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Value chain analysis of groundnut in traditional rain-fed area, a case of Sheikan locality north Kordofan State, Sudan

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Abstract

Value chain is way to improve income generation and refers to the entire set of activities carried out by difference actors in the chain as well as can lead to proper resources management. Groundnut represents one of the most important oil crop in Sudan. The study conducted in North Kordofan State (NKS) of Sheikan locality during 2019/2020 cropping season. It aimed at analyzing groundnut value chain in traditional rain-fed and identifying value chain actors in Sheikan locality of North Kordofan State. Three administrative units were randomly selected. Data collected via structured questionnaires and group discussion. Where 196 farmers were selected using the clustered random sample technique. Study revealed that, the main value chain actors were farmers, traders, wholesalers, processors, retailers, and consumers. Moreover, the highest value added in groundnut is received by processors (42.12%), while farmers, assemblers, wholesalers, and retailers who received as 31.1%, 3.6%, 9.8% and 13.4%, respectively along the chain. Results also indicated that, the lowest coefficient was15.4% received by farmers, followed by 49.3%, 60.9%, 104.2%, and 153% for traders, wholesalers, processors, and retailers, respectively. Study showed that many constraints were found to prevent groundnut value chain development in the study area. The study recommended policy intervention for developing market information and marketing infrastructure of groundnut in Sheikan particularly.

Keywords: Groundnut; Value Chain; Traditional Rain-fed; Sheikan; North Kordofan State

1. Introduction

Groundnut, represent one of important cash crop in Kordofan [1]. Now a day's worldwide increased concern about developing the major food-cash crops production to meet the demand of population growth and farm sustainability [2]. Agricultural crops value chain is fundamental to the survival of human society, the growth or maintenance of regional and national economies [5]. [6], stated that, poor agriculture producers often struggle to gain market access, because they lack knowledge of market skills or requirements as well as poor information flow and other obstacles in value chain.Traditional rain-fed agriculture now is the basis of economic and social development (12), and produces much of the food consume globally and poor communities in developing countries [14], it widely practiced in North Kordofan especially in the southern and central parts where rainfall is relatively higher. Groundnut or peanut (Arachis hypogaea L.) is the sixth most important oilseed crop in the world [9], it is main crop in North Kordofan for producing oil, fodder and planting with Acacia senegal tree in form of agro-forestry [7 and 8]. A value chain is a full range of activities that are

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required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final customers, and final disposal after use [16]; [10]; [24];. Value chain is way to improve income generation and can lead to proper resources management. However, it based on a complete characterization of input-output relationship from producer to retailer, and the coordinating mechanisms that guide activities at each stage [6]. Agricultural crop value chain can also upgrade the chain to enhance the production process, product quality, chain functions and relationship with other chains [18]. It fosters the interactions between actors participating through the identified points of intervention to bring increased market efficiency, leading to a rise in general value [22]. Each actor plays an important role in the value chain of product]. It is necessary to consider markets relationships, the participation of different actors, and the significant constraints that limit the growth of crops production and competitiveness of smallholder farmers who received only a small tiny proportion of the final value of their output [4]. Poor infrastructure of market and fragment finance, lack of skills and technology exposed are considered big constraints of value chain analysis and marketing efficiency [25]. However, profits modernizing and commercializing products are urgently required in the traditional sector to enhance the competitiveness of product supply chains and to enhance yield; along with value addition to the product and a policy that strengthens constraints, and opportunity of farmers in traditional rain-fed to raise the productivity of the ecosystem. On the other hand, it was shown that, less income household receiving higher than medium and higher income household [19]. There is lack of value chain studies of crops in Sudan particularly groundnut. [14] studied the efficiency of groundnut production. Among this development of value of given product lead to reducing poverty of smallholder farmers. The study assumes processors and wholesalers are the main beneficiaries in groundnut value chain analysis. This study is provided information about value chain of groundnut and involved actors and can be help the decision maker to take action about the products for more improvement.

1.1. Research Objectives

The overall objective of the study was to analyzing groundnut value chain in traditional rain-fed in North kordofan State, while the specific objectives were:

- To Identifying groundnut value chain actors
- To Measuring groundnut added value along the chain
- To assess the groundnut marketing cost and efficiency
- To Identifying the constraints/weakness, opportunities, strength and threats of field crops.

2. Material and Methods

2.1. Study area

The study is carried out in Sheikan locality of North Kordofan State where fall in latitudes 25' 12°, 45' 13° North and longitudes 35' 29°, 30' 30° East. It located in Savannah area, mostly used for agriculture, and grazing activities [23] and [20]. The locality is production home for many crops such as sesame, groundnut [14], sorghum, millet [13]. In terms of soil, the two main and most extensive types are sandy soils (70% of arable lands) and semi-clay soils (20% of arable lands), as well as alluvial clays along watercourses and dark cracking clay soils. However, there is a seasonal and short rainy season (250-400 mm), and the average minimum and maximum temperature ranges from 20 to 30 degrees Celsius [17].

2.2. Methods

The study was conducted with farmers in three administrative units in Sheikan locality; namely, Umsemema, Kazgial, and KhorTagat which they are practicing traditional rain fed agriculture for different type of crops including groundnut. Data were collected using a questionnaire, focus groups discussion, and observation. A questionnaire was design and distributed to 196 farmers. Clustered random sample technique was used in household level. Other data were collected from groundnut traders in the three administrative units from December 2019 to February 2020.

2.3. Data analysis

The data collected were sorted and entered to statistical analysis for social sciences (SPSS ver., 22) and Microsoft excel 2007 for description and frequency analysis. Groundnut marketing cost and value-added were also assessed through the following equation;-

$$Vij = Yij - II\ ij \ldots\ldots\ldots\ldots (1)$$

The overall value-added is the in equation (2):

$$VA = Ychain - II\ chain = \sum VA\ actors \ldots\ldots\ldots\ldots(2)$$

Where:
VAij = value-added of product
Yij = value of outputs of the product
II ij = value of intermediate inputs of product.
∑VA = total value added of actors

Marketing Efficiency method:

$$M.E=\frac{\text{Costs of marketing of products}}{\text{Total value of marketing of the products}} x100\% \ldots\ldots\ldots\ldots(3)$$

M.E = Marketing Efficiency (coefficient).

3. Results and discussions

3.1. Groundnut value chain actors and activities a long chain

Agriculture crops value chain can identify strategies for farmers to improve their income and livelihood security [11]. Groundnut value chain map in Sheikan locality described actors, functions, and environmental enablers (Figure 1). Therefore the map illustrated that the main actors in the groundnut value chain were farmers, traders, wholesalers, processors, retailers, and consumers; which describing all actors functions and activities through different channels. The map revealed also banks, instituted, and other providers to enable the environment of the value chain that affects farmers' agricultural performance.

3.2. Marketing cost of the groundnut value chain

It refers to Marketing cost paid by actors in value chain of groundnut; farmers paying a 2.2 cost of Zakat in addition to the initial cost 7.1 SDG/kg (i.e.. per kilogram) to sell to traders in villages. Traders incurred costs of transportation, cleaning, shelling, and repackaging at 29.66 SDG/kg including traders purchased price, and sold to the wholesalers who paid the cost of loadings, transportations, taxes, and other market fees including purchased price all equivalent to 36.62 SDG/kg and sold the product to processors. Processors paid marketing and processing cost at 62.68 SDG/kg with a purchased price to sell groundnut oil and cake to retailers. Then, retailers of oil and cake of groundnut paid marketing cost at 91.93 SDG/Kg to sell their product to the consumer. This could be related to activities carried by processors in the chain. As coincide with what had been said by [9] and [15] that, processing tend to increase value addition, (Table 1).

3.3. Marketing gross margin and added value of groundnut

The highest gross margin 25.32SDG/kg received by processors which representing 42.1% followed by 18.7 SDG/ Kg, 5.88 SDG/Kg, 8.07 SDG/Kg, 2.14 SDG/ Kg, with the added value of 31.1%, 13.4%, 9, 8%, and 3.6 % received by farmers, wholesalers, retailers, and traders, respectively (Table 2).This indicated that processing creates a new value and therefore increases the gross margin, this also goes with what had been reported by [21] describing that, producers received good gross margin from specific quantity but other actors trade more quantities than producer or depend on their capitals, Table 2.

3.4. Market efficiency of groundnut chain actors in North Kordofan

(Table 3) showed that, the lowest coefficient was15.4% received by farmers, followed by 49.3%, 60.9%, 104.2%, and 153% of traders, wholesalers, processors, and retailers, respectively. This implied that 31.4% of the total revenues were received by the farmers. This was either due to the monopolistic behavior in the markets or imperfect competition of price variation for the raw materials and marketing costs. This result also agreed by [3], the lower coefficient the better marketing margin, hence the more efficient market.

3.5. Constrain, opportunities and policy intervention for groundnut value chain development

Many constraints, opportunities, and policy interventions were identified in the three stages in the groundnut value chain. These constraints were found to prevent groundnut value chain development in the study area. This agreed with

[19], fluctuating in local prices are the key constrain to small producer and have negative impact on product sustainability, limited access to finance and market information, Table 4.

Table 1 Marketing cost (SDG/Kg) for groundnut value chain

Cost	Farmers	traders	Wholesalers	Processors	Retailers
Farmers marketing cost	7.1	-	-	-	-
Transporting	-	0.64	-	0.5	0.2
Loading	-	-	0.52	1.5	-
Storing	-	-	0.5	-	-
Packaging	-	0.44	-	9.1	3.73
Cleaning	-	0.26	-	-	-
Shelling	-	0.32	-	-	-
Processing	-	-	-	1.65	-
Taxes	-	-	3.8	0.68	-
Zakat	2.2	-	-	-	-
Fees	-	-	-	6.75	-
Total costs	9.3	1.66	4.82	20.18	3.93

Table 2 Market gross margin and added value of groundnut

Actors	Marketing cost/SDG	Sell price	Gross margin /SDG	% added value
Farmers	9.3 *	28	18.7	31.1
Traders	29.66	31.8	2.14	3.6
Wholesalers	36.62	42.5	5.88	9.8
Processors	62.68	88	25.32	42.1
Retailers	91.93	100	8.07	13.4
Total	-	-	60.11	100

*include initial value of groundnut = 7.1 SDG/kg

Table 3 Distribution of groundnut Value added and market efficiency among major chain actors

Value chain Actors	Farmers	Traders	Wholesalers	Processors	Retailers
Sell price SDG/kg	28	31.8	42.5	88	100
Cost of marketing ofproduct/SDG	9.3	29.66	36.62	62.68	91.93
Gross added value	18.7	2.14	5.88	25.32	8.07
Total added value (%)	31.1	3.6	9.8	42.1	13.4
Market efficiency (%)	15.4	49.3	60.9	104.2	153

The total marketing value of the product = **60.11** SDG/Kg

Table 4 Constraints, opportunities and policy intervention for groundnut value chain development in North Kordofan

Value chain stages	Constraints	Opportunities	Policy interventions
Inputstage	uncertified seeds, high cost ofinputs	Agri. Centers, state of agriculture,	Easing access input via government, strengthen Agri. Centers role.
Productionstage	Erratic rainfall, lack of extension services, pests and diseasespost-harvest loss	Labor availability, land ownership, rainfall, and suitable land for production	Strengthen extension cervices, train farmers pests control, use drought-resistant seeds, strengthen farmers to finance for agriculture,
Marketing stages	Transporting problems, low prices, poor marketing information, lack of marketing research, stores problems Poor product quality, high fees, and taxes, traditionally processing. High cost of the product, low consumers income, lack of consumers associations	crops high demanded, market accessibility, availability of market channel, research centers High demand for oil and cake, factories closer to production place, labor availability, and private investments in oil factories High consumption willingness.	Improve markets infrastructure, empowering farmers associations, Increase markets linkages of groundnut VC. Facilitateprivate investors of oil factories, Improve consumers awareness for better consumptions

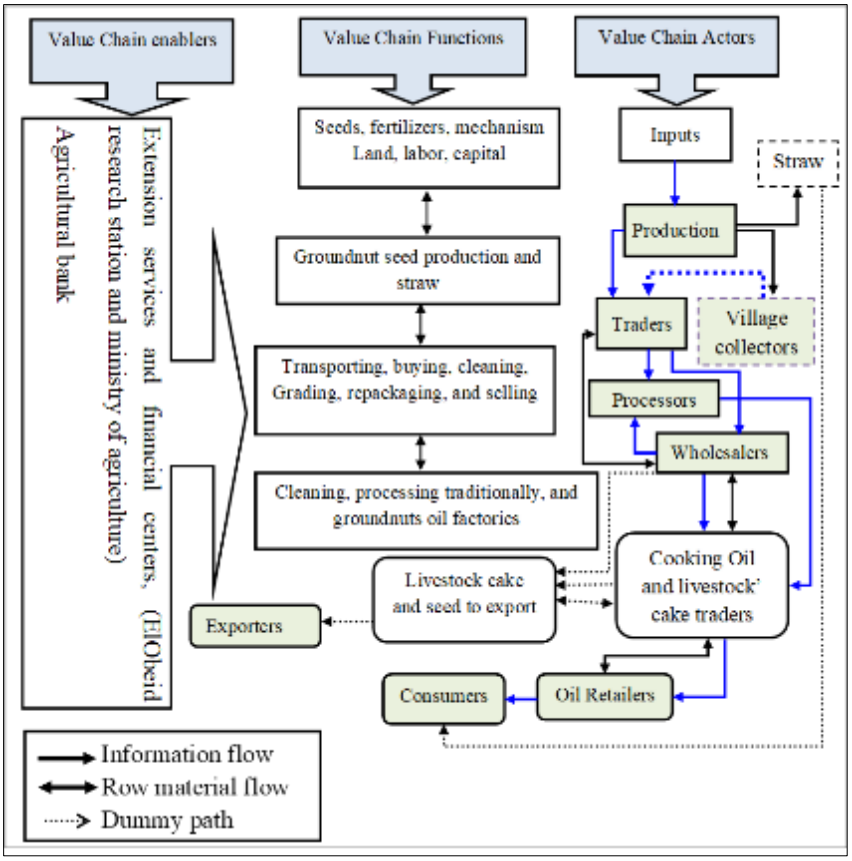

Figure 1 Marketing map of the groundnut value chain

4. Conclusion

Based on study findings, groundnut value chain channels is a bit long and complicated between actors in the chain. Processing of groundnut to oil and*Impaz* (cake after processing the oil) has significantly increased the value of the product. These findings set policy intervention to provide farmers with marketing information and improve the infrastructure of the processing of groundnut value chain. The study recommended increase marketing efficiency to raise the general value, consider the market relationship and the partnership of the different actors and improve their skills through capacity building enhancement.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest is to be disclosed.

Statement of ethical approval

The present research work does not contain any studies performed on animals/humans subjects by any of the authors'.

Statement of informed consent

Informed consent was enhance from all actors and stakeholders included in the study.

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