





## 1. INTRODUCTION

The study of value chains comprises of two keywords; value and chain. The term value is known to "value added" in the value chain analysis (VCA) as it characterizes the incremental value of a resultant product produced from processing of a products. For agricultural products value addition gives farmers opportunities to create new differentiated product from others and thus gains advantage over competitors. Michigan State University (MSU) (2005). Price of the resultant product shows it incremental value. The term chain refers to a supply chain indicating the process and the actors involved in the life cycle (from conception to disposal) of a product (Howkes, 2011). Kaplinsky *et al*; (2001) defined value chain analysis as the "full range of activities which are undertaken to bring a product or service from conception, through the different phases of production, transformation and delivery to consumes and final disposal after use. Sango (2010) also described it as movement of product from one stage to another and identification of the actors, firms and their services.

Demand for agricultural products value added is in the increase globally, this is attributed to the facts that raw and unprocessed agricultural products do not attract the attention of the global market as such products are usually low price with the exporter on the losing side (Kumar *et al*; 2011). Countries that have undergone continuous enhancement and modification of their agricultural products have competitive advantage in the global market as their products attract higher premium. The significant of value addition to the value chain of agricultural commodities cannot be over emphasized, agricultural products has this unique characteristics of been perishable but with value addition, processing of harvesting produced, packaging and transportation, the shelf life of the agricultural products improves with value addition.



Soybean is gaining recognition in Nigeria as it offer variety of potential benefits to the production system, diets and incomes of smallholder producers. In addition, the high protein content of 42.8%, could also contribute to improved nutritional status of rural household (Dixit *et al*; 2011).

The specific objective includes examining the socio economic characteristics of the respondents, analyze cost and returns, as well as factors affecting profit margin of various actors and examined the most efficient stages of value addition for soybean. And also identify the constraints faced by different actors in the soybean chain,

## 2.0 METHODOLOGY

### 2.1 The Study Area

The study was carried out in Kaduna State, Nigeria. The State lies between latitude  $9^{\circ} 10' E$  and  $11^{\circ} 30' N$  and longitude  $6^{\circ} E$  and  $9^{\circ} 10' N$  of green which meridian. It is bordered with Katsina and Kano States to the north, Plateau State to north east, Nasarawa State and Abuja to the south and with Niger and Zamfara State to the west. Kaduna State Agricultural Development Project (KADP 2007). The climate of the State is savannah type with two clear differentiated seasons – wet and dry seasons. The wet or raining season begins April and ends in October while dry season commences in November and ends in March. The annual rainfall ranges from 1,300mm – 1524mm while the annual temperature ranges from  $24^{\circ}c$  to  $36^{\circ}c$ . Geographical location of the State lies within the northern Guinea savannah agro – ecological zone of Nigeria and has an estimated population of 6,066,512 million .National Population Census (NPC)(2006) and 471,000 farm families (KADP 2007). The State is predominantly rural dwellers engaged in rain fed subsistence agriculture and produced crops such as maize, rice, sorghum, soybean, yam, fruits and vegetable as well as cattle, sheep, goats, pig and chicken rearing.

## 2.2 Sampling Procedure

The sampling procedure used was a multistage random sampling method leading to the selection of 175 respondents of the actors involved in farming, marketing and processing of soybean from three (3) selected Local Government Areas of Kaduna State. The choice of these LGAs was based on purposive sampled due their predominance participation in soybean production, marketing and processing.

## 2.3: Method of Data Collection

Data for the study was obtained from primary sources only. This involved administering a well structured questionnaire and interview schedules to the respondents.

## 2.4 Method of Data Analysis

The tool employed in analysis includes descriptive statistical tools, such as means, percentages and frequency distribution table, farm budgeting technique, multiple regression model and efficiency indices were used to achieve the objectives.

## 2.5 Model specification

The ordinary least squares, multiple regression analysis was employed to analyze the data of various actors in the value chain. The model is implicitly stated as:

$$Y = f(X_1 X_2 X_3 X_4 X_5 X_6 X_7 X_8 X_9 \dots + U)$$

The explicit form of the model is stated as:

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 \dots + u)$$

Y	=	Total	value	addition	on	soybean	
X <sub>1</sub>	=	Age	of	respondents	in	years	
X <sub>2</sub>	=	Sex	of	respondents (binary variable: male = 1, female = 0)			
X <sub>3</sub>	=	Household	size	(no	of	persons)	
X <sub>4</sub>	=	Educational	level	(no	of	years spent in school)	
X <sub>5</sub>	=	Years	of	experience	(no	of	years in activities)
X <sub>6</sub>	=		Labor	(man		days)	



$X_1$  = Capital inputs (depreciation of inputs in ₦)  
 $X_2$  = Credit availability (amount received ₦)  
 $X_3$  = Cooperative (dummy variable; member = 1, non member = 0)  
 $X_4$  = Distance to market (km)  
 $X_5$  = Farm size (hectares)  
 $B_1$  = Is the parameter  
 $U$  = Is the error term.

Various functional forms were fitted for each of the actors to the data to select the lead equation. The successful lead equations are:

1. Double Log (Cobb - Douglas)  
 $\ln Y = \ln b_0 + b_1 \ln x_1 + b_2 \ln x_2 + b_3 \ln x_3 + b_4 \ln x_4 + b_5 \ln x_5 + b_6 \ln x_6 + \dots + b_n \ln x_n + u$
2. Exponential  
 $\ln Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + \dots + b_n x_n + u$

### 3.0 RESULTS AND DISCUSSIONS

#### 3.1 Socio - Economic Characteristics of the Respondents.

This section considers the socio economic characteristics of the respondents, their age, gender, marital status, household size, educational level, years of experience, credit availability etc.

**Table 1: Socio-economic characteristics of soybean value chain actors**

Items	Producers Freq. and %	Wholesalers Freq. and %	Retailers Freq. and %	Processors Freq. and %
<b>Gender</b>				
Male	53 (66.3)	8 (27.6)	10 (38.5)	6 (15.0)
Female	27 (33.7)	21 (72.4)	16 (61.5)	34 (85.0)
<b>Years of Education</b>				
No formal education	25 (31.3)	3 (10.3)	3 (11.5)	10 (25.0)
1 - 6 yrs	14 (17.5)	8 (27.6)	8 (30.8)	16 (40.0)
7 - 12 yrs	12 (15.0)	11 (37.9)	10 (38.5)	7 (17.5)
Above 14 yrs	29 (36.2)	7 (24.2)	5 (19.2)	7 (17.5)
Mean	9	9	9	7
<b>Years of Experience</b>				
1 - 10 yrs	35 (43.7)	4 (13.8)	16 (61.5)	23 (57.5)
11 - 20 yrs	32 (40.0)	22 (75.9)	8 (30.8)	15 (37.5)
21 - 30 yrs	13 (16.3)	3 (10.3)	2 (7.7)	2 (5.0)
Mean	15	10	10	12
<b>Membership of</b>				

Association				
Non member	17 (21.2)	11 (37.9)	8 (30.8)	5 (12.5)
Member	63 (78.8)	18 (62.1)	18 (69.2)	35 (87.5)
Amount of credit Received (N)				
Non Credit	18 (22.5)	8 (27.6)	6 (23.1)	13 (32.5)
> 50,000	25 (31.5)	11 (37.9)	13 (50.0)	11 (27.5)
50,000 – 100,000	23 (28.8)	5 (17.2)	4 (15.3)	9 (22.5)
100,000 – 150,000	4 (5.0)	1 (3.5)	1 (3.8)	1 (2.5)
> 150,000	10 (12.5)	4 (13.8)	2 (7.8)	6 (15.0)
Mean	17	119	6288	4362
Total	80 (100.0)	29 (100.0)	26 (100.0)	40 (100.0)

\*Numbers in parenthesis are percentages

Source: Field Survey, 2015

Table 1 presents the socio economic characteristics of soybean value chain actors, the gender reveals that majority of the sample producers were males representing 66.3 percent while 33.7 percent were females. Soybean production is mainly dominated by the males. This may be attributed to the fact that predominant culture in the study areas discourages women active participation in farming but relegated to harvesting.

Results in Table 1 also revealed that 72.4 percent of the wholesalers and 61.5 percent of the retailers were females while 27.6 percent and 38.5 percent were males respectively. This implies soybean marketing business is mainly dominated by the females' folk. This may be due to the fact that women dominate and play active roles in the downstream segment of agricultural products marketing.

More so, sample processors in the study areas represent 85.0 percent females' and 15.0 percent males. This implies soybean processing business is predominant carried out by the women folk.

The table further revealed that most of the soybean producers had formal education above 14 years representing 36.2%, The soybean producers in the study areas are educated this may be one of the reasons that encourages expansion and increased productivity. When compared with the wholesalers and retailers who have 37.9% and 38.5% respectively for education between 7-12



years. Education of the soybean marketers will improve their ability to effectively control their resources, understands and work with new innovation. The processors had less educational years of 1-6 (40%). Education of the soybean processors will have a positive impact on the use of improve processing techniques and raise the technical competence of individuals, expose the actors to several opportunities and alternative which could lead to better outputs and incomes.

The experience of the soybean value chain actors is based on the number of years been spent in the business. The result revealed that all the actors in soybean value chain have some level of experience in the business with the producers, wholesalers, retailers and processors having a mean years of 15, 10, 10, and 12 respectively.

The majority of the soybean value chain actors belongs to association with producers representing 78.8%, wholesalers 62.1%, retailers 69.2%and processors with 87.5%. This may be attributed to the existences of these associations in the study areas which will gave them opportunities to transform from small scale to large scale business and even accessed credit at eased.

Table 1further shows the amount of credit obtained by different value chain actors to finance soybean business. And it reveals that some percentage of all the actors have accessed credit of >50,000 naira to finance their business

**Table 2: Estimated Annual costs, returns and gross margin of soybean producers**

Items	Amount (₦)/ha	(%) of Total Costs
<b>Variable Cost (VC)</b>		
Cost of soybean seeds	2,611.80	2.50
Fertilizers	11,736.28	11.24
Herbicides	9,101.65	8.7
Transportation	6,276.07	6.01
Labor	41,642.18	39.87
<b>Total Variable Cost (TVC)</b>	<b>83,673.30</b>	
<b>Fixed Cost (FC)</b>		
Rent on land	1,133.47	1.10
Depreciation on capital	1,992.50	1.90
Payment of interest	2,578.76	2.47

were sex, household size, inoculate, farm size, education, experience, cost of transport, credit amount, distance to market, labor and grinding cost while age, agro chemicals, capital inputs, transport cost and firewood negatively affects the value chain. Inadequate of credit facilities was one of the major challenges facing value chain; based on the results of this finding the following recommendations are proffered:

1. Government should formulate policies that will stimulate commercial banks to lend credit to value chain actors, at lower interest rate and the issue collateral demands should be reviewed.
2. Policies should be formulated and sustain to enhance less privilege people in the soybean value chain, since it is found to be profitable.
3. Proper management of the stages in the soybean value chain should be maintained as these stages have significant effect on the prices and all season availability of soybean.
4. Extension agent should sensitized public to patronized soybean products because of its nutritional value for healthy life.

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