilizer Handling & Transport	187.65	171.18	224.12	327.06
Labor for Application	620.83	650.00	704.17	716.67
Sub Total	6,098.77	5,333.34	5,410.11	6,238.39
Herbicide Application at Planting				
Herbicide Procurement	347.34	416.27	457.22	392.48
Herbicide Handling & Transport	106.00	90.00	160.00	87.35
Labor for Application	310.42	325.00	352.09	358.34
Sub Total	763.75	831.27	969.30	838.17
Field Maintenance				
Manual Weeding Labor	6,413.17	6,116.50	6,414.99	6,880.03
Sub Total	6,413.17	6,116.50	6,414.99	6,880.03
Pest Control				
Bird Scaring Labor (Family estimate)	28,402.97	25,597.00	27,328.84	28,724.13
Bird Scaring Material	1,571.00	1,571.00	1,571.00	1,571.00
Rodent Control Labor	4,743.00	4,972.50	5,386.90	5,482.53
Rodent Control Materials	2,065.90	2,065.90	2,065.90	2,065.90
Sub Total	36,782.87	34,206.40	36,352.64	37,843.56
Harvesting				
Labor for Harvesting	3,499.74	3,858.85	3,906.53	4,170.57
Labor for Threshing on the Field (Hired)	3,807.78	3,948.60	4,920.84	4,850.36
Labor for Threshing on the Field (Family)	2,246.26	2,786.69	3,172.78	3,999.42
Labor for Cleaning and Bagging (Hired)	1,333.26	1,345.79	1,822.93	1,950.00
Labor for Cleaning and Bagging (Family)	2,478.39	2,534.71	2,381.96	2,925.00
Cost of storage fumigant	438.00	488.00	510.00	634.00
Cost of Transporting Laborers	608.69	721.67	830.00	869.00
Cost of Transporting Harvests to Barn	915.00	940.50	999.06	1,101.54
Cost of Transporting Storage Materials	236.59	292.65	273.24	521.18
Rental or Depreciation Barn	1,083.33	1,227.77	1,483.33	1,675.00
Sub Total	16,647.03	18,145.23	20,300.67	22,696.07
Total Production Cost Per Hectare	89,038.19	86,041.35	94,082.93	98,372.91

Figures 14a - d summaries the distribution of the per hectare Ofada paddy rice production costs across various variable factors. We find that labor accounts for the lion share of the variable costs, accounting for an average of 74 per cent of production cost on an average farm in 2007. Some variation exists however in the factor shares: labor share in 2007 stood at 72.4 per cent in Ekiti, 78.9 per cent in Ogun and 69.7 per cent in Osun. Meanwhile, an average Ofada rice farmer in Osun state expended a greater share (21.6 per cent) of his production costs on intermediate capital materials like fertilizer and other agrochemicals than what obtains for an average farmer in the study area (19.3 per cent). The main evidence emanating from the above is that Ofada rice production system in the study area is labor intensive. Therefore, efforts targeted at lowering production cost and enhancing efficiency may have to be targeted at lowering labor costs.

Evidences earlier presented on Table 10 shows that bird scaring alone accounted for about 42 per cent of total labor allocation to activities on Ofada rice farms. It is therefore, not surprising that costs associated with pest control accounted for about 40 per cent of the per hectare costs of Ofada paddy rice production, across all locations (Tables 11 – 14). In 2007, an average Ofada rice farm in the sample (i.e. across all locations) incurred as much as N37, 843.56 on pest control, which amounted to 38.5 per cent of total cost and about 52 per cent of labor costs. It would therefore, appear that any technology that reduces labor use in bird scaring, while effectively controlling pests, may go a long way in curtailing production costs and enhancing production efficiency on Ofada rice farms.

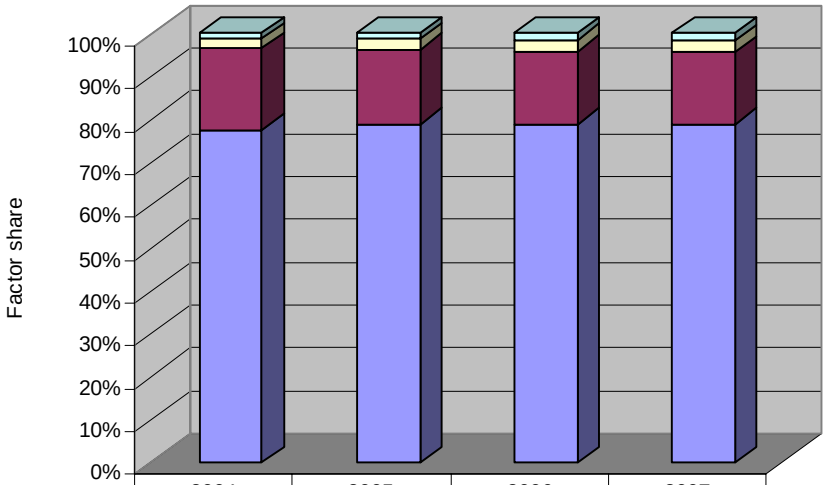
Fig. 14a: Relative factor cost in Ofada rice paddy production in Ekiti State



	2004	2005	2006	2007
Depreciation & Others	1,000.00	1,200.00	1,400.00	1,600.00
Transportation costs	2,462.25	3,512.67	3,779.57	6,444.59
Materials costs	14,391.00	13,542.44	14,057.38	15,409.47
Labour Costs	61,549.13	52,019.25	56,356.88	61,460.40

Year

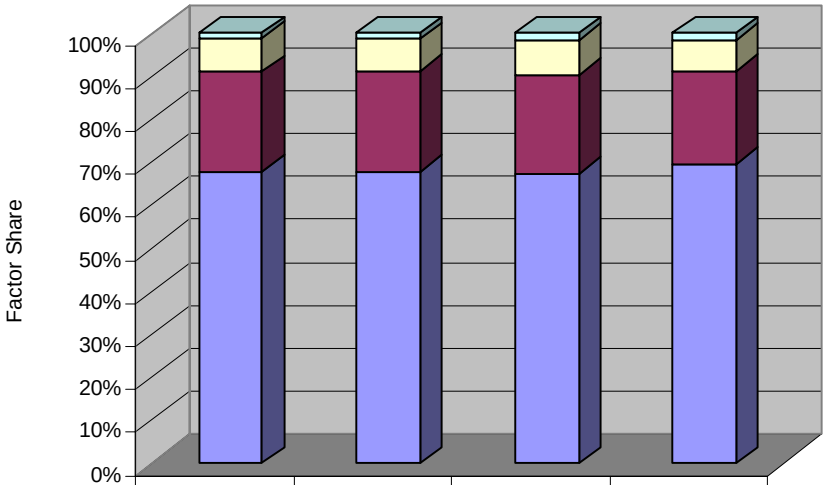
Fig. 14b: Relative factor costs in Ofada paddy rice production in Ogun State



	2004	2005	2006	2007
Depreciation & Others	1,250.00	1,283.30	1,550.00	1,675.00
Transportation costs	1,998.50	2,278.62	2,632.07	2,831.02
Materials costs	17,158.09	16,231.24	17,008.39	16,990.37
Labour Costs	70,503.23	73,753.27	79,369.74	80,527.66

Year

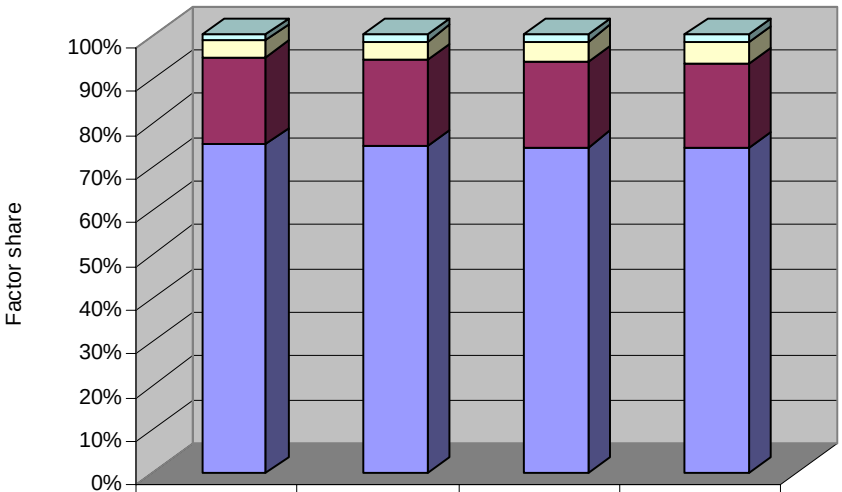
Fig. 14c: Relative factor costs in Ofada rice paddy production in Osun state



	2004	2005	2006	2007
Depreciation & Others	1,000.00	1,200.00	1,500.00	1,750.00
Transportation costs	7,088.27	7,169.33	8,231.33	7,598.58
Materials costs	21,248.11	22,513.73	23,209.11	23,041.25
Labour Costs	61,543.87	65,271.51	67,855.10	74,488.45

Year

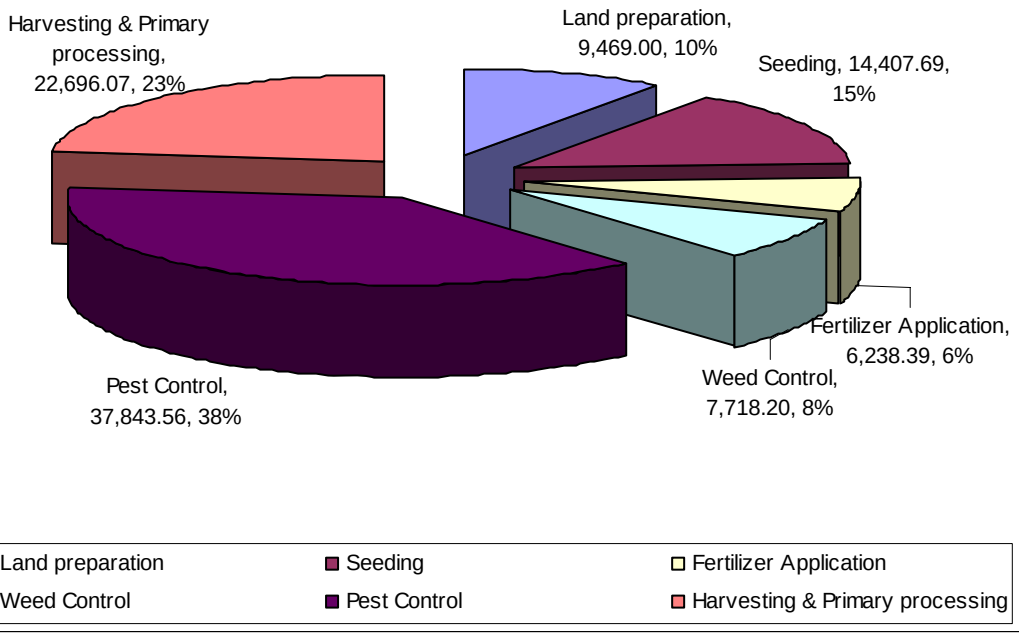
Fig. 14d: Relative factor costs in Ofada rice paddy production (All locations)



	2004	2005	2006	2007
Depreciation & Others	1,083.33	1,227.77	1,483.33	1,675.00
Transportation costs	3,467.12	3,796.39	4,289.38	4,873.80
Materials costs	17,613.12	16,869.55	18,377.00	18,996.00
Labour Costs	66,874.62	64,147.64	69,933.21	72,828.11

Year

Fig. 15: Cost shares by operation on an average Ofada rice farm in 2007



5.4.1.7 Returns to Ofada Paddy Rice Production

The main motivation for farmers' involvement in Ofada rice production includes, but may not necessarily be restricted to, the pursuit of income (profit) needed for meeting farm household members' needs and welfare in general. This sub-section provides a summary of the costs and returns to Ofada paddy rice production in the study area, with a view to determining profitability.

With specific reference to sampled rice farmers from Ekiti state, available evidence as summarized in Table 15 suggests that if all factors (including family and hired labor) were valued at the prevailing market prices, a typical Ofada paddy rice farmer in the state operated at a loss between 2005 and 2007. In other words, whatever the farmers seems to be getting from their efforts (up to the point of producing paddy rice that could be sold) do not adequately compensate for their labor if it is valued at the prevailing wage rate. This probably explain a situation where most Ofada rice producing farmers in the state reported they had to undertake the processing of rice paddy into finished rice directly or by other household members. A close examination of results on Table 15, however, points clearly at poor yield as the main source of this poor performance. While several factors may account for this poor yield, including inadequate pest control, the relatively poor yield is however not unexpected if one considers the fact that an average Ofada rice farmer in Ekiti state adopted a labor intensive production system, with very little or no use of modern (yield enhancing) inputs like fertilizer, herbicides, tractors, etc. It is also worthy to note that sales price of Ofada paddy rice in Ekiti state is generally low and lower than the average in study area. This could, in part, be associated with a relatively poor level of farm productivity and/or poor demand, the latter of which is very much unlikely, given the rising demand for rice in Nigeria.

Table 15: Summary of Costs and Returns to Ofada Paddy Rice Production in Ekiti State

Description	**Cost / Revenue by Production Year (Ekiti)**			
	2004	**2005**	**2006**	**2007**
Mean Yield (tons/ha)	1.89	1.40	1.40	1.58
Mean Selling Price of Paddy Rice (N/ton)	50,000.00	52,000.00	52,000.00	55,000.00
Total Revenue Per Hectare	**94,500.00**	**72,800.00**	**72,800.00**	**86,900.00**
Variable Costs				
Labor Costs	61,549.13	52,019.25	56,356.88	61,460.40
Materials costs	14,391.00	13,542.44	14,057.38	15,409.47
Transportation costs	2,462.25	3,512.67	3,779.57	6,444.59
Total Variable Costs Per Hectare	**78,402.38**	**69,074.36**	**74,193.82**	**83,314.46**
Gross Income (N/Ha)	**16,097.63**	**3,725.64**	**- 1,393.82**	**3,585.54**
Fixed Costs				
Rent on land	1,500.00	1,800.00	2,050.00	4,292.50
Depreciation of farm tools	2,130.57	2,130.57	2,130.57	2,130.57
Depreciation of barn	1,000.00	1,200.00	1,400.00	1,600.00
Total Fixed Cost	**4,630.57**	**5,130.57**	**5,580.57**	**8,023.07**
Total Costs Per Hectare	**83,032.95**	**74,204.93**	**79,774.39**	**91,337.53**
Net Income Per Hectare	11,467.06	- 1,404.93	- 6,974.39	- 4,437.53

Production Cost Per Ton	**43,932.78**	**53,003.52**	**56,981.71**	**57,808.56**
Net Income Per Ton	6,067.22	- 1,003.52	- 4,981.71	- 2,808.56
Rate of Return on Investment	**13.8%**	**-1.9%**	**-8.7%**	**-4.9%**

As presented in the previous sections, Ofada rice farming systems and operation costs in Ogun state is not substantially different from what obtains in Ekiti state. However, evidence obtained as summarized in Table 16 shows that Ofada rice farmers in Ogun state performed a little bit better than their counterparts in Ekiti state largely because they were able to sell their product at much higher prices (N68, 333.33 in 2007 as against Ekiti state's N55, 000.00 in the same year). Yield on an average rice farm in the sample from Ogun state was also slightly higher than what was obtained by their counterpart in Ekiti state. In all, the worth of Ofada paddy rice output of an average rice farmer in the sample from Ogun state was estimated at about N123, 000 per hectare in 2007 as against a total cost of about N109, 000. The rate of return (net income as a percentage of total cost) recorded on paddy rice production between 2004 and 2007 by an average Ofada rice farmers was estimated at between 11.4 per cent in 2004 and 25.1 per cent in 2006. It is however worthy to note that the rate achieved was largely determine by variation in yield as well as the rising price of Ofada paddy rice in the study location. It should be noted, at this juncture, that like their counterparts in Ekiti state, most Ofada rice farmers drawn from Ogun state reported they also had to undertake the processing of paddy rice produced into finished rice and marketed the product directly or through their wives and/or other household members to take advantage of the high selling price of finished rice in Lagos.

Table 16: Summary of Costs & Returns to Ofada Paddy Rice Production in Ogun State

Description	**Cost / Revenue by Production Year (Ogun)**			
	2004	**2005**	**2006**	**2007**
Mean Yield (tons/ha)	1.81	1.94	2.07	1.80
Mean Selling Price of Paddy Rice (N/ton)	59,000.00	59,666.67	64,666.67	68,333.33
Total Revenue Per Hectare	**106,790.00**	**115,753.34**	**133,860.01**	**122,999.99**
Variable Costs				
Labor Costs	70,503.23	73,753.27	79,369.74	80,527.66
Materials costs	17,158.09	16,231.24	17,008.39	16,990.37
Transportation costs	1,998.50	2,278.62	2,632.07	2,831.02
Total Variable Costs Per Hectare	**89,659.82**	**92,263.13**	**99,010.20**	**100,349.05**
Gross Income (N/Ha)	**17,130.18**	**23,490.21**	**34,849.81**	**22,650.94**
Fixed Costs				
Rent on land	2,866.67	3,850.00	4,328.57	5,216.67
Depreciation of farm tools	2,118.37	2,118.37	2,118.37	2,118.37
Depreciation of barn	1,250.00	1,283.30	1,550.00	1,675.00
Total Fixed Cost	**6,235.04**	**7,251.67**	**7,996.94**	**9,010.04**
Total Costs Per Hectare	**95,894.86**	**99,514.80**	**107,007.14**	**109,359.09**
Net Income Per Hectare	10,895.14	16,238.54	26,852.87	13,640.90
Production Cost Per Ton	**52,980.59**	**51,296.29**	**51,694.27**	**60,755.05**

Net Income Per Ton	6,019.41	8,370.38	12,972.40	7,578.28
Rate of Return on Investment	**11.4%**	**16.3%**	**25.1%**	**12.5%**

Evidence from Osun state is substantially different from what obtains in Ogun and Ekiti state in a number of ways. Results presented earlier showed that farmers in Osun state, while still operating a labor intensive farming system, used much more modern (yield enhancing / labor saving) inputs than their counterpart in the other two study locations. This probably explained the relatively higher yield of paddy rice recorded by an average Ofada rice farmer in Osun state (2.25 tons/ha in 2007 as against 1.58 ton/ha in Ekiti and 1.80 tons/ha in Ogun) and lower labor cost share as earlier presented. Table 17 summarized the implications of this mode of operation on profitability of Ofada paddy rice production in Osun state.

One very interesting result from Table 17 is the fact that Ofada paddy rice from Osun state, commanded much higher prices than what obtains in other study location. This is most likely a reflection of the higher quality of paddy rice coming from farms in Osun state. It is also instructive to note that it is only in Osun state that an active trade in paddy rice (as against finished rice in other locations) was significant. Why most farmers in Ogun and Ekiti had to, for one reason or another, undertake direct processing of their paddy rice, most farmers in Osun state reported that they normally sell their paddy rice to paddy merchants, which were noticeable only in Osun state.

Table 17: Summary of Costs and Returns to Ofada Paddy Rice Production in Osun State

Description	**Cost / Revenue by Production Year (Osun)**			
	2004	**2005**	**2006**	**2007**
Mean Yield (tons/ha)	2.33	2.31	2.15	2.25
Mean Selling Price of Paddy Rice (N/ton)	60,000.00	62,500.00	73,000.00	71,750.00
Total Revenue Per Hectare	**139,800.00**	**144,375.00**	**156,950.00**	**161,437.50**
Variable Costs				
Labor Costs	61,543.87	65,271.51	67,855.10	74,488.45
Materials costs	21,248.11	22,513.73	23,209.11	23,041.25
Transportation costs	7,088.27	7,169.33	8,231.33	7,598.58
Total Variable Costs Per Hectare	**89,880.25**	**94,954.58**	**99,295.53**	**105,128.28**
Gross Income (N/Ha)	**49,919.75**	**49,420.42**	**57,654.47**	**56,309.22**
Fixed Costs				
Rent on land	1,840.00	2,480.00	3,200.00	4,200.00
Depreciation of farm tools	1,858.25	1,858.25	1,858.25	1,858.25
Depreciation of barn	1,000.00	1,200.00	1,500.00	1,750.00
Total Fixed Cost	**4,698.25**	**5,538.25**	**6,558.25**	**7,808.25**
Total Costs Per Hectare	**94,578.50**	**100,492.83**	**105,853.78**	**112,936.53**
Net Income Per Hectare	45,221.50	43,882.17	51,096.22	48,500.97
Production Cost Per Ton	**40,591.63**	**43,503.39**	**49,234.32**	**50,194.01**
Net Income Per Ton	19,408.37	18,996.61	23,765.68	21,555.99

Rate of Return on Investment	**47.8%**	**43.7%**	**48.3%**	**42.9%**

Despite the fact that Ofada paddy rice total production costs were higher (or at least comparable) in most years than what obtains in other study location, returns on farmers efforts was much higher in Osun state than what obtains in the other two locations. Rate of return on investment was greater than 40 per cent in Osun state in all the years. It is however, worthy to note that the relatively high rate of return may be adduced to the higher yield (possibly a product of more use of modern inputs) and higher selling prices for paddy rice (most likely a result of higher product quality and better organization as evident in the existence of a virile paddy trading system in the state). All these points to the fact that interventions required for raising efficiency on Ofada rice farms in the study area and in lowering operation costs would need to emphasis the introduction of labor saving production system and proper organization of the production – to consumption system.

Focusing on the average farmer in the entire sample, it would appear that return to Ofada paddy rice production in the study area is reasonably high. An average Ofada paddy rice farmer earns around 20 per cent return on his/her investment (ranging from 18.3% in 2007 to 26.8% in 2006) (Table 18). This is however made possible by the rather high selling prices, which to some extent is only being sustained by the high tariff placed on imported rice in the country).

Table 18: Summary of Costs and Returns to Ofada Paddy Rice Production (All Locations)

Description	**Cost / Revenue by Production Year (All locations)**			
	2004	**2005**	**2006**	**2007**
Mean Yield (tons/ha)	1.96	1.90	1.93	1.86
Mean Selling Price of Paddy Rice (N/ton)	57,444.44	59,222.22	65,555.56	66,888.89
Total Revenue Per Hectare	**112,591.10**	**112,522.22**	**126,522.23**	**124,413.34**
Variable Costs				
Labor Costs	66,874.62	64,147.64	69,933.21	72,828.11
Materials costs	17,613.12	16,869.55	18,377.00	18,996.00
Transportation costs	3,467.12	3,796.39	4,289.38	4,873.80
Total Variable Costs Per Hectare	**87,954.86**	**84,813.58**	**92,599.60**	**96,697.91**
Gross Income (N/Ha)	**24,636.24**	**27,708.64**	**33,922.64**	**27,715.42**
Fixed Costs				
Rent on land	2,415.38	2,776.92	3,671.43	4,698.00
Depreciation of farm tools	2,059.32	2,059.32	2,059.32	2,059.32
Depreciation of barn	1,083.33	1,227.77	1,483.33	1,675.00
Total Fixed Cost	**5,558.03**	**6,064.01**	**7,214.08**	**8,432.32**
Total Costs Per Hectare	**93,512.89**	**90,877.59**	**99,813.68**	**105,130.23**
Net Income Per Hectare	19,078.21	21,644.63	26,708.56	19,283.10
Production Cost Per Ton	**47,710.66**	**47,830.31**	**51,716.93**	**56,521.63**
Net Income Per Ton	9,733.78	11,391.91	13,838.63	10,367.26
Rate of Return on Investment	**20.4%**	**23.8%**	**26.8%**	**18.3%**

5.2.2 Inputs Availability and Costs

It is obvious from the results presented so far, that the availability and access to modern inputs and services such as tractor hire services, fertilizer and other agrochemicals might be central to the enhancement of productivity within the value chain. This section provides information on the range of farm inputs/services available to farmers in the study area and their associated costs. A total of nine farm service centers (three in each study location/state) were identified and included in the sample. The socio-economic profile of these service providers had earlier been presented in section 4.1.

5.2.2.1 Location of Suppliers

As shown on Table 19, these suppliers of modern inputs are predominantly urban / sub-urban based. On the average, government owned agro-service centers which dominate the market are located about 13km from an average rice farmer in the sample, while those operated by private individuals were located at an average of 8km from the farmers (Table 20). Though these may seem close enough, the limited availability of good rural road networks, transport services providers and the cost associated with their services remain a major constraint to farmers. The immediate effect of this is the high cost of transportation of inputs (Table 21).

Table 19: Farmers by Location of Suppliers from Whom Inputs Were Procured

Location of input supplier	Percentage of farmers by study location / state			Total
	Ekiti	Ogun	Osun	
Ofada		40.0%		19.0%
Owode		50.0%		23.8%
Korisa		10.0%		4.8%
Isiri			33.3%	9.5%
Erinoke			33.3%	9.5%
Oshogbo			33.3%	9.5%
Igbemo	40.0%			9.5%
Emure	40.0%			9.5%
Ikole	20.0%			4.8%
Total	100.0%	100.0%	100.0%	100.0%

Table 20: Avg Distance (Km) Of Patronized Input Suppliers to an Average Farmer

Study location / state	Distance (km)	
	Government	Private
Ekiti	15	5
Ogun	13	7.5
Osun	12.5	12
Total	13.25	8

Table 21: Transportation Cost of Inputs Using Farmer in the Sample by Study Location

Input	Percentage of farmers by study location / state			Sample Average
	Ekiti	Ogun	Osun	

Fertilizer	500.00	153.33	1,200.00	432.00
Fumigant			200.00	200.00
Herbicide	278.33		750.00	467.00
Seed	145.00	155.00	400.00	196.82

5.2.2.2 Availability of modern inputs

As shown on Tables 22 and 23, NPK 15-15-15 and NPK 20-10-10 are the most commonly available fertilizers in the market. They are offered for sale by 64 per cent and 27 per cent of the input suppliers respectively. NPK 15-15-15 was reported to have been supplied in 50kg packaging units, at an average selling price of N1, 962.50 in 2004, up to N2, 784.38 in 2007. Vestamin 2-4D, Gramozone and Atrazine are the most widely distributed herbicides, offered for sale by 42 per cent, 33 per cent and 27 per cent of the input suppliers respectively. Apron plus (45%) is the most commonly supplied seed dresser, while Nuvacon (18%), Termicot (18%) and/or Actelic (18%) are the commonest storage fumigants being made available to farmers in the study area. It is however worthy of note that many of the agrochemicals in the study locations are either internationally banned or prohibited. It may therefore imply that some of these items, which may have been manufactured several years ago, may have exceeded their half-life, thus their limited potency. These in part, may explain why most farmers in the sample complained about the ineffectiveness of agrochemicals they purchased.

Coming to tractor hire services, only two out of the nine input suppliers in the sample offered tractor hire services. Interestingly, the two respondents are government–owned agro-service centres. They claimed to have 6/10 tractors and one/two planters for hire to farmers. One agency also claimed it had 10-sprayers for hire. The per hectare rental charges for tractor services was put at N2,500 in 2007 while planters are leased out at the rate of N3000 per hectare.

Overall, information on Tables 22 – 23 tends to suggest that the input delivery system in the study area may not be in a position to offer effective services. For example, with only 6-8 tractors available in an Agroservice Corporation's zone, which usually covers three or more LGAs, only the privileged few end up gaining access to these services assuming that the machines were functional.

Table 22a: Range of Inputs Available in the Study Area (Fertilizer, Herbicide & Insecticide)

Brand Name	Supplier selling Product (%)	Packaging Unit		Average selling price of the highest packaging unit			
		Min	Max	2004	2005	2006	2007
Fertilizers							
NPK Abifort 20.10.10	27%	50	50	2150.00	2300.00	2475.00	2600.00
NPK 15.15.15	64%	20	50	1962.50	2187.50	2559.38	2784.38
NPK 27.13.13	9%						
NPK 12.12.17+Mg	-						
NPK 27.12.10	9%	50	50	1800.00	2000.00	2450.00	2500.00
NPK 10.10.10	9%	50	50	1800.00	2000.00	2450.00	2500.00
NPK 27.13.13	-	50	50	2000.00	2200.00	2450.00	2500.00
Agauzer	9%	25	25	300.00	400.00	500.00	500.00
NPK 10.10.12	9%	50	50	1700.00	2000.00	2800.00	3500.00
Booster Extra	9%	1	1	833.33	1000.00	1066.67	1233.33
Urea	9%	50	50	2100.00	2100.00	2450.00	2450.00
Herbicides							
Gramazone	33%	1	5	1510.00	1750.00	1934.00	1980.00
Aminoforce	9%	1	40	500.00	650.00	700.00	800.00
Abex2, 4D	9%	60	60	600.00	650.00	700.00	800.00
Select 2, 4D	9%	1	40	750.00	774.00	824.00	882.00
Vestamin 2, 4D	42%	40	40	600.00	650.00	700.00	800.00
Paraforte	9%	1	1	550.00	650.00	700.00	850.00
Dragon	9%	1	4	550.00	625.00	675.00	800.00
Ultrazine	27%	1	4	766.67	800.00	833.33	866.67
Glycel	18%	1	2	875.00	950.00	1030.00	1040.00
Vinash	-	1	4	600.00	700.00	775.00	900.00
Ultranion	-	4	4	700.00	750.00	800.00	800.00
Weed Off	9%	1	1	750.00	800.00	825.00	950.00
Force Off	9%	1	2	2000.00	2050.00	2150.00	2250.00
Powid Up	9%	1	1	1125.00	1187.50	1150.00	1200.00
Clear Weed	-	1	1	500.00	600.00	800.00	1000.00
Propan	9%	1	1	725.00	760.00	850.00	950.00
Orizo Plus	9%	1	1	.00	.00	.00	1200.00
Saro State	9%	2	2	1000.00	1000.00	1000.00	1000.00
Touch Down	9%	2	2	1100.00	1100.00	1100.00	1100.00
Delstate	9%	2	2	1200.00	1200.00	1200.00	1200.00
Fungicides/Insecticides							
Endocel	9%	100	100	840.00	900.00	1100.00	1100.00
Dash	9%	20	20	1000.00	1000.00	1000.00	1200.00
Suraksha	9%	25	25	800.00	800.00	800.00	800.00
Karate	9%	1	1	1500.00	1500.00	1800.00	2000.00
Zap	9%	100	100	.00	300.00	300.00	400.00
Cypermenthrin	8%	1	1	800.00	850.00	1000.00	1000.00
Endofalm	9%	1	1	925.00	1000.00	1125.00	1150.00
Act Force	18%	1	1	800.00	900.00	950.00	980.00
Endoforce	9%	1	1	900.00	950.00	1000.00	1200.00

Table 22b: Range of Inputs Available in Study Area (Seed Dressers & Storage Fumigants)

Brand Name	Supplier selling Product (%)	Packaging Unit		Average selling price of the highest packaging unit			
		Min	Max	2004	2005	2006	2006
Seed Dresser							
Apron plus	45%	0	100	360.00	394.00	436.00	496.00
Apron Stairs	18%	10	10	85.00	125.00	165.00	165.00
Dress Force	18%	10	10	60.00	90.00	125.00	125.00
Facon	9%	0	0	70.00	80.00	100.00	100.00
Monocoptrose	9%	0	0	.00	.00	.00	.00
Seed plus	18%	1	10	600.00	685.00	735.00	800.00
Dithane M45	9%	1000	1000	120.00	200.00	250.00	250.00
Ridomil	9%	1000	1000	90.00	120.00	150.00	150.00
Storage Fumigants							
Nuvacon	18%	1	10	1050.00	1125.00	1700.00	1800.00
Forcetoxin	9%	1	1	500.00	800.00	1200.00	900.00
Termicot	18%	1	1	825.00	875.00	1250.00	1250.00
Aluplus	9%	1	1	750.00	750.00	1200.00	1200.00
Jestoxin	9%	1	1	750.00	750.00	1200.00	1200.00
Actelic	18%	1	1	1166.67	1233.33	1406.67	1693.33
Storeforce	9%	1	1	1000.00	1000.00	1100.00	1300.00
Phostoxin	9%	30	30	300.00	400.00	500.00	600.00
Quickphose	9%	1	1	400.00	500.00	600.00	700.00

Table 23: Equipment Leasing Services Available in Study Area

Machine / Equipment	Supplier selling Product	No. available		Average rental rate (N/Ha/day)			
		Min	Max	2004	2005	2006	2006
Tractor	2	6	10	1775.00	1975.00	2100.00	2500.00
Planter	2	0	2	1500.00	2000.00	2500.00	3000.00
Sprayer	1	10	10	140.00	180.00	220.00	250.00

5.2.3 Paddy Rice Merchandising

Globally, agricultural commodities tend to thrive well in locations and situations where the services of assemblers are in adequate supply. In the Ofada rice value-chain, paddy merchants, particularly in Osun state, consolidate paddy rice across the state, warehouse same, and gradually release them throughout the year to processors. This activity helps stabilize paddy rice supply and price, thus enhancing the overall efficiency of the value chain in Osun state, in specific. In this study, ten paddy merchants were sampled. This section provides actionable information on the commercial activities in paddy rice, and its associated costs and returns. You may wish to see section 4.1 for the socio-economic profile of these categories of stakeholders.

5.2.3.1 Sourcing of Paddy Rice

Table 24 presents the distribution of the paddy merchants by sources, destination, and purpose of paddy rice procurements. The dominant procurement sites for paddy rice in the study area include feeder markets in Kenta-Kilasho in Ogun state, Alaka in Osun state and Agbado in Ekiti state. Farmers and other sellers of paddy rice dispose off their produce to the paddy merchants, who assemble the produce and arrange their transportation to point of sales/processing in Owode, Erin-Oke and Igbemo in Ogun, Osun and Ekiti states respectively.

It is instructive to note, that while virtually all Ofada paddy rice merchants in Osun state resell their merchandise to processors, their counterparts in Ogun and Ekiti states directly undertake the processing of this commodity to finished rice. This suggests that the bulking agents in paddy rice trade in Ogun and Ekiti integrate processing with their activities. In other words, paddy merchandising as a distinct role exists only in the Ofada rice value chain in Osun state.

This however, may not be unconnected with the fact that the paddy rice produced by farmers in Osun state might be of better quality, and are sold in larger quantity, than what obtains in Ogun and Ekiti state. Post survey interaction with the farmers revealed that most Ofada rice farmers in Ogun and Ekiti states don't sell their rice as paddy: rather, they get it processed within their households and sold as finished rice in an attempt to derive as much income as possible from their relatively small outputs.

This tendency weakens the prospects for trade in paddy rice and also discourages the emergence of large processing units that might be able to take advantage of economies of scale. It also means that overhead costs that ought to be spread over large volume transactions are being borne individually by several smallholders, and at a prohibitive cost which ultimately get passed on to the consumers.

Table 24: Distribution of Paddy Merchants by Mode of Paddy Rice Procurement

	Location			Total
	Ekiti	Ogun	Osun	
Procurement Sites				
• Kenta Kilasho		75.0%		30.0%
• Ita Oko		25.0%		10.0%
• Alaka			66.7%	20.0%
• Ofon			33.3%	10.0%
• Ilupeju	33.3%			10.0%
• Agbado	66.7%			20.0%
Total	100.0%	100.0%	100.0%	100.0%
What is done with rice procured				
• Resell			100.0%	22.2%
• Processed	100.0%	100.0%		77.8%
Total	100.0%	100.0%	100.0%	100.0%
Processing Site / Sale Point				
• Owode		100.0%		40.0%
• Erin Oke			100.0%	30.0%
• Igbemo	100.0%			30.0%
Total	100.0%	100.0%	100.0%	100.0%
Distance between procurement and processing sites (km)				
• Below 10		25.0%	100%	40.0%
• 10 - <20	33.3%	50.0%		30.0%
• Above 20	66.7	25.0%		30.0%
Total	100.0%	100.0%	100.0%	100.0%

5.2.3.2 Costs and Return Profile of Paddy Merchants

Table 25 presents the costs and returns structure in paddy rice merchandising in Osun state. It was observed that an average paddy rice merchant in the Osun state sample, traded in as many as 30 tons of paddy rice in the 2007 trading season compared to an average of 15 tons in the 2004 trading season. Paddy rice are usually transported in 10 tons capacity lorries, at a fee of about N10,000 per trip in 2004 rising to N20,500 in 2007. In addition to assembling and transportation of paddy rice to point of sales, paddy merchants also engage in sorting, dusting, re-bagging and grading for better pricing.

At the enterprise level, an average merchant's gross income rose from N42,517 in 2004 to N231,425 in 2007. When evaluated on per ton basis, a typical merchant procured paddy rice at an average price of N61,750 in 2007 (up from N50,000 in 2004) and resold at an average price of N75, 000 per ton (up from N56, 667 in

2004). The total marketing cost incurred per ton was estimated at an average of N5, 536 (up from N3,894 in 2005), yielding a gross profit of N7,714 per ton in 2007.

Table 25: Budgetary Analysis of Costs and Returns to Paddy Rice Merchandising in Osun State, Nigeria

Osun State - Paddy Merchants	**Per Enterprise Analysis**				**Per ton Analysis**			
Description	**2004**	**2005**	**2006**	**2007**	**2004**	**2005**	**2006**	**2007**
Average quantity of paddy rice traded (tons/year)	15.5	20.75	25.25	30				
Estimated foreign bodies content (%)	0.78%	1.00%	1.03%	1.00%				
Purchase price of rice paddy (N/ton)	50,000	52,250	56,250	61,750				
Selling price of rice paddy (N/ton)	56,667	62,000	71,333	75,000				
Average capacity of vehicle used (tons)	10	10	10	10				
Number of vehicle trips to transport paddy	2	2	3	3				
Transport cost on hired vehicle (N / vehicle trip)	10,000	11,000	16,800	20,500				
Hired labor cost (loading, off-loading, etc) (N/ton)	200	200	450	500				
Average quantity of paddy rice transported per trip (tons)	8	10	8	10				
Sales revenue (N)	**878,333**	**1,286,500**	**1,801,167**	**2,250,000**	**56,667**	**62,000**	**71,333**	**75,000**
Cost of goods sold (N)	**775,000**	**1,084,188**	**1,420,313**	**1,852,500**	**50,000**	**52,250**	**56,250**	**61,750**
Add: Marketing costs								
Cost of product transportation (N)	20,000	22,000	50,400	61,500	1,290	1,060	1,996	2,050
Cost of hired labor (loading, off-loading, etc) (N)	3,100	4,150	11,363	15,000	200	200	450	500
Cost of removing foreign bodies (N)	8,267	13,833	18,517	22,000	533.33	666.67	733.33	733.33
Cost of intermediate materials (bags, storage, etc) (N)	6,200	8,300	10,100	12,000	400	400	400	400
Warehousing costs (N)	11,625	16,263	21,305	27,788	750	784	844	926
Taxes and levies (N)	7,750	10,842	14,203	18,525	500	523	563	618
Other marketing costs	3,875	5,421	7,102	9,263	250	261	281	309
Sub-total (marketing costs, N)	**60,817**	**80,809**	**132,988**	**166,075**	**3,924**	**3,894**	**5,267**	**5,536**
Total Variable Cost (N)	835,817	1,164,997	1,553,301	2,018,575	53,924	56,144	61,517	67,286
Gross Margin (N)	**42,517**	**121,503**	**247,866**	**231,425**	**2,743**	**5,856**	**9,816**	**7,714**
Benefit/Cost ratio	1.05	1.10	1.16	1.11	1.05	1.10	1.16	1.11
Gross margin (%)	5%	10%	16%	11%	5%	10%	16%	11%

Evidence from Table 25 suggests that paddy merchandising is a quite lucrative business in Osun state, and the profitability is rising, on the average, over time. The benefit-cost ratio for example rose from 1.05 in 2004 to 1.11 in 2007. Gross earning percentage, which measures rate of returns to the traders investment in the business (after accounting for own labor and other household resources used) also rose from 5.0 per cent in 2004 to 11.0 in 2007. Bearing in mind the fact that paddy merchandising is a short duration business, which does not substantially tie down capital this rate of returns appears quite rewarding.

5.2.4 Rice Milling Services

Rice millers occupy a central position in the Ofada rice value chain, as they provide the much needed milling services to several small-holders (farmers and processors) who could not afford to own a mill of their own. This section profiles the operation costs and returns of the 10 rice millers included in the sample. Please recall that socio-economic characteristics of the millers were earlier discussed in section 4.1. Figure 16 and 17 summarize the structure of the costs of operation of an average rice miller in the study area, while others relevant details are presented in Tables 26 – 30 for each study location. Note however that apart from rice milling, these operators also render milling services for other agricultural produce.

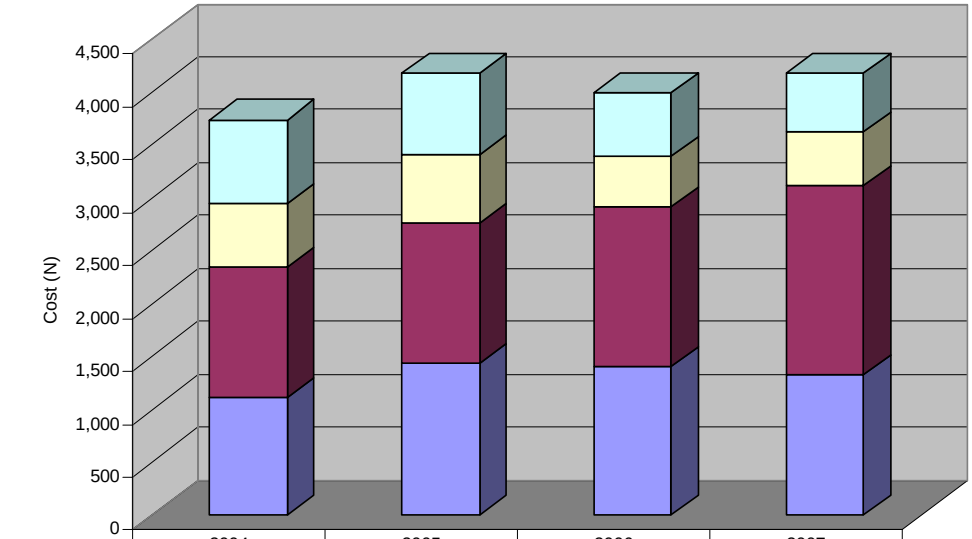
As shown on Table 26, an average rice miller in the study area charged an average of N6, 089.77 per ton for rice milling services in 2007 (up from N4, 919.41 in 2007), and milled an average of 56 tons of paddy rice in that year (up from 27 tons in 2004). This transaction volume is however only about 81 per cent of total tonnage of agricultural commodities that was milled.

An average rice miller in the sample incurred a total cost of about N4,171 per ton of paddy rice milled in 2007 (up from N3,734 per ton in 2004), and charged an average of N6,090 per ton (up from N4,919 per ton in 2004). The net income per ton of paddy rice milled in 2007 was estimated at about N1,919 (up from about N1,186 in 2004) which amounted to a benefit-cost ratio of 1.46 or about 46 per cent returns on investment in 2007. The average milling charge per ton of paddy rice in the study area is rather too high and could be stifling. This, however, may not be unconnected with the rather high cost of operation, most especially energy and Labor costs. A close examination of the cost structure shows that as much as about 43 per cent of the average miller's costs were expended on Labor while another 32 per cent was expended on energy. This shows clearly that high costs of operation of the rice millers may be ascribed to a large extent, on the policy induced rising cost of petroleum products in Nigeria and unstable electric power supply, which made the investment in diesel generator necessary. The main import of this is that policies and interventions aimed at lowering the rather high cost of Ofada rice in the study area must seek stable power supply or alternative and much more cost effective power supply to the rice millers.

Comparing activities of rice millers across study locations, we find that service volume is higher among sampled rice millers in Osun state (about 52 tons/year in 2007) and lower in Ekiti state (about 25 tons/year in 2007) than what obtains in Ogun state (about 44 tons/year in 2007). The milling charges are generally high, but cheaper in Ekiti state (N5, 472.92 /ton in 2007) than the sample average (N6, 415.83 /ton in 2007). The cost

structure is comparable, with energy cost taking the lion share of operation costs across all the locations.

Fig. 16: Components of operation costs of a typical rice miller in the study area per ton of paddy ri ce milled (2004 - 2007)



	2004	2005	2006	2007
Depreciation	797	776	604	552
Repairs	593	635	476	509
Labor	1,232	1,334	1,502	1,788
Energy	1,112	1,429	1,405	1,321

Year

Fig. 17: Relative share of operation costs incurred by an average rice miller in 2007

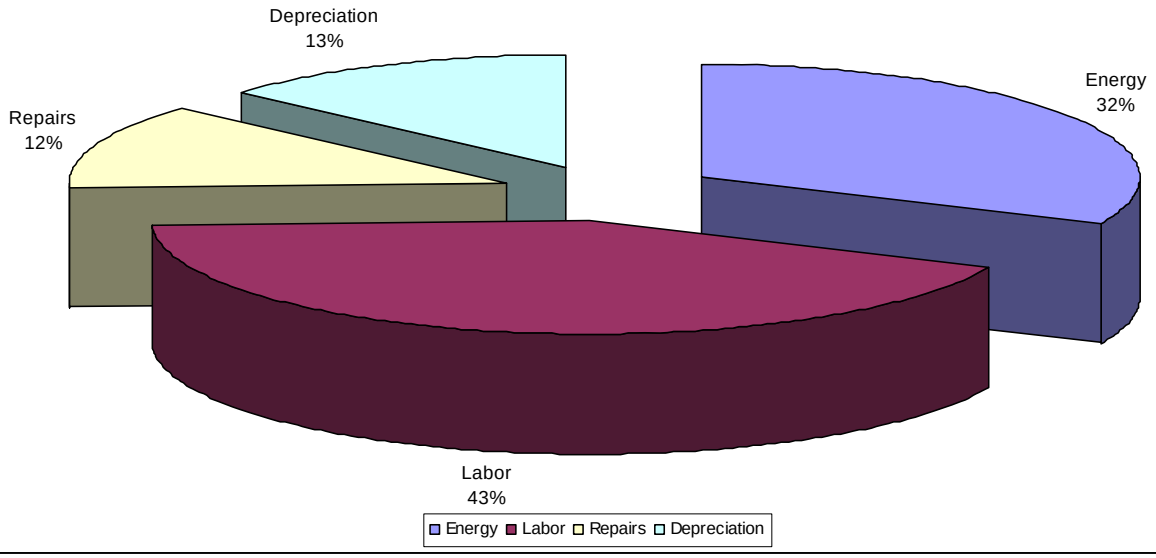


Table 26 Costs and Returns of an Average Rice Miller in the Sample

Descriptions	**ALL LOCATIONS**			
	2004	2005	2006	2007
Total Income from milling services (N/year)	235,621	256,664	301,818	420,878
Income share contributed by rice milling (%)	56	71	91	81
Volume of paddy rice milled (ton/year)	27	35	58	56
Volume of finished rice derived (ton/year)	19	25	42	40
Finished rice - paddy ratio	0.72	0.72	0.72	0.72
Milling Charges for Paddy Rice (N/ton)	4,919	5,215	4,776	6,090
Income from rice milling	130,911	181,076	276,013	340,533
Energy Cost				
PHCN	14,117	26,283	33,367	29,533
Diesel	30,467	33,567	43,250	43,651
Oil & Grease	8,667	10,462	12,183	18,125
Sub-total (Energy cost)	**53,250**	**70,312**	**88,800**	**91,309**
Energy cost due to rice milling (N/ton)	**1,112**	**1,429**	**1,405**	**1,321**
Labor				
Man-day per Ton of Rice - Hired Labor	1	1	1	2
Man-day per Ton of Rice - Family and Friends	1	1	1	1
Total Labor (Man-day/ton)	2	2	2	3
Daily Rate - Hired Labor – 2004	560	580	653	715
Labor Cost per ton of paddy milled	**1,232**	**1,334**	**1,502**	**1,788**
Depreciation				
Buildings	9,500	9,500	9,500	9,500
Milling Equipments	28,155	28,155	28,155	28,155
Off furniture & Equipment	525	525	525	525
Sub-total (Depreciation)	**38,180**	**38,180**	**38,180**	**38,180**
Depreciation cost (N/ton of paddy)	**797**	**776**	**604**	**552**
Materials for Repairs & maintenances				
Leather	4,532	5,256	5,214	6,545
Belt	4,305	4,643	4,357	5,172
Nozzle	2,085	2,015	2,532	2,747
Huller	5,892	7,008	6,331	8,081
Blade	363	438	372	485
Sieve	5,438	6,132	5,586	6,464
Bearing	453	438	372	404
Crank Shaft	4,000	4,000	4,000	4,000
Block Engine	1,100	1,100	1,100	1,100
Others	227	219	186	202
Sub-total (Repairs & Maintenance)	**28,394**	**31,248**	**30,052**	**35,200**
Maintenance & repairs (N/ton)	**593**	**635**	**476**	**509**
Total milling cost (N/ton of paddy)	**3,734**	**4,173**	**3,987**	**4,171**
Net Income (N/ton of paddy rice milled)	**1,186**	**1,042**	**789**	**1,919**
Benefit-Cost ratio	1.32	1.25	1.20	1.46
Net income (%)	32%	25%	20%	46%

Table 27 Costs and Returns of an Average Rice Miller in Ekiti State

Descriptions	**EKITI STATE**			
	2004	2005	2006	2007
Total Income from milling services (N/year)	177,625	179,522	197,387	267,040
Income share contributed by rice milling (%)	72	77	87	70
Volume of paddy rice milled (ton/year)	29	30	33	35
Volume of finished rice derived (ton/year)	20	21	23	25
Finished rice - paddy ratio	0.70	0.70	0.70	0.70
Milling Charges for Paddy Rice (N/ton)	4,403	4,517	5,133	5,304
Income from rice milling	127,890	137,639	171,076	186,928
Energy Cost				
PHCN				
Diesel	26,400	31,700	33,000	34,453
Oil & Grease	6,000	7,700	9,550	16,050
Sub-total (Energy cost)	**32,400**	**39,400**	**42,550**	**50,503**
Energy cost due to rice milling (N/ton)	**803**	**991**	**1,107**	**1,003**
Labor				
Man-day per Ton of Rice - Hired Labor	2	2	2	2
Man-day per Ton of Rice - Family and Friends	1	1	1	1
Total Labor (Man-day/ton)	3	3	3	3
Daily Rate - Hired Labor – 2004	538	558	563	600
Labor Cost per ton of paddy milled	**1,613**	**1,673**	**1,688**	**1,800**
Depreciation				
Buildings	10,000	10,000	10,000	10,000
Milling Equipments	24,615	24,615	24,615	24,615
Off furniture & Equipment	525	525	525	525
Sub-total (Depreciation)	**35,140**	**35,140**	**35,140**	**35,140**
Depreciation cost (N/ton of paddy)	**871**	**884**	**914**	**698**
Materials for Repairs & maintenances				
Leather	2,932	3,290	3,017	4,129
Belt	2,785	2,906	2,521	3,263
Nozzle	1,349	1,261	1,465	1,733
Huller	3,811	4,386	3,663	5,098
Blade	235	274	215	306
Sieve	3,518	3,838	3,232	4,078
Bearing	293	274	215	255
Crank Shaft	2,510	2,510	2,510	2,510
Block Engine	750	750	750	750
Others	147	137	108	127
Sub-total (Repairs & Maintenance)	**18,329**	**19,627**	**17,698**	**22,249**
Maintenance & repairs (N/ton)	**454**	**494**	**460**	**442**
Total milling cost (N/ton of paddy)	**3,741**	**4,042**	**4,168**	**3,943**
Net Income (N/ton of paddy rice milled)	**662**	**475**	**965**	**1,361**
Benefit-Cost ratio	1.18	1.12	1.23	1.35
Net income (%)	18%	12%	23%	35%

Table 28 Costs and Returns of an Average Rice Miller in Ogun State

Descriptions	OGUN STATE			
	2004	2005	2006	2007
Total Income from milling services (N/year)	523,810	585,366	466,969	586,990
Income share contributed by rice milling (%)	60	62	87	70
Volume of paddy rice milled (ton/year)	57	60	62	63
Volume of finished rice derived (ton/year)	40	42	44	44
Finished rice - paddy ratio	0.70	0.70	0.70	0.70
Milling Charges for Paddy Rice (N/ton)	5,500	6,000	6,500	6,500
Income from rice milling	314,286	360,000	403,929	410,893
Energy Cost				
PHCN	23,100	59,100	77,100	68,100
Diesel	20,000	22,000	27,000	36,000
Oil & Grease	10,000	11,687	12,000	20,325
Sub-total (Energy cost)	**53,100**	**92,787**	**116,100**	**124,425**
Energy cost due to rice milling (N/ton)	**558**	**951**	**1,616**	**1,378**
Labor				
Man-day per Ton of Rice - Hired Labor	1	1	1	1
Man-day per Ton of Rice - Family and Friends	1	1	1	1
Total Labor (Man-day/ton)	2	2	2	2
Daily Rate - Hired Labor – 2004	517	517	550	550
Labor Cost per ton of paddy milled	**863**	**1,033**	**1,100**	**1,100**
Depreciation				
Buildings	7,500	7,500	7,500	7,500
Milling Equipments	28,155	28,155	28,155	28,155
Off furniture & Equipment	700	700	700	700
Sub-total (Depreciation)	**36,355**	**36,355**	**36,355**	**36,355**
Depreciation cost (N/ton of paddy)	**382**	**373**	**506**	**403**
Materials for Repairs & maintenances				
Leather	5,664	6,478	5,625	7,406
Belt	5,381	5,722	4,701	5,852
Nozzle	2,606	2,483	2,732	3,109
Huller	7,364	8,637	6,830	9,144
Blade	453	540	402	549
Sieve	6,797	7,558	6,027	7,315
Bearing	566	540	402	457
Crank Shaft	5,000	5,000	5,000	5,000
Block Engine	1,200	1,200	1,200	1,200
Others	283	270	201	229
Sub-total (Repairs & Maintenance)	**35,314**	**38,428**	**33,120**	**40,261**
Maintenance & repairs (N/ton)	**371**	**394**	**461**	**446**
Total milling cost (N/ton of paddy)	**2,173**	**2,751**	**3,683**	**3,326**
Net Income (N/ton of paddy rice milled)	**3,327**	**3,249**	**2,817**	**3,174**
Benefit-Cost ratio	2.53	2.18	1.76	1.95
Net income (%)	153%	118%	76%	95%

Table 29 Costs and Returns of an Average Rice Miller in Osun State

Descriptions	OSUN STATE			
	2004	2005	2006	2007
Total Income from milling services (N/year)	320,646	380,048	440,336	447,224
Income share contributed by rice milling (%)	75	75	100	100
Volume of paddy rice milled (ton/year)	50	56	77	69
Volume of finished rice derived (ton/year)	37	42	58	52
Finished rice - paddy ratio	0.75	0.75	0.75	0.75
Milling Charges for Paddy Rice (N/ton)	4,855	5,129	5,694	6,469
Income from rice milling	240,484	285,036	440,336	447,224
Energy Cost				
PHCN	19,250	19,750	23,000	20,500
Diesel	45,000	47,000	69,750	60,500
Oil & Grease	10,000	12,000	15,000	18,000
Sub-total (Energy cost)	**74,250**	**78,750**	**107,750**	**99,000**
Energy cost due to rice milling (N/ton)	**1,124**	**1,063**	**1,393**	**1,432**
Labor				
Man-day per Ton of Rice - Hired Labor	1	1	1	1
Man-day per Ton of Rice - Family and Friends	2	2	2	2
Total Labor (Man-day/ton)	3	3	3	3
Daily Rate - Hired Labor – 2004	625	650	650	700
Labor Cost per ton of paddy milled	**1,563**	**1,625**	**1,625**	**1,750**
Depreciation				
Buildings	11,000	11,000	11,000	11,000
Milling Equipments	31,695	31,695	31,695	31,695
Off furniture & Equipment	350	350	350	350
Sub-total (Depreciation)	**43,045**	**43,045**	**43,045**	**43,045**
Depreciation cost (N/ton of paddy)	**652**	**581**	**557**	**623**
Materials for Repairs & maintenances				
Leather	5,000	6,000	7,000	8,100
Belt	4,750	5,300	5,850	6,400
Nozzle	2,300	2,300	3,400	3,400
Huller	6,500	8,000	8,500	10,000
Blade	400	500	500	600
Sieve	6,000	7,000	7,500	8,000
Bearing	500	500	500	500
Crank Shaft	4,500	4,500	4,500	4,500
Block Engine	1,250	1,250	1,250	1,250
Others	250	250	250	250
Sub-total (Repairs & Maintenance)	**31,450**	**35,600**	**39,250**	**43,000**
Maintenance & repairs (N/ton)	**476**	**480**	**508**	**622**
Total milling cost (N/ton of paddy)	**3,815**	**3,749**	**4,082**	**4,427**
Net Income (N/ton of paddy rice milled)	**1,040**	**1,380**	**1,612**	**2,042**
Benefit-Cost ratio	1.27	1.37	1.39	1.46
Net income (%)	27%	37%	39%	46%

5.2.4 Paddy Rice Processing

Processing is a major source of value addition and costs in Ofada rice value chain. Thus, the study examined resource use, costs and returns to activities of the nine artisanal processors included in the sample. Socio-economic characteristics of the processors were earlier presented in section 4.1, while other results are summarized in this sub-section.

5.2.4.1 Resource Use and Costs in Paddy Rice Processing

Artisanal processors undertake the parboiling, drying, de-stoning, winnowing, bagging and milling of paddy rice into finished rice. Tables 31 – 34 summarize the labor and material resources required in processing a ton of paddy rice into finished rice in each of the study locations.

A typical artisanal processor in the sample employed about three man-days of labor in parboiling one ton of paddy rice, another three man-days for drying, two man-days for de-stoning, and one man-day each for winnowing and bagging, adding-up to 10 man-days per ton (Table 31). Parboiling, drying and de-stoning are usually executed using both hired and family labor in almost equal proportion. Winnowing and bagging on the other hand are predominantly handled by hired labor. Generally speaking, wages for processing operations tend to be low (N350 – N375 per day) compared to that of field operations (N828.41 per man-day in 2007: see Figure 10). The only exception is parboiling operation, whose rate is N697.17 per man-day in 2007.

Overall, the total cost of processing a ton of Ofada paddy rice into finished rice by an average artisanal processor in the sampled locations was estimated at N12,777 in 2007 (up from N8,924 in 2004). This figure is rather high, stifling, and contributes to the inability of Ofada rice to compete favorably with imported rice without the high tariff placed on imported rice. Analysis of the cost components shows that the bulk (61 per cent) of the cost of rice processing in the study area was incurred at the milling stage (loading and off loading, the transportation of paddy rice to the point of milling and milling). Milling charges alone accounted for 48 per cent of the total processing costs while labor accounted for about 37 per cent (See: Figures 18 and 19) with the remaining 15% been accounted for by other processing inputs.

On a close analysis of the cost headings of a typical milling operation in the location of interest it was observed that power (which in most cases is privately generated) accounted for 71% of the recurrent expenditure of such operation as previously reported. Kindly see figures 16 and 17 above for detail. There is no doubt that the high cost of power generation and/or is/are responsible perhaps for the high cost of milling. The situation is also made much more difficult by the fact that the available processing technology is labor intensive (drudgery): thus, processors, in addition to paying heavily for milling, still have to face the challenge of exorbitant labor bills.

Comparing evidence across the three study locations (Tables 23 – 34), it would appear that no substantial variations exist in the patterns of labor use. Most cost variation arises from differences in milling charges and wage rates, culminating in an average processor in Ekiti state incurring total processing costs of N12,028 per ton in 2007 as against the

N13,017 and N13,286 incurred by an average processor in Ogun and Osun states respectively.

Table 31 Operation Costs of a Typical Artisanal Processor (All Locations)

Description	SAMPLE AVERAGE			
	2004	2005	2006	2007
Parboiling				
Hired Labor use in parboiling (Man-day / ton)	1.44	1.44	1.44	1.44
Family Labor use in parboiling (Man-day / ton)	1.33	1.33	1.33	1.33
Total labor use in parboiling	2.77	2.77	2.77	2.77
Daily Wage Rate (N) (Parboiling), (N/Man-day)	450.00	566.67	633.33	733.33
Parboiling labor cost (N/ton)	**1,255.56**	**1,566.67**	**1,755.56**	**2,044.44**
Add: Energy and Fuel costs (N/ton)	128.21	187.94	244.63	272.17
Sub-total - parboiling cost (N/ton)	**1,383.76**	**1,754.61**	**2,000.19**	**2,316.61**
Drying				
Hired Labor use in drying (Man-day / ton)	1.08	1.08	1.33	1.33
Family Labor use in drying (Man-day / ton)	1.21	1.21	1.23	1.34
Total Labor use in drying (Man-day / ton)	2.39	2.39	2.56	2.67
Daily Wage Rate (N) (Drying), (N/Man-day)	238.89	298.61	338.89	338.89
Drying labor cost (N/ton)	**553.70**	**692.13**	**842.59**	**881.48**
De-stoning				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Family Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Total Labor Use in De-stoning	2.00	2.00	2.00	2.00
Daily Wage Rate (N) (Drying), (N/Man-day)	238.89	298.61	338.89	338.89
De-stoning labor cost (N/ton)	**477.78**	**597.22**	**677.78**	**677.78**
Winnowing				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (N) (Winnowing), (N/Man-day)	238.89	298.61	338.89	338.89
Winnowing labor cost (N/ton)	**238.89**	**298.61**	**338.89**	**338.89**
Bagging				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (Bagging), (N/Man-day)	175.00	225.00	250.00	375.00
Bagging labor cost (N/ton)	**175.00**	**225.00**	**250.00**	**375.00**
Add: Cost of bags	400.00	400.00	400.00	400.00
Sub-total - Bagging cost (N/ton)	**575.00**	**625.00**	**650.00**	**775.00**
Milling Costs (N/ton)				
Hired labor (loading, off-loading, etc)	191.67	225.00	333.33	391.67
Transportation fares to and fro milling site	583.33	666.67	1,066.67	1,306.18
Milling Charges	4,919.41	5,215.08	5,775.72	6,089.77
Sub-total - Milling cost (N/ton)	**5,694.41**	**6,106.74**	**7,175.72**	**7,787.62**
Sub-total (Hired labor), (Man-days/ton)	5.53	5.53	5.78	5.78
Sub-total (Family labor), (Man-days/ton)	4.00	4.00	4.00	4.11
Total Labor Used (Man-days/ton)	**9.53**	**9.53**	**9.78**	**9.89**
Labor Cost (N/ton)	**2,892.59**	**3,604.63**	**4,198.15**	**4,709.26**
Add: Millers charges	4,919.41	5,215.08	5,775.72	6,089.77
Transportation	583.33	666.67	1,066.67	1,306.18
Intermediate materials (energy, bags, etc)	528.21	587.94	644.63	672.17
Total Processing Cost (N/ton)	**8,923.54**	**10,074.31**	**11,685.17**	**12,777.38**
Annual Depreciation (Straight line method)	2,415.94	2,415.94	2,415.94	2,415.94

Table 32: Operation Costs of a Typical Artisanal Processor in Ekiti State

Description	Ekiti			
	2004	2005	2006	2007
Parboiling				
Hired Labor use in parboiling (Man-day / ton)	1.00	1.00	1.00	1.00
Family Labor use in parboiling (Man-day / ton)	2.00	2.00	2.00	2.00
Total labor use in parboiling	3.00	3.00	3.00	3.00
Daily Wage Rate (N) (Parboiling), (N/Man-day)	425.00	600.00	650.00	700.00
Parboiling labor cost (N/ton)	**1,275.00**	**1,800.00**	**1,950.00**	**2,100.00**
Add: Energy and Fuel costs (N/ton)	73.89	91.41	76.19	115.66
Sub-total - parboiling cost (N/ton)	**1,348.89**	**1,891.41**	**2,026.19**	**2,215.66**
Drying				
Hired Labor use in drying (Man-day / ton)	1.50	1.50	2.00	2.00
Family Labor use in drying (Man-day / ton)	2.00	2.00	2.00	2.00
Total Labor use in drying (Man-day / ton)	3.50	3.50	4.00	4.00
Daily Wage Rate (N) (Drying), (N/Man-day)	200.00	250.00	300.00	300.00
Drying labor cost (N/ton)	**700.00**	**875.00**	**1,200.00**	**1,200.00**
De-stoning				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Family Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Total Labor Use in De-stoning	2.00	2.00	2.00	2.00
Daily Wage Rate (N) (Drying), (N/Man-day)	200.00	250.00	300.00	300.00
De-stoning labor cost (N/ton)	**400.00**	**500.00**	**600.00**	**600.00**
Winnowing				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (N) (Winnowing), (N/Man-day)	200.00	250.00	300.00	300.00
Winnowing labor cost (N/ton)	**200.00**	**250.00**	**300.00**	**300.00**
Bagging				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (Bagging), (N/Man-day)	200.00	300.00	300.00	500.00
Bagging labor cost (N/ton)	**200.00**	**300.00**	**300.00**	**500.00**
Add: Cost of bags	400.00	400.00	400.00	400.00
Sub-total - Bagging cost (N/ton)	**600.00**	**700.00**	**700.00**	**900.00**
Milling Costs (N/ton)				
Hired labor (loading, off-loading, etc)	200.00	250.00	300.00	300.00
Transportation fares to and fro milling site	500.00	500.00	1,000.00	1,209.27
Milling Charges	4,403.48	4,516.67	5,133.33	5,303.56
Sub-total - Milling cost (N/ton)	**5,103.48**	**5,266.67**	**6,433.33**	**6,812.83**
SUMMARY				
Sub-total (Hired labor), (Man-days/ton)	5.50	5.50	6.00	6.00
Sub-total (Family labor), (Man-days/ton)	5.00	5.00	5.00	5.00
Total Labor Used (Man-days/ton)	**10.50**	**10.50**	**11.00**	**11.00**
Total Labor Cost (N/ton)	**2,975.00**	**3,975.00**	**4,650.00**	**5,000.00**
Add: Millers charges	4,403.48	4,516.67	5,133.33	5,303.56
Transportation	500.00	500.00	1,000.00	1,209.27
Intermediate materials (energy, bags, etc)	473.89	491.41	476.19	515.66
Total Processing Cost (N/ton)	**8,352.37**	**9,483.07**	**11,259.52**	**12,028.48**
Annual Depreciation (Straight line method)	2,217.06	2,217.06	2,217.06	2,217.06

Table 33: Operation Costs of a Typical Artisanal Processor in Ogun State

Description	Ogun			
	2004	2005	2006	2007
Parboiling				
Hired Labor use in parboiling (Man-day / ton)	2.00	2.00	2.00	2.00
Family Labor use in parboiling (Man-day / ton)	1.00	1.00	1.00	1.00
Total labor use in parboiling	3.00	3.00	3.00	3.00
Daily Wage Rate (N) (Parboiling), (N/Man-day)	500.00	500.00	600.00	800.00
Parboiling labor cost (N/ton)	**1,500.00**	**1,500.00**	**1,800.00**	**2,400.00**
Add: Energy and Fuel costs (N/ton)	105.60	123.58	244.71	241.38
Sub-total - parboiling cost (N/ton)	1,605.60	1,623.58	2,044.71	2,641.38
Drying				
Hired Labor use in drying (Man-day / ton)				
Family Labor use in drying (Man-day / ton)	1.00	1.00	1.00	1.33
Total Labor use in drying (Man-day / ton)	1.00	1.00	1.00	1.33
Daily Wage Rate (N) (Drying), (N/Man-day)	250.00	312.50	350.00	350.00
Drying labor cost (N/ton)	**250.00**	**312.50**	**350.00**	**466.67**
De-stoning				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Family Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Total Labor Use in De-stoning	2.00	2.00	2.00	2.00
Daily Wage Rate (N) (Drying), (N/Man-day)	250.00	312.50	350.00	350.00
De-stoning labor cost (N/ton)	**500.00**	**625.00**	**700.00**	**700.00**
Winnowing				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (N) (Winnowing), (N/Man-day)	250.00	312.50	350.00	350.00
Winnowing labor cost (N/ton)	**250.00**	**312.50**	**350.00**	**350.00**
Bagging				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (Bagging), (N/Man-day)	175.00	225.00	250.00	375.00
Bagging labor cost (N/ton)	**175.00**	**225.00**	**250.00**	**375.00**
Add: Cost of bags	400.00	400.00	400.00	400.00
Sub-total - Bagging cost (N/ton)	**575.00**	**625.00**	**650.00**	**775.00**
Milling Costs (N/ton)				
Hired labor (loading, off-loading, etc)	175.00	225.00	250.00	375.00
Transportation fares to and fro milling site	500.00	500.00	1,000.00	1,209.27
Milling Charges	5,500.00	6,000.00	6,500.00	6,500.00
Sub-total - Milling cost (N/ton)	**6,175.00**	**6,725.00**	**7,750.00**	**8,084.27**
SUMMARY				
Sub-total (Hired labor), (Man-days/ton)	5.00	5.00	5.00	5.00
Sub-total (Family labor), (Man-days/ton)	3.00	3.00	3.00	3.33
Total Labor Used (Man-days/ton)	**8.00**	**8.00**	**8.00**	**8.33**
Total Labor Cost (N/ton)	**2,850.00**	**3,200.00**	**3,700.00**	**4,666.67**
Add: Millers charges	5,500.00	6,000.00	6,500.00	6,500.00
Transportation	500.00	500.00	1,000.00	1,209.27
Intermediate materials (energy, bags, etc)	505.60	523.58	644.71	641.38
Total Processing Cost (N/ton)	**9,355.60**	**10,223.58**	**11,844.71**	**13,017.32**
Annual Depreciation (Straight line method)	1,914.92	1,914.92	1,914.92	1,914.92

Table 34: Operation Costs of a Typical Artisanal Processor in Osun State

Description	Osun			
	2004	2005	2006	2007
Parboiling				
Hired Labor use in parboiling (Man-day / ton)	1.33	1.33	1.33	1.33
Family Labor use in parboiling (Man-day / ton)	1.00	1.00	1.00	1.00
Total labor use in parboiling	2.33	2.33	2.33	2.33
Daily Wage Rate (N) (Parboiling), (N/Man-day)	425.00	600.00	650.00	700.00
Parboiling labor cost (N/ton)	**991.67**	**1,400.00**	**1,516.67**	**1,633.33**
Add: Energy and Fuel costs (N/ton)	205.13	348.84	413.01	459.46
Sub-total - parboiling cost (N/ton)	1,196.79	1,748.84	1,929.67	2,092.79
Drying				
Hired Labor use in drying (Man-day / ton)	0.67	0.67	0.67	0.67
Family Labor use in drying (Man-day / ton)	2.00	2.00	2.00	2.00
Total Labor use in drying (Man-day / ton)	2.67	2.67	2.67	2.67
Daily Wage Rate (N) (Drying), (N/Man-day)	266.67	333.33	366.67	366.67
Drying labor cost (N/ton)	**711.11**	**888.89**	**977.78**	**977.78**
De-stoning				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Family Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Total Labor Use in De-stoning	2.00	2.00	2.00	2.00
Daily Wage Rate (N) (Drying), (N/Man-day)	266.67	333.33	366.67	366.67
De-stoning labor cost (N/ton)	**533.33**	**666.67**	**733.33**	**733.33**
Winnowing				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (N) (Winnowing), (N/Man-day)	266.67	333.33	366.67	366.67
Winnowing labor cost (N/ton)	**266.67**	**333.33**	**366.67**	**366.67**
Bagging				
Hired Labor Use (Man-day/ton)	1.00	1.00	1.00	1.00
Daily Wage Rate (Bagging), (N/Man-day)	150.00	150.00	200.00	250.00
Bagging labor cost (N/ton)	**150.00**	**150.00**	**200.00**	**250.00**
Add: Cost of bags	400.00	400.00	400.00	400.00
Sub-total - Bagging cost (N/ton)	**550.00**	**550.00**	**600.00**	**650.00**
Milling Costs (N/ton)				
Hired labor (loading, off-loading, etc)	200.00	200.00	450.00	500.00
Transportation fares to and fro milling site	750.00	1,000.00	1,200.00	1,500.00
Milling Charges	4,854.75	5,128.57	5,693.83	6,465.76
Sub-total - Milling cost (N/ton)	**5,804.75**	**6,328.57**	**7,343.83**	**8,465.76**
SUMMARY				
Sub-total (Hired labor), (Man-days/ton)	5.00	5.00	5.00	5.00
Sub-total (Family labor), (Man-days/ton)	4.00	4.00	4.00	4.00
Total Labor Used (Man-days/ton)	**9.00**	**9.00**	**9.00**	**9.00**
Total Labor Cost (N/ton)	**2,852.78**	**3,638.89**	**4,244.44**	**4,461.11**
Add: Millers charges	4,854.75	5,128.57	5,693.83	6,465.76
Transportation	750.00	1,000.00	1,200.00	1,500.00
Intermediate materials (energy, bags, etc)	605.13	748.84	813.01	859.46
Total Processing Cost (N/ton)	**9,062.66**	**10,516.29**	**11,951.29**	**13,286.33**
Annual Depreciation (Straight line method)	3,115.83	3,115.83	3,115.83	3,115.83

Fig. 18: Relative share of the processing costs incurred at various stages by an average artisanal processor in the study area in 2007

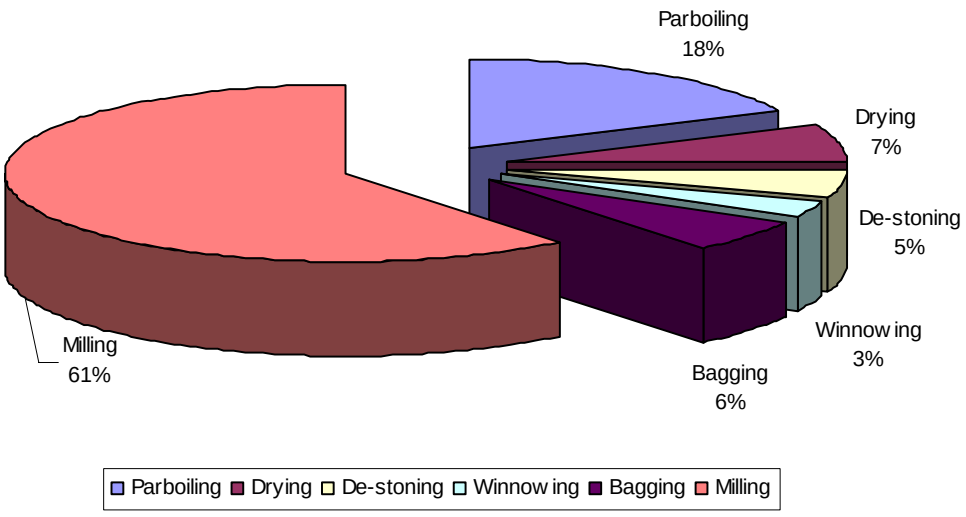
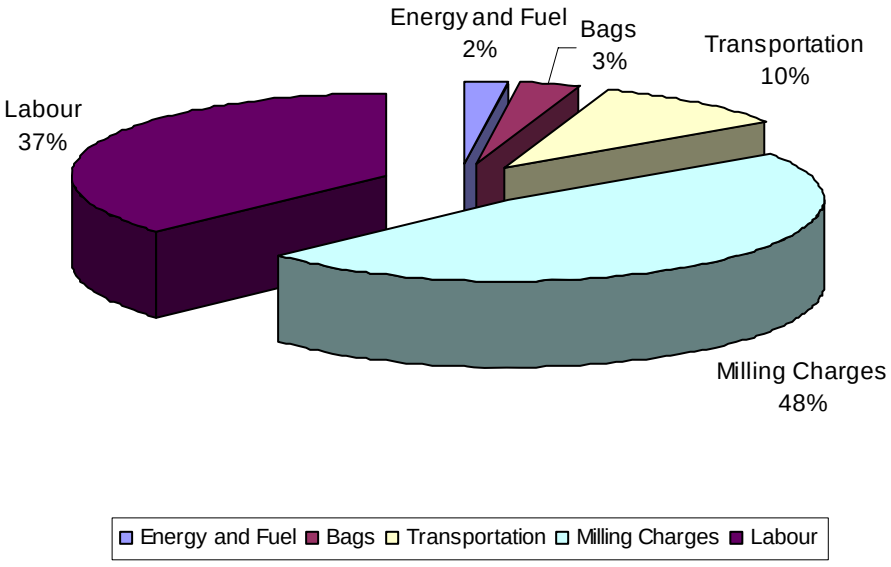


Fig. 19: Relative share of various factors in the processing cost incurred by an average artisanal processor in the study area in 2007



5.2.4.2 Returns Structure in Paddy Rice Processing

As a follow up to the previous section, the main aim of engaging in most economic activities, such as artisanal rice processing, includes but may not be restricted to income generation. This section therefore summarizes the costs and returns structure in artisanal rice processing with a view to assessing value addition and contribution to household income at this critical stage in Ofada rice value chain. The four tables below speak for themselves and are self explanatory. Kindly go through them for additional information.

Table 35: Artisanal Rice Processing Returns Structure for All Sampled Locations

Description	**Sample Average**			
	2004	2005	2006	2007
Quantity of finished rice derived per ton of paddy	0.72	0.72	0.72	0.72
Sales Price of finished rice (N/ton)	95,750.00	101,727.27	119,871.25	125,265.77
Revenue (N/ton of paddy rice processed)	**67,716.67**	**72,408.33**	**84,187.90**	**89,304.57**
Cost of paddy rice processed (N/ton)	**57,444.44**	**59,222.22**	**65,555.56**	**66,888.89**
Add: Processing costs				
Parboiling	1,383.76	1,754.61	2,000.19	2,316.61
Drying	553.70	692.13	842.59	881.48
De-stoning	477.78	597.22	677.78	677.78
Winnowing	238.89	298.61	338.89	338.89
Milling	5,694.41	6,106.74	7,175.72	7,787.62
Bagging	575.00	625.00	650.00	775.00
Sub-total (processing cost)	**8,923.54**	**10,074.31**	**11,685.17**	**12,777.38**
Total Variable Cost	**66,367.98**	**69,296.53**	**77,240.73**	**79,666.27**
Gross Margin (N/ton)	**1,348.69**	**3,111.80**	**6,947.17**	**9,638.30**
Benefit-cost ratio	1.02	1.04	1.09	1.12
Percentage Margin	2%	4%	9%	12%

Table 36: Artisanal Rice Processing Returns Structure for Ekiti State

Description	**Ekiti**			
	2004	**2005**	**2006**	**2007**
Quantity of finished rice derived per ton of paddy	0.7	0.7	0.7	0.7
Sales Price of finished rice (N/ton)	86,000.00	88,500.00	94,500.00	96,000.00
Revenue (N/ton of paddy rice processed)	**60,200.00**	**61,950.00**	**66,150.00**	**67,200.00**
Cost of paddy rice processed (N/ton)	**50,000.00**	**52,000.00**	**52,000.00**	**55,000.00**
Add: Processing costs				
Parboiling	1,348.89	1,891.41	2,026.19	2,215.66
Drying	700.00	875.00	1,200.00	1,200.00
De-stoning	400.00	500.00	600.00	600.00
Winnowing	200.00	250.00	300.00	300.00
Milling	5,103.48	5,266.67	6,433.33	6,812.83
Bagging	600.00	700.00	700.00	900.00
Sub-total (processing cost)	**8,352.37**	**9,483.07**	**11,259.52**	**12,028.48**
Total Variable Cost	**58,352.37**	**61,483.07**	**63,259.52**	**67,028.48**
Gross Margin (N/ton)	**1,847.63**	**466.93**	**2,890.48**	**171.52**
Benefit-cost ratio	1.03	1.01	1.05	1.00
Percentage Margin	3%	1%	5%	0%

Table 37: Artisanal Rice Processing Returns Structure for Ogun State

	Ogun			
Description	2004	2005	2006	2007
Quantity of finished rice derived per ton of paddy	0.7	0.7	0.7	0.7
Sales Price of finished rice (N/ton)	106,000.00	112,000.00	143,091.00	157,091.00
Revenue (N/ton of paddy rice processed)	**74,200.00**	**78,400.00**	**100,163.70**	**109,963.70**
Cost of paddy rice processed (N/ton)	**59,000.00**	**59,666.67**	**64,666.67**	**68,333.33**
Add: Processing costs				
Parboiling	1,605.60	1,623.58	2,044.71	2,641.38
Drying	250.00	312.50	350.00	466.67
De-stoning	500.00	625.00	700.00	700.00
Winnowing	250.00	312.50	350.00	350.00
Milling	6,175.00	6,725.00	7,750.00	8,084.27
Bagging	575.00	625.00	650.00	775.00
Sub-total (processing cost)	**9,355.60**	**10,223.58**	**11,844.71**	**13,017.32**
Total Variable Cost	**68,355.60**	**69,890.25**	**76,511.38**	**81,350.65**
Gross Margin (N/ton)	**5,844.40**	**8,509.75**	**23,652.32**	**28,613.05**
Benefit-cost ratio	1.09	1.12	1.31	1.35
Percentage Margin	9%	12%	31%	35%

Table 38: Artisanal Rice Processing Returns Structure for Osun State

	Osun			
Description	2004	2005	2006	2007
Quantity of finished rice derived per ton of paddy	0.75	0.75	0.75	0.75
Sales Price of finished rice (N/ton)	91,666.67	102,500.00	115,000.00	121,000.00
Revenue (N/ton of paddy rice processed)	**68,750.00**	**76,875.00**	**86,250.00**	**90,750.00**
Cost of paddy rice processed (N/ton)	**60,000.00**	**62,500.00**	**73,000.00**	**71,750.00**
Add: Processing costs				
Parboiling	1,196.79	1,748.84	1,929.67	2,092.79
Drying	711.11	888.89	977.78	977.78
De-stoning	533.33	666.67	733.33	733.33
Winnowing	266.67	333.33	366.67	366.67
Milling	5,804.75	6,328.57	7,343.83	8,465.76
Bagging	550.00	550.00	600.00	650.00
Sub-total (processing cost)	**9,062.66**	**10,516.29**	**11,951.29**	**13,286.33**
Total Variable Cost	**69,062.66**	**73,016.29**	**84,951.29**	**85,036.33**
Gross Margin (N/ton)	**- 312.65**	**3,858.71**	**1,298.71**	**5,713.67**
Benefit-cost ratio	1.00	1.05	1.02	1.07
Percentage Margin	0%	5%	2%	7%

5.2.5. Finished Rice Merchants

Depending on the market being targeted, finished rice wholesaling apart from the cost associated with warehousing and product distributions, at times requires additional value additions in terms of additional de-stoning, winnowing as well as packaging (500gm to I kg) for the organized retail market. Tables 39 to 42 provide details on the subject of interest and it is suggested that you go through them for further details.

Table 39: Rice Merchants Returns Structure for All Sampled Locations

	Sample Average			
Descriptive Statistics	2004	2005	2006	2007
Cost of loading labor (N/ton)	192	266	336	390
Cost of hiring vehicle (N/trip)	5,161	6,050	9,637	10,478
Carrying capacity of vehicle used(tons)	4	4	4	4
Labor Use in secondary processing & packaging				
Winnowing (N/ton)	125	175	242	325
Picking Sorting (N/ton)	200	350	400	500
De-stoning/Sifting (N/ton)	200	300	300	350
Packaging/Branding (N/ton)	200	250	300	300
Sub-total (Secondary processing), (N/ton)	725	1,075	1,242	1,475
Distribution cost				
Hired vehicle, cost of hire per trip	3,257	3,927	4,517	4,517
Vehicle capacity (tons)	3.37	3.37	3.37	3.37
Transport cost per ton of rice procured (N/ton)	392	492	617	617
Cost of loading labor (N/ton)	140	173	233	283
Sub-total (Distribution Cost) (N/ton)	532	665	850	900
Gross Margin Analysis (per ton)				
Selling price of rice (N/ton)	103,556	114,611	133,919	141,919
Purchase price of rice (N/ton)	90,889	101,000	114,833	117,333
Add: marketing costs				
Transport cost per ton of rice procured (N/ton)	1,449	1,844	2,758	3,357
Cost of loading labor (N/ton)	192	266	336	390
Secondary processing cost (N/ton)	725	1,075	1,242	1,475
Distribution cost (N/ton)	532	665	850	900
Materials	500	500	500	500
Total Variable cost	**94,286**	**105,350**	**120,519**	**123,955**
Gross Margin (N/ton)	9,269	9,262	13,400	17,964
Benefit/Cost ratio	1.10	1.09	1.11	1.14
Gross margin (%)	9.83%	8.79%	11.12%	14.49%

Table 40: Rice Merchants Returns Structure for Ekiti State

	Ekiti			
Descriptive Statistics	2004	2005	2006	2007
Cost of loading labor (N/ton)	170	220	300	350
Cost of hiring vehicle (N/trip)	2,625	3,433	4,550	5,767
Carrying capacity of vehicle used(tons)	2	2	2	2
Labor Use in secondary processing & packaging				
Winnowing (N/ton)	200	300	400	500
Picking Sorting (N/ton)	200	300	400	500
De-stoning/Sifting (N/ton)	200	200	200	200
Packaging/Branding (N/ton)	200	250	300	300
Sub-total (Secondary processing), (N/ton)	800	1,050	1,300	1,500
Distribution cost				
Hired vehicle, cost of hire per trip	20	30	50	50
Vehicle capacity (tons)	0.10	0.10	0.10	0.10
Transport cost per ton of rice procured (N/ton)	200	300	500	500
Cost of loading labor (N/ton)	170	220	300	350
Sub-total (Distribution Cost) (N/ton)	370	520	800	850
Gross Margin Analysis (per ton)				
Selling price of rice (N/ton)	**98,667**	**115,333**	**132,167**	**132,167**
Purchase price of rice (N/ton)	86,000	88,500	94,500	96,000
Add: marketing costs				
Transport cost per ton of rice procured (N/ton)	1,313	1,717	2,275	2,883
Cost of loading labor (N/ton)	170	220	300	350
Secondary processing cost (N/ton)	800	1,050	1,300	1,500
Distribution cost (N/ton)	370	520	800	850
Materials	500	500	500	500
Total Variable cost	**89,153**	**92,507**	**99,675**	**102,083**
Gross Margin (N/ton)	9,514	22,827	32,492	30,083
Benefit/Cost ratio	1.11	1.25	1.33	1.29
Gross margin (%)	10.67%	24.68%	32.60%	29.47%

Table 41: Rice Merchants Returns Structure for Ogun State

	Ogun			
Descriptive Statistics	2004	2005	2006	2007
Cost of loading labor (N/ton)	155	278	308	320
Cost of hiring vehicle (N/trip)	177	237	360	467
Carrying capacity of vehicle used(tons)	0.10	0.10	0.10	0.10
Labor Use in secondary processing & packaging				
Winnowing (N/ton)	50	100	150	300
Picking Sorting (N/ton)	200	400	400	500
De-stoning/Sifting (N/ton)	200	400	400	500
Packaging/Branding (N/ton)	200	250	300	300
Sub-total (Secondary processing), (N/ton)	650	1,150	1,250	1,600
Distribution cost				
Hired vehicle, cost of hire per trip				
Vehicle capacity (tons)				
Transport cost per ton of rice procured (N/ton)				
Cost of loading labor (N/ton)				
Sub-total (Distribution Cost) (N/ton)	-	-	-	-
Gross Margin Analysis (per ton)				
Selling price of rice (N/ton)	**106,000**	**117,500**	**143,091**	**157,091**
Purchase price of rice (N/ton)	95,000	112,000	135,000	135,000
Add: marketing costs				
Transport cost per ton of rice procured (N/ton)	1,767	2,367	3,600	4,667
Cost of loading labor (N/ton)	155	278	308	320
Secondary processing cost (N/ton)	650	1,150	1,250	1,600
Distribution cost (N/ton)	-	-	-	-
Materials	500	500	500	500
Total Variable cost	**98,072**	**116,294**	**140,658**	**142,087**
Gross Margin (N/ton)	7,928	1,206	2,434	15,004
Benefit/Cost ratio	1.08	1.01	1.02	1.11
Gross margin (%)	8.08%	1.04%	1.73%	10.56%

Table 42: Rice Merchants Returns Structure for Osun State

	Osun			
Descriptive Statistics	2004	2005	2006	2007
Cost of loading labor (N/ton)	250	300	400	500
Cost of hiring vehicle (N/trip)	12,680	14,480	24,000	25,200
Carrying capacity of vehicle used(tons)	10	10	10	10
Labor Use in secondary processing & packaging				
Winnowing (N/ton)	125	125	175	175
Picking Sorting (N/ton)	200	350	400	500
De-stoning/Sifting (N/ton)	200	300	300	350
Packaging/Branding (N/ton)	200	250	300	300
Sub-total (Secondary processing), (N/ton)	725	1,025	1,175	1,325
Distribution cost				
Hired vehicle, cost of hire per trip	9,750	11,750	13,500	13,500
Vehicle capacity (tons)	10.00	10.00	10.00	10.00
Transport cost per ton of rice procured (N/ton)	975	1,175	1,350	1,350
Cost of loading labor (N/ton)	250	300	400	500
Sub-total (Distribution Cost) (N/ton)	1,225	1,475	1,750	1,850
Gross Margin Analysis (per ton)				
Selling price of rice (N/ton)	**106,000**	**111,000**	**126,500**	**136,500**
Purchase price of rice (N/ton)	91,667	102,500	115,000	121,000
Add: marketing costs				
Transport cost per ton of rice procured (N/ton)	1,268	1,448	2,400	2,520
Cost of loading labor (N/ton)	250	300	400	500
Secondary processing cost (N/ton)	725	1,025	1,175	1,325
Distribution cost (N/ton)	1,225	1,475	1,750	1,850
Materials	500	500	500	500
Total Variable cost	**95,635**	**107,248**	**121,225**	**127,695**
Gross Margin (N/ton)	10,365	3,752	5,275	8,805
Benefit/Cost ratio	1.11	1.03	1.04	1.07
Gross margin (%)	10.84%	3.50%	4.35%	6.90%

The picture presented by the tables above tends to suggested that the volume of trade in this commodity is highest in Osun State going by the type of truck used in shipping finished rice. While in Ogun and Ekiti state the preponderance of the mode of transportation of finished rice is either a two-ton truck (Ekiti) or Okada (Ogun state), 10ton lorries are deployed in Osun state suggesting inter state haulage and trade in this commodity. Ogun's proximity to Lagos tends to suggest that the quantity retailed by merchants is marginal while the number in the trade are many (predominantly farmers wives) as the production, processing, wholesaling and retailing of rice in this location appears to be dominated by members of the farmers' household. Gross margin on rice merchandising tends to be higher here than in other sampled locations (8.08%, 1.04%, 1.73% and 10.56% in 2004, 2005, 2006 and 2007 respectively). The scenario in Osun State however presents a picture of a functional value chain as it seems largely driven by volume of trade rather than margin as indicated in Ogun State. Gross margin in this commodity in the state is relatively lower and more stable than what obtains in Ogun state (10.84%, 3.50%, 4.35%, and 6.90% in 2004, 2005, 2006 and 2007).

5.2.6. Case Study (Thailand)

The choice of Thailand as a case study was informed by the fact that most of the nation's rice imported is of Thailand origin which is among the four major rice exporting countries that account for 75% of the world trade in this commodity. Thailand is perhaps the biggest exporter among the four countries accounting for 38%, Vietnam is second at 15%, then the United States 12% and India 10%. The country is blessed with 34.12 rice farming household whose average yield per hectare is about 2.62 tons. The country's rice industry is serviced by 42,532 mills which play major roles in the bulking, distribution and export trade in this commodity. Most of Thailand rice exports are imported by Asian and African countries with Nigeria being one of its major importers.

Starting from the production end of the supply chain, Rice farmers in Thailand belong to the poorest group in the society. In an attempt to augment their household income, many of them work on other rice farms and this seems to be an additional main source of employment and livelihood for landless and marginal farmers who constitute one-third to one-half of rural households in Asia generally. There are two types of rice farmers in Thailand, independent and contract farmers. Contract farmers are largely dependent on world market demand and inadvertently becoming factory workers in their own fields but with no company to take responsibility for securing their jobs, their social welfare, etc.

In its attempt to make inputs available to farmers, enhance productivity and income, the Thai government initiated a green revolution program. This led to the establishment of agricultural cooperatives and farmer organizations with linkages to the program. This not withstanding, a number of rice farmers are still into organic rice farming which is similar in a number of ways with rice cultivation in most of the sampled area in Nigeria. The only difference between the two countries is that organic rice in Thailand is certified while its counter part in Nigeria is not and no effort is being made in that direction. As a result of organic rice cultivation, it's processing and packaging particularly in areas where it is produced, as well as the direct marketing of the finished rice, farmers in Thailand are better rewarded for their efforts as they seem largely in control of their produce when compared to contract growers of non organic rice. Though organic rice cultivation seems more rewarding, the focus of Thai government is fully on rural employment through rice cultivation and the maintenance or expansion of its international market share in the rice export market. In effect, contract non organic rice cultivation seems the most common practice and it is largely subsidized by the government. Present below is the Thailand rice production profile which was obtained for the purpose of comparing it with what obtains in the sampled location in the southwestern Nigeria.

Table 43: Rice Production Cost Profile of Thailand

Per ha	Cash	Non cash	Total	%
Variable	**16,078**	**19,794**	**35,872**	**87%**
Labour	10,026	17,926	27,952	68%
Land preparation	2,433	5,774	8,207	20%
Planting	1,602	3,158	4,760	12%
Rearing	192	1,656	1,848	4%
Harvest	5,799	7,340	13,139	32%
Materials	**6,053**	**1,868**	**7,921**	**19%**
Seed	130	1,835	1,966	5%
Fertilizer	4,467	34	4,500	11%
Pesticide/Herbicides	532	-	532	1%
Fuel	550	-	550	1%
Farm equipment	281	-	281	1%
Repears	92	-	92	0%
Farm land Rent	1,850	3,667	5,517	13%
Total per ha	**17,928**	**23,461**	**41,389**	**100%**

As one would have observed, form table 43 above, two thirds of the cost of operations is attributable to labor which is largely supplied by farmers' household.

Following harvesting, all other value addition is done on farm before the commodity ends up at a rice mill for de-husking paddy rice into brown rice. It is normal in most instances for large mill to determine the prices in the geographical locations. They monitor how much rice comes to the mills, the volume being sold and the inventory in stocks. These statistical inputs are then used in setting prices which are usually pasted on the notice board in front of the mill. In effect millers are not just service providers as it seems in Nigeria but bulking agents. Information has it that in certain situation, and particularly at private mills, farmers can't even be certain of the weight of their produce. They are denied access to the process of how the quality of their rice is determined, neither are they allowed to examine the scales. ''Mills and not farmers control the price of paddy and they do so on the basis of information provided by rice agents about the price exporters are willing to pay".

In Thailand, millers who are bulking agents buy rice at the price that covers their cost of production plus profit. In effect, the largest benefits from rice production went to the millers, wholesalers and retailers in the chain. Though middlemen are a necessary part of the chain, they put farmers under pressure, dictating prices below the market price and charging high interest rates on contract farming loans. This became an incentive for the farmers' cooperative setting up their own mills. NAG Rice mill was established in 1991 to address the pricing concerns of farmers (the low price of paddy, and the control traders/mill owners exercised over the price of un-milled rice) and in addition to its milling services, it is currently providing its member inventory credit as a means of checking forced sales of this produce. It buys paddy at the market price on the day that farmers agree to sell, plus a margin for each group. Cooperative ownership of mill is essential for the control of the chain. Therefore farmer groups' greater involvement in milling is nothing but a big step in the right direction which comes with additional responsibilities and creates rooms for innovative thinking by the challenges associated with it. In-spite of the allocation of rice export quotas to a number of farmers' cooperatives, more than half of Thai farmers still sell their rice to paddy traders or middlemen and about 20% sell direct to mills. Only 6% of Thai farmers sell through their cooperative. Currently, Thailand rice export trade is highly subsidized by government and it is largely controlled by 10 rich and powerful families, with extensive connection with government.

5.2.7: Waterfall Analysis of The rice Value Chain of the Sampled Locations

Though seven stake holders groups (farmers, input suppliers, artisanal processors, millers, paddy rice merchants, finished rice merchants and rice packers) were interviewed, only three which are critical to the chain were subjected to water fall analysis. This became necessary as the cost of inputs and millers had been accounted for at one point or the other along the value chain. Tables 44 through 47 relates to this analysis over a period of four years in all the locations of interest. These tables are self explanatory and we advise that you go through them for details.

Table 44: Waterfall Analysis of Rice Value Chain Covering 4yrs in All Locations

Description	**All locations**			
	2004	**2005**	**2006**	**2007**
Farmer's Production Costs (N/ton of paddy rice)				
Rent on land	1,232.34	1,461.54	1,902.30	2,525.81
Labor Costs	34,119.70	33,761.92	36,234.82	39,154.90
Materials costs	8,986.29	8,878.71	9,521.76	10,212.90
Transportation costs	1,768.94	1,998.10	2,222.48	2,620.32
Depreciation	1,603.39	1,730.05	1,835.57	2,007.70
Farmer's Margin	9,733.78	11,391.91	13,838.63	10,367.26
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	**57,444.44**	**59,222.22**	**65,555.56**	**66,888.89**
Labor Cost (N/ton)	2,892.59	3,604.63	4,198.15	4,709.26
Milling charges	4,919.41	5,215.08	5,775.72	6,089.77
Transportation	583.33	666.67	1,066.67	1,306.18
Intermediate materials (energy, bags, etc)	528.21	587.94	644.63	672.17
Processor's Margin	1,348.69	3,111.80	6,947.17	9,638.30
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	**67,716.67**	**72,408.34**	**84,187.90**	**89,304.57**
Labor	660	965	1,136	1,343
Transport	1,426	1,806	2,598	3,065
Materials	360	360	360	360
Retailer's margin	6,674	6,668	9,648	12,934
Consumer Price (N/ton)	**76,836.67**	**82,208.34**	**97,929.74**	**107,006.41**
Farmer's Production Costs Share of Consumer Price (%)				
Rent on land	1.60%	1.78%	1.94%	2.36%
Labor Costs	44.41%	41.07%	37.00%	36.59%
Materials costs	11.70%	10.80%	9.72%	9.54%
Transportation costs	2.30%	2.43%	2.27%	2.45%
Depreciation	2.09%	2.10%	1.87%	1.88%
Farmer's Margin	12.67%	13.86%	14.13%	9.69%
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	74.76%	72.04%	66.94%	62.51%
Labor Cost (N/ton)	3.76%	4.38%	4.29%	4.40%
Milling charges	6.40%	6.34%	5.90%	5.69%
Transportation	0.76%	0.81%	1.09%	1.22%
Intermediate materials (energy, bags, etc)	0.69%	0.72%	0.66%	0.63%
Processor's Margin	1.76%	3.79%	7.09%	9.01%
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	88.13%	88.08%	85.97%	83.46%
Labor	0.86%	1.17%	1.16%	1.25%
Transport	1.86%	2.20%	2.65%	2.86%

Materials	0.47%	0.44%	0.37%	0.34%
Retailer's margin	8.69%	8.11%	9.85%	12.09%
Consumer Price (N/ton)	100.00%	100.00%	100.00%	100.00%

Table 45: Waterfall Analysis of Rice Value Chain Covering 4yrs in Ekiti State

Description	Ekiti			
	2004	2005	2006	2007
Farmer's Production Costs (N/ton of paddy rice)				
Rent on land	793.65	1,285.71	1,464.29	2,716.77
Labor Costs	32,565.68	37,156.61	40,254.91	38,898.99
Materials costs	7,614.29	9,673.17	10,040.99	9,752.83
Transportation costs	1,302.78	2,509.05	2,699.69	4,078.85
Depreciation	1,656.39	2,378.98	2,521.84	2,361.12
Farmer's Margin	6,067.23	-1,003.52	-4,981.71	-2,808.56
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	**50,000.01**	**52,000.00**	**52,000.01**	**55,000.00**
Labor Cost (N/ton)	2,975.00	3,975.00	4,650.00	5,000.00
Milling charges	4,403.48	4,516.67	5,133.33	5,303.56
Transportation	500	500	1,000.00	1,209.27
Intermediate materials (energy, bags, etc)	473.89	491.41	476.19	515.66
Processor's Margin	1,847.63	466.93	2,890.48	171.52
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	**60,200.01**	**61,950.01**	**66,150.01**	**67,200.01**
Labor	679	889	1,120	1,295
Transport	1,178	1,566	2,153	2,613
Materials	350	350	350	350
Retailer's margin	6,660	15,978	22,744	21,059
Consumer Price (N/ton)	**69,066.91**	**80,733.11**	**92,516.91**	**92,516.91**
Farmer's Production Costs Share of Consumer Price (%)				
Rent on land	1.15%	1.59%	1.58%	2.94%
Labor Costs	47.15%	46.02%	43.51%	42.05%
Materials costs	11.02%	11.98%	10.85%	10.54%
Transportation costs	1.89%	3.11%	2.92%	4.41%
Depreciation	2.40%	2.95%	2.73%	2.55%
Farmer's Margin	8.78%	-1.24%	-5.38%	-3.04%
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	72.39%	64.41%	56.21%	59.45%
Labor Cost (N/ton)	4.31%	4.92%	5.03%	5.40%
Milling charges	6.38%	5.59%	5.55%	5.73%
Transportation	0.72%	0.62%	1.08%	1.31%
Intermediate materials (energy, bags, etc)	0.69%	0.61%	0.51%	0.56%
Processor's Margin	2.68%	0.58%	3.12%	0.19%
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	87.16%	76.73%	71.50%	72.64%
Labor	0.98%	1.10%	1.21%	1.40%
Transport	1.71%	1.94%	2.33%	2.82%
Materials	0.51%	0.43%	0.38%	0.38%
Retailer's margin	9.64%	19.79%	24.58%	22.76%
Consumer Price (N/ton)	100.00%	100.00%	100.00%	100.00%

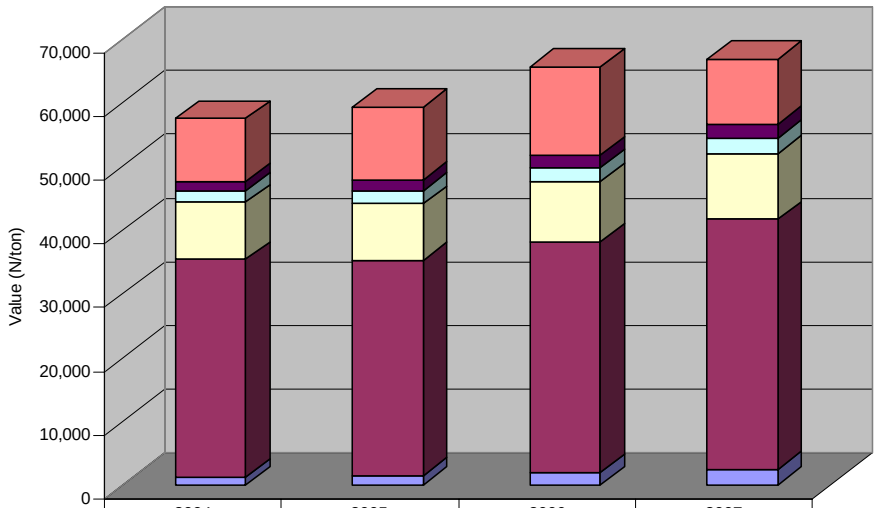
Table 46: Waterfall Analysis of Rice Value Chain Covering 4yrs in Ogun State

Description	Ogun			
	2004	2005	2006	2007
Farmer's Production Costs (N/ton of paddy rice)				
Rent on land	1,583.80	1,984.54	2,091.10	2,898.15
Labor Costs	38,952.06	38,017.15	38,342.87	44,737.59
Materials costs	9,479.61	8,366.62	8,216.61	9,439.09
Transportation costs	1,104.14	1,174.55	1,271.53	1,572.79
Depreciation	1,861.14	1,753.44	1,772.16	2,107.43
Farmer's Margin	6,019.41	8,370.38	12,972.40	7,578.28
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	**59,000.17**	**59,666.67**	**64,666.67**	**68,333.33**
Labor Cost (N/ton)	2,850.00	3,200.00	3,700.00	4,666.67
Milling charges	5,500.00	6,000.00	6,500.00	6,500.00
Transportation	500	500	1,000.00	1,209.27
Intermediate materials (energy, bags, etc)	505.6	523.58	644.71	641.38
Processor's Margin	5,844.40	8,509.75	23,652.32	28,613.05
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	**74,200.17**	**78,400.00**	**100,163.70**	**109,963.70**
Labor	564	1,000	1,091	1,344
Transport	1,237	1,657	2,520	3,267
Materials	350	350	350	350
Retailer's margin	5,550	844	1,703	10,503
Consumer Price (N/ton)	**81,900.17**	**82,250.00**	**105,827.40**	**125,427.40**
Farmer's Production Costs Share of Consumer Price (%)				
Rent on land	1.93%	2.41%	1.98%	2.31%
Labor Costs	47.56%	46.22%	36.23%	35.67%
Materials costs	11.57%	10.17%	7.76%	7.53%
Transportation costs	1.35%	1.43%	1.20%	1.25%
Depreciation	2.27%	2.13%	1.67%	1.68%
Farmer's Margin	7.35%	10.18%	12.26%	6.04%
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	72.04%	72.54%	61.11%	54.48%
Labor Cost (N/ton)	3.48%	3.89%	3.50%	3.72%
Milling charges	6.72%	7.29%	6.14%	5.18%
Transportation	0.61%	0.61%	0.94%	0.96%
Intermediate materials (energy, bags, etc)	0.62%	0.64%	0.61%	0.51%
Processor's Margin	7.14%	10.35%	22.35%	22.81%
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	90.60%	95.32%	94.65%	87.67%
Labor	0.69%	1.22%	1.03%	1.07%
Transport	1.51%	2.01%	2.38%	2.60%
Materials	0.43%	0.43%	0.33%	0.28%
Retailer's margin	6.78%	1.03%	1.61%	8.37%
Consumer Price (N/ton)	100.00%	100.00%	100.00%	100.00%

Table 47: Waterfall Analysis of Rice Value Chain Covering 4yrs in Osun State

Description	Osun			
	2004	2005	2006	2007
Farmer's Production Costs (N/ton of paddy rice)				
Rent on land	789.70	1,073.59	1,488.37	1,866.67
Labor Costs	26,413.68	28,256.06	31,560.51	33,105.98
Materials costs	9,119.36	9,746.20	10,794.93	10,240.56
Transportation costs	3,042.18	3,103.61	3,828.53	3,377.15
Depreciation	1,226.72	1,323.92	1,561.98	1,603.67
Farmer's Margin	19,408.37	18,996.61	23,765.68	21,555.99
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	**60,000.00**	**62,500.00**	**73,000.00**	**71,750.00**
Labor Cost (N/ton)	2,852.78	3,638.89	4,244.44	4,461.11
Milling charges	4,854.75	5,128.57	5,693.83	6,465.76
Transportation	750	1,000.00	1,200.00	1,500.00
Intermediate materials (energy, bags, etc)	605.13	748.84	813.01	859.46
Processor's Margin	-312.65	3,858.71	1,298.71	5,713.67
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	**68,750.01**	**76,875.01**	**86,249.99**	**90,750.00**
Labor	731	994	1,181	1,369
Transport	1,870	2,192	3,113	3,278
Materials	375	375	375	375
Retailer's margin	7,774	2,814	3,956	6,604
Consumer Price (N/ton)	**79,499.76**	**83,250.01**	**94,874.99**	**102,375.00**
Farmer's Production Costs Share of Consumer Price (%)				
Rent on land	0.99%	1.29%	1.57%	1.82%
Labor Costs	33.22%	33.94%	33.27%	32.34%
Materials costs	11.47%	11.71%	11.38%	10.00%
Transportation costs	3.83%	3.73%	4.04%	3.30%
Depreciation	1.54%	1.59%	1.65%	1.57%
Farmer's Margin	24.41%	22.82%	25.05%	21.06%
Artisanal Processing Costs (N/ton of paddy rice)				
Farm Gate Price of Paddy Rice (N/ton)	75.47%	75.08%	76.94%	70.09%
Labor Cost (N/ton)	3.59%	4.37%	4.47%	4.36%
Milling charges	6.11%	6.16%	6.00%	6.32%
Transportation	0.94%	1.20%	1.26%	1.47%
Intermediate materials (energy, bags, etc)	0.76%	0.90%	0.86%	0.84%
Processor's Margin	-0.39%	4.64%	1.37%	5.58%
Retailers Marketing Costs (N/ton of paddy rice equivalent)				
Wholesale Price of finished rice (N/ton)	86.48%	92.34%	90.91%	88.64%
Labor	0.92%	1.19%	1.25%	1.34%
Transport	2.35%	2.63%	3.28%	3.20%
Materials	0.47%	0.45%	0.40%	0.37%
Retailer's margin	9.78%	3.38%	4.17%	6.45%
Consumer Price (N/ton)	100.00%	100.00%	100.00%	100.00%

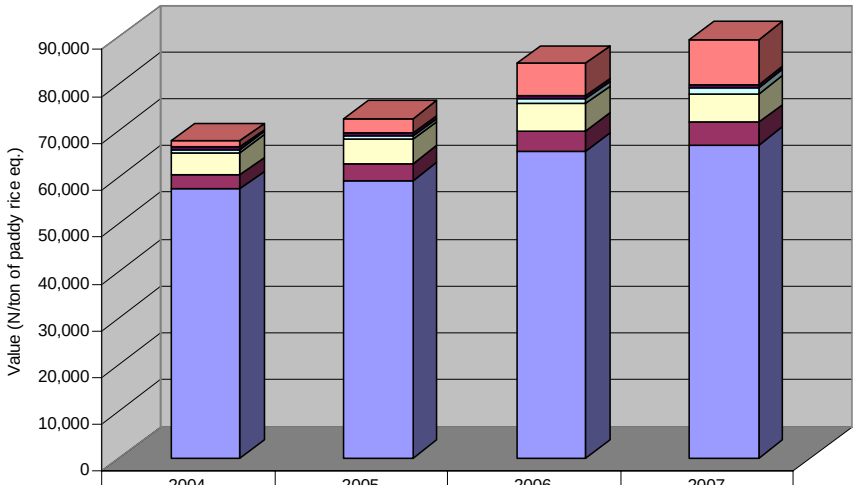
Fig. 20a: Component of farm gate price of paddy rice (N/ton) in the study area



	2004	2005	2006	2007
Farmer's Margin	9,734	11,392	13,839	10,367
Depreciation	1,603	1,730	1,836	2,008
Transportation costs	1,769	1,998	2,222	2,620
Materials costs	8,986	8,879	9,522	10,213
Labor Costs	34,120	33,762	36,235	39,155
Rent on land	1,232	1,462	1,902	2,526

Year

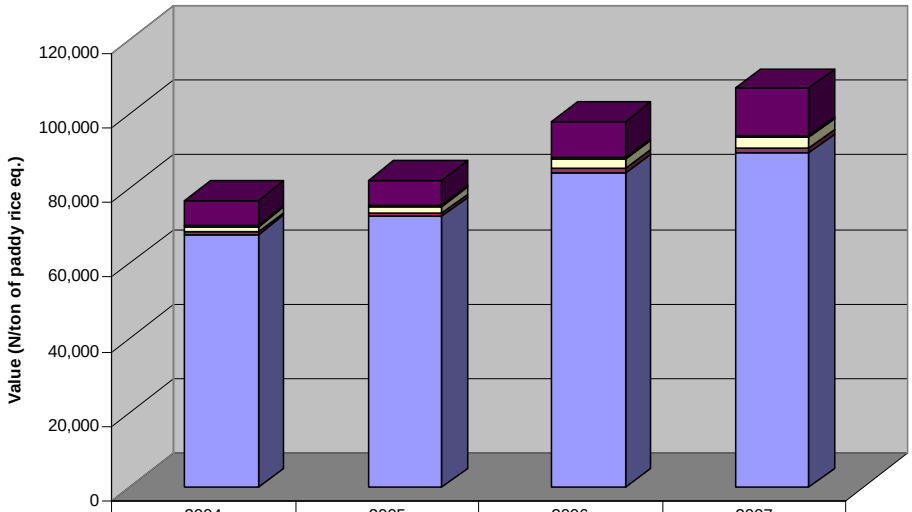
Fig. 20b: Components of artisanal procssors' sales price of finished rice in the study area (tons of paddy rice equivalent)



	2004	2005	2006	2007
Processor's Margin	1,349	3,112	6,947	9,638
Intermediate materials (energy, bags, etc)	528	588	645	672
Transportation	583	667	1,067	1,306
Milling charges	4,919	5,215	5,776	6,090
Labor Cost (N/ton)	2,893	3,605	4,198	4,709
Farm Gate Price of Paddy Rice (N/ton)	57,444	59,222	65,556	66,889

Year

Fig. 20c: Components of retailers' sales price of finished rice in the study area (tons of paddy rice equivalent)



	2004	2005	2006	2007
Retailer's margin	6,674	6,668	9,648	12,934
Materials	360	360	360	360
Transport	1,426	1,806	2,598	3,065
Labor	660	965	1,136	1,343
Wholesale Price of finished rice (N/ton)	67,717	72,408	84,188	89,305

Year

From a very close analysis of the information provided on Tables 44 through 47 as well as the graphical illustrations accompanying them, it is clear that labor alone account for a chunk (40 to 34%) on the cost of production of farmers. When further analyzed, it was observed that well over half of the labor input goes into negative labor inputs such as bird scaring. One is of the opinion that with proper land utilization policy that favors farm land aggregation/consolidation, farm operations mechanization, etc, this cost item could be significantly reduced if not eliminated, as large farms with no trees will significantly cut down the propensity for bird's infestation.

6. Discussions and Conclusion

6.1. Farmers

Starting from farmers' profile, it is clear that the supply end of the chain which includes farmers, processors, etc, is a trade of the uneducated and the old. Both farming and processing are gender sensitive, the first been dominated by the male and the later by the female. It is not clear how effective training in the use of modern inputs such as insecticides, herbicide and fertilizer could impact on this group of stakeholders as the use of these inputs are precision oriented in nature for optimization of outcome. Perhaps this is as a result of their limited knowledge. The fact that in most cases these farmers have small holdings (less than 2 hectares of farm land and which are fragmented over a wide area) even makes the demand and application of these inputs difficult. In most cases, over 80% of farmers in Ogun State are landless, usually rent farmland for a period of one year, and are unable to develop (stumping) such farmland as desired for mechanized operation. With limited access to land, it is clear why the young and educated are not interested in farming as many of them would not want to engage in back breaking farming operations to which our aging farming population is exposed.

In the absence of a well articulated land use policy that makes land available to farmers over a leased period of at least 50 years, farmland development, as well as the provisions of infrastructure (road, electricity, water, health facilities, schools etc), becomes difficult and expensive. A situation whereby agricultural land is developed, linked by roads, supported with other socio economic infrastructures and subsequently leased to farmers, could go a long way in clustering farmland, cut down the transaction cost associated with inputs/services delivery, reduce the transaction time and cost associated with produce bulking while also making the provision of rural socio-economic infrastructures cost effective in the long run. These could also serve as incentives for youth's involvement in farming.

In effect, there is a need for a rethink of the current land use policies in the states of interest. Though government has established a number of farm settlements in addition to those established in the first republic, government's ability to develop and allocate them is challenged by the fact that Government in most cases is unable to pay the compensation due to the traditional title holders, which in many cases are communities. Subsequently and when allocated, allottees are challenged with the problem of been unable to develop their land and even end up paying double rent (one to government and another to the community) on the same piece of land.

While it is true that the land use decree vested ownership of the land in government but this is not without compensating the traditional title owner. A creative policy which allows the government access to community land and the community a portion of the lease income generated from such land, could prove helpful in the long run. This could be a test case for a tri-sector approach to agricultural farmland development. The impact of which could be significant in addressing a number of issues confronting the emergence of commercial agriculture in the country.

Currently nothing much can be done with what is on ground, as it is not economically and financially viable for services providers to service small and fragmented farms, which are not adequately developed for mechanized operation. This is perhaps one of the reasons why there is little or no farm mechanization service provider in the locations of interest.

The same reasons could be adduced for why the organized private sector of the economy is not showing much interest and or investing in the supply market of agrochemicals. The sector is now dominated by informal importers and distributors of questionable, highly poisonous, none bio degradable agrochemicals, which are wrongly labeled, outdated, ineffective, and long prohibited (world wide) such as Paraquat, Chlorophynols, etc.

The farmers seeming resistance to the usage of these agrochemicals is informed by their non effectiveness which they considered an avenue for divesting them of their limited resources. Though several interventions could be going side by side and is so suggested, nothing much could be achieved without addressing the issue of land use and allocation issues, as all efforts without them, could seem to amount to treating surface instead of systemic issues.

6.2. Artisanal Processors

This operation is directly related and linked to the issues raised in raised in section 5.1 above. The market for rice is growing particularly in southwestern Nigeria which is highly urbanized. Since farm holdings are rather small, manually operated, and with limited yield, farming households take advantage that the fast growing but under supplied local market offers by going into value addition not at the farm gate but all the way to the point of consumption. In effect, the value chain in certain states (Ogun in particular) is largely driven by the farm household. By addressing the issues raised in section 5.1 above, this incentive would be removed as farmers will have access to larger farm holdings over an elongated lease period. This could allow for such farmland to be developed ultimately leading to increased yield and enhanced productivity as observed in Osun State.

6.3. Milling

Milling operations (transportation to milling sites and milling) account for about 61% of processing cost with milling alone accounting for 48% of same. A chunk of miller's recurrent expenditure is on labor (42%) and energy (32%) with both accounting for about 74% of their operating cost. One of the reasons why expenditure on labor is high could be attributed to the limited incentive for process automation due largely to the limited volume of trade. This is a disincentive for investment in specialized rice milling equipment. Even when the problem of energy is resolved, milling charges could still remain high if there was limited produce to mill.

6.4. Inputs Supply

The supply of agrochemicals is a function of demand. Fragmented small holding operations which are manually operated and which are common in Ogun and to some extent Ekiti is a major disincentive for the emergence of a vibrant agrochemical market. As previously mentioned, the costs of servicing such service users are usually high and un-encouraging to service providers. This market is likely to remain static if the land use policy is not addressed. In any way, Osun state seems the only exception not because of the existence of the right land use policies but by the fact that there is limited pressure on farmland. The issues associated with the quality, standards, labeling, health hazards, etc, of agrochemicals in the Nigerian market remains serious issues for Nigerian Agricultural, Food and Drug Control Commission (NAFDAC) and Standard Organization of Nigerian

(SON) to address. Currently, farmers seem unlikely to invest in these labor saving inputs due largely to the issue earlier mentioned and their reactions are quite understandable.

6.5. Paddy and finished Rice Merchants

Practically all the issues raised in sections 5.1 through 5.4 above have grave implications for trade in either paddy or finished rice. The situation in Osun state seems completely different from those in Ogun and Ekiti states largely because of good accessibility to land in commercial size and to cost saving inputs and services. When the issues raised in section 5.1 above are addressed, the market in Ogun and perhaps Ekiti are likely to respond in similar manners.

6.6. The Thailand Case Study.

Rice production is Thailand seems cultural as Cassava in Nigeria. There is hardly a household in rural Thailand that is not into rice production. This commodity is the major means of livelihood to the Thai's rural populace and the government subsidizes the sector as a means of controlling rural and urban unemployment. Though production practices and yield are relatively similar for upland rice production, unlike southwestern Nigeria, most farms in Thailand are aggregated and clustered in accessible locations, thus reducing the cost of service delivery and bulking of produce. It is unfortunate that farmers in Thailand generally have no voice in how their produce is priced. Unlike the southwest Nigeria where farmers sell their paddy at a negotiated price and or process their paddy to sell at a negotiated price, those in Thailand sell to millers who determine what price to pay and at price dictated by export merchants. The Thai's approach though questionable seems more responsive to the global market and the policy of the Thai government of maintaining and or expanding its share of the global rice market as a means of controlling unemployment. It seems a significant portion of the wealth generated by Thai's rice farmers goes to the middlemen (millers, packer, and exporter) which is not so in Nigeria.

While global competitiveness is desirable, equity and fairness helps trade to grow. It is difficult to understand how Thai's rice can remain competitive particularly in Nigeria that has similar production and cost profile. The Thai's government is highly involved in the production, marketing and rice export market which is subsidizes. It's bulking services and export is practically controlled by cartels with relationship with government and which are provided with marketing support in import destination countries. It is not unlikely that when the subsidy element of Thai's upland rice industry is removed, its production profile might not be as competitive with that of southwestern Nigeria. However, there are a number of lessons to be learnt from the formulation and implementation of the pro-poverty reduction, employment generation and maintenance policies of the Thai government that has made them the number rice exporter in the world.

7. Emerging Issues and Suggested Ways Forward

Principally a number of issues came out from this survey. The issues were filtered during the two feedback sessions to stakeholders during which, a number of possible ways forward were suggested. In the mean time please find below the issues surfaced and possible ways forward

7.1. Access to land, its allocation, use, and the implications for effective and efficient rural development, employment generation, poverty reduction and control of rural urban migration.

7.1.1. Suggested Ways Forward

Land is a primary means of production and on which government revenue is anchored. A situation were farmers who need to expand their operation have to rent land on yearly basis is to say the least discouraging and even unhelpful to the government. PrOpCom need to make the issue of accessibility to land one of it principal government policy reform focus in the states of interest. Ogun State Government is currently implementing a tri-sector development approach in the housing and industrial park development sectors and same could be engaged in agricultural development. Government institutions (secondary schools, colleges of educations, polytechnic, universities, and government establishment such as Odua Investment) are sitting on several thousands of hectares of land that they are unable to develop and use. With the right policies in place, these parcels of land can be leased out to private farmland developers who would develop and sub-lease them to interested farmers. In such cases, institutions with the original title could make income from so doing and pay taxes to government

There is the need for PrOpCom policy group to engage government on policies that could promote collaboration in the acquisition, allocation and management of land resources belonging to communities (traditional title holders). A policy that promotes the acquisition of community land without denying them interest in such land could go along way in addressing the issues associated with payment of compensation. In this situation, the allocation of land to third party developers becomes the responsibilities of both the government and the community with both parties agreeing to a fair and equitable distribution of the income generated from such lease or rent. In this regard, such farmland would be allocated to a farm estate developer, whose rent would be shared by the government and the community and at the end of lease tenor the land will revert to the community or traditional title holders.

Government policies and legislation could also focus on punitive measures to stimulate the lease of institutional and community land for development as failure to do so is certainly a loss of revenue to government.

7.2. Farm clustering and aggregation for the emergence of commercial agriculture and viable agro services and inputs markets

7.2.1. Suggested Ways Forward

In addition to section 6a above, PrOpCom through its Facilitation Fund could engage government in the sampled state to lease out government owned estates or settlements to private farm estate developers for effective management and allocation. There is a need to engage government on this subject and demonstrate what government could be loosing by not going this route. Also these ideas need to be supported with effective legislations as such leases and the investments to follow thereof are long term in nature. In effect, investments must be protected, as the government policies are usually challenged by lack of continuity and stability.

It is obvious that the current approach where government is engaged in retail farmland allocation is unworkable and present avenues for loss of revenue. When our suggestions are executed it is not unlikely that the market for agro services and inputs would grow, productivity will be enhanced, and taxable wealth would be generated. There are a number of opportunities for PrOpCom interventions in this area and those isolated include:

- Training in community resources management and reporting
- Training in lease and contract negotiation as well as enforcement
- Awareness creation for local legislators, government agents and community leaders in advocacy for reforms and legislations on issues relating to community land leasing and management
- Training in farmland and estate development
- Training in equipment procurement, finance and maintenance
- Training on foundry development, spare parts fabrication and standardization,

7.3. Farm clustering and aggregation for the emergence of viable commodity bulking and markets

7.3.1. Suggested Ways Forward

The implementation of the suggestions made in sections 6a and b above certainly would go along way in generally improving agricultural productivity in the states of focus. When this happens, commodity bulking centers are bound to emerge and to which bulking agents are bound to respond as such centers would help in no small means in reducing their transaction cost. There are a number of opportunities for PrOpCom interventions in this area which could include:

- Facilitation of emergence of trade networks
- Training relating to produce handling, storage and maintenance

- Training in bonded warehouse maintenance and inventory credit
- Training in equipment procurement and maintenance
- Training in foundry development, spare parts fabrication and standardization, etc.

7.4. Farm inputs/services standards control and enforcement

7.4.1. Suggested Ways Forward

The incentives for input service providers to introduce new and effective agro chemicals into the markets is been hampered by limited and fragmented pockets of demand. The implementations of the suggestions made above could go a long way in addressing this issue. However, before that happens, it is but essential that public concerns in relation to the agrochemicals in the market be addressed. To start with there is a need for an in depth study of the Nigerian Agrochemical markets as suggested by the stake holders who are of the opinion of being reaped off by the market which is considered full of substandard, ineffective and dangerous agrochemicals.

These apart, there is a window of opportunity for PrOpCom to engage NAFDAC and SON on this issue through its Facilitation Fund. This engagement is likely to throw up a number of issues relating to policy and policy enforcement, public health issues, institutional/systems environment (policy and legislation) gaps, organizational and individual capacity gaps. All these could inform the ToR for the study of the Nigerian agrochemical market. As at now nothing definite about what could be done could be suggested as there are no details on the issues within this market. However, the following generic training could be considered for implementation among farmers and contract farming service providers.

- Active ingredients labeling and equipment calibration for effective and optimization of agrochemical usage
- Use of field kits and plant tissue sampling in determining nutrient needs by field crop and fertilizer applications
- Sponsor and or collaborate with appropriate agencies in raising public awareness in the proper use of Agrochemical and its implications for public health

7.5. Market informed inputs and output pricing

7.5.1. Suggested Ways Forward

In conducting this study, the biggest challenge that confronted one, was the near absence of standards within and across states. It is a very worrisome experience finding out that farmers are not even sure what size of farmland they were holding. Many could not make out the difference between acres and hectares. In all the locations visited, the unit of measurement varies from one state to the other and this necessitated the need for calculating and recalculating so as to standardize the data obtained. All these have serious implications for contracting and contract farming. In-fact this should be one of the major focus of PrOpCom and if it is well executed the program would have gone a long way in addressing the most problematic issues relating to production and marketing contracting. Again this is an issue that must be handled at the State and SON level. Though addressing this subject is likely to be a long drawn one but the earlier it is taken on the better as it has serious implications for contracting, contract enforcement, title

documentation and above all in the prevention of avoidable business transaction related conflicts. Again, relying on the Facilitation Fund, the entry point is policy level engagement with Federal and States Governments as well as NAFDAC and SON. The engagement processes would throw open a number of issues that could pin point the direction of PrOpCom interventions in this regard.

7.6. Energy generation, distribution and pricing.

7.6.1. Suggested Ways Forward

The problem of energy generation and distribution is rather critical as it is seen as one of the primary factors promoting poverty in the country. So serious is the problem that the President had to declare a state of emergency on this issue. Before the last administration departed there was a number of national Independent Power Projects (NIPP) at various levels of completion. However, it was recently made public that there were no provisions for the funding of these crucial projects in the year 2008 budget, thus making their early completion questionable. Though government claimed it could not make provisions for their funding due to a subsisting court order and that other sources of financing were being looked into, there is a general feeling that Government is not serious about this problem. One is not too sure what PrOpCom could do in this regards but it certainly not a problem that can be put away as the livelihood of millions and government revenue generation are dependent on this subject.

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9. Annexes