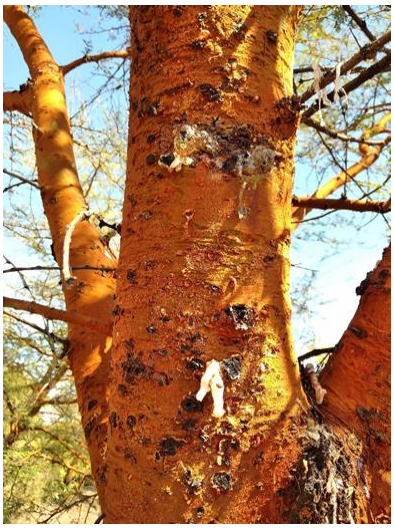
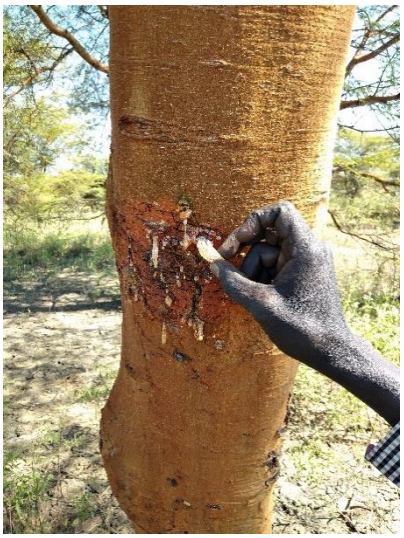
Engendered Value Chain Assessment for Sorghum, Groundnuts, Milk and Gum Arabic in the Former Northern Bahr El Ghazal State, South Sudan


Compiled by:

[1]Bernard B. Obaa, PhD and [2]Stephen Angudubo

[1]Department of Extension and Innovation Studies, College of Agricultural and Environmental Sciences, Makerere University P.O. Box 7062, Kampala; obaaben@gmail.com;
Tel: +256772660006

[2]National Crops Resources Reaseach Institute Namulonge, National Agricultural Research Organization, P.O Box 7084 Kampala, Uganda

Submitted to VWB/VSF-Canada's "Sustainable Agriculture and Livestock Production Initiative in the former Northern Bahr el Ghazal State" (SALPI) funded under EU Zonal Efforts for Agricultural Transformation - Bahr el Ghazal Efforts for Agriculture Development (ZEAT-BEAD)

March 2020

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LIST OF ACRONYMS

ACF	Action Against Hunger
EU	European Union
FFS	Farmer Field School
FGD	Focus Group Discussion
FRC	Farmer Resource Center
GBCs	Gender Based Constraints
HeRY	Help Restore Youth South Sudan
Kg	Kilogram
M&E	Monitoring and Evaluation
MDI	Microfinance Deposit Institution
NBeG	Northern Bahr el Ghazal
NGO	Non-Governmental Organization
SALPI	Sustainable Agriculture and Livestock Production Initiative
SSP	South Sudanese Pounds
VCA	Value Chain Analysis
VSF	Vétérinaires Sans Frontières (Veterinarians without Borders)
VSLA	Village Savings and Loans Associations

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ACKNOWLEDGEMENTS

We are grateful to all the farmers, traders and processors in the former Northern Bahr el Ghazal state who spared their valuable time to participate in this value chain assessment. We acknowledge the significant contribution of the team in Juba office in facilitating the study and reviewing the preliminary findings. In particular, we thank Vétérinaires Sans Frontières - Suisse, Vétérinaires Sans Frontières Canada and Help Restore Youth South Sudan staff at both Juba and field levels for technical, financial and logistical support in the execution of this consultancy assignment. Specifically, we thank Bul John Ajak for his excellent coordination work and Rose Mary Moria for her assistance with financial matters and hotel bookings. As M&E Manager, Isaac Mayen Bhoryiak helped greatly throughout the field work in providing guidance and conducting some key informant interviews. The team in the compound of VSF Suisse in Malwalkon was very friendly and supportive throughout. It was such a wonderful experience living in the compound. We thank Luke Wono for being such a great team leader in the compound. We learnt so much about the project and local communities in our interactions in the compound with John Issa, Dominic Oyom and Michael Mogga. We acknowledge the contribution of the team of 10 dedicated data collectors and the two drivers. Specifically, we acknowledge the support of Agamy Dut throughout the field work. He was our guide and translator in addition to conducting several individual interviews. Our two dedicated drivers Peter Atak Tong and Santino Bol Nyong were phenomenal in executing their duties despite the bad roads. Our heartfelt thanks go to the two ladies who work as cooks and cleaners in the compound for such delicious meals. Lastly, appreciate government officials and local leaders who provided insightful information and guidance.

EXECUTIVE SUMMARY

Vétérinaires Sans Frontières (VSF) Canada in collaboration with VSF Suisse and Help Restore Youth South Sudan (HeRY) is implementing a three-year project, entitled, "*Sustainable Agriculture and Livestock Production Initiative in the former Northern Bahr el Ghazal State (SALPI)",* funded by the European Union (EU) under ZEAT BEAD Component 2 Sustainable Supply of Agriculture and Livestock Inputs and Services through the Private Sector. The project aims to contribute to improved food and nutrition security, livelihoods and incomes of smallholder agro-pastoralist communities in all the former counties of Northern Bahr el Ghazal states namely Aweil Center, Aweil East, Aweil West, Aweil North and Aweil South. As part of the SALPI project, a detailed engendered value chain analysis be conducted to assess actors, participation, gender-based constraints, (GBCs), and opportunities for women, men, and girls and boys in the production, marketing process through to the final consumer was requested. The main objective of the study was to determine which farming enterprise, and livelihood activities provide better livelihood opportunities, product expansion, market viability, value addition opportunities, quality improvement and input availability for women, men, girls, and boys.

Main results

Sorghum value chain

The main actors along the sorghum value chain included producers, local traders and brokers. The average annual land size under sorghum production was 2 acres with slight differences between the second season of 2018 and the first season of 2019. Access to agro-inputs for sorghum production was generally low in the last production seasons, although the youth had greater access than the adult producers. The main sources for agro-inputs were fellow farmers and NGOs especially the implementing partners of the SALPI project. Women and men jointly executed sorghum production activities with youth and children providing a supportive role. On average, the producers obtained 636.8 Kg and 516.8 Kg of sorghum in 2018 and 2019 respectively. Although, the male youth obtained higher sorghum outputs than their counterparts, they sold relatively smaller amounts. Key constraints faced by men and women in sorghum production included diseases, pests, weather vagaries, poor crop varieties, limited land, inadequate access to quality inputs, limited mechanization, and poor postharvest handling. Sorghum production was also constrained by limited access to extension and financial services.

In sorghum marketing, the main buyers were local traders and brokers. Most sorghum was sold at the farm gate and rural markets. The main marketing season is between April and August. Prices generally increase as the marketing season progresses from April to August. The main marketing constraints were limited market demand, low prices, and poor marketing structures, exploitation by middlemen, poor postharvest handling and lack of transport. Additional constraints in sorghum trade included high taxes, high rental fees for business premises and low demand. Low prices were more prevalent among women and female youth (33.3% and 39% respectively) compared to men and male youth. About 50% and 30% of the women and female youth respectively reported exploitation by middlemen.

The gross margin analysis indicated that sorghum production was generally profitable among producers that sold through different channels namely, local traders, urban traders, brokers, and local consumers. The producers earned on average SSP 86,247.6, 12,159.5, 91,804.5, and 51,235.8 through selling to local traders, urban traders, brokers, and local consumers respectively. Comparatively, the producers earned more profits by selling to marketing agents (brokers) and less from sale of sorghum to local consumers. Local traders and brokers got greater gross margins than producers.

To strengthen the sorghum value chain, the following are recommended: 1) Training on agronomic practices, postharvest handling, and financial literacy; 2) Support to women, men and the youth for participation in seed multiplication and input distribution; 3) Support to the youth in order to provide hired labor for on- and off-farm production and marketing activities; 4) Increase access to improved inputs and appropriate technologies for increased sorghum productivity; 5) Provide mobile processing services; and 6) Promote affordable and cost-effective technologies such as PICS bags, motorized sorghum sprayers and small-scale irrigation equipment and implements.

Groundnuts value chain

The main actors in the groundnuts value chain were producers, local traders, urban traders and local consumers. Most groundnut producers had limited access to agricultural inputs. Within the limited access, the youth had relatively higher access to agricultural inputs than the women and men. The main sources of inputs were fellow farmers, own saved seeds, stock or livestock residue, village or local market, and agro-input dealers. To a lesser extent, some producers obtained agro-inputs through the support from the State Agriculture Department. Access to inputs was constrained by high costs, inputs not readily available, high transport costs and poor quality.

Women generally play a more dominant role in production and postharvest handling activities such as land preparation, planting, weeding, and harvesting. Men were more involved in marketing of groundnuts. The youth and children provided supportive role in production and marketing activities. Generally, output levels were below the potential production and there was significant difference between outputs in 2018 and 2019 seasons. The average groundnut output in 2018 and 2019 were 627.4Kg and 2015.3Kg respectively. Some of the key factors that affected production of groundnuts included diseases, pests, weather vagaries, poor crop varieties and inadequate access to quality inputs.

On marketing of groundnuts, the main buyers were local traders, urban traders and brokers. The main marketing season is between September and February. Prices between the two production seasons vary (SSP 326 in 2018 and SSP 290 in 2019). The main marketing constraints included high taxes aggravated by double taxation, stress in transportation on bad roads, low prices, high cost of renting business premises, limited market demand, exploitation by the middlemen, poor postharvest handling, and poor marketing infrastructure.

The gross margin analysis indicates that groundnut farmers made profits through selling to local traders, urban traders, and brokers. The gross margin obtained from sale of groundnuts to local

traders, urban traders, and brokers were SSP 307,317, 100,897.5, and 621,984.4 respectively. The highest profit was recorded by groundnut farmers who sold to brokers. Comparatively, the producers earned less profits by selling to local traders.

The following are the strategic interventions to improve groundnut value chain: (1) Strengthen capacity of farmer institutions through training in group dynamics, organizational management and leadership; (2) Strengthen the capacity of individual farmers by enhancing their knowledge and skills on new technologies, and farming as a business; (3) Support integrated pest and disease management through robust extension advisory service; (4) Increase access to improved agricultural inputs by making them available and affordable; (5) Increase access to agricultural and advisory services through Farmer Field Schools and farmer Resource Centers; and (6) Promote value addition in groundnuts to increase returns to investment coupled with provision of appropriate value addition machinery.

Milk value chain

The main actors in the milk value chain were input suppliers, milk producers, local traders, and urban traders. On average, each household kept 21 cattle, comprising local breeds, cross breeds and pure breeds. The cattle were mostly acquired through inheritance, especially among women and female youth. Other sources of livestock were local livestock markets, donations from NGOs, and purchase and/or exchanges from neighbors. Analysis of gender issues indicate that all the gender categories play a role in cattle rearing. The men were mostly involved in kraal maintenance, branding, feeding/grazing and provision of water. Activities such as cleaning of milk containers, milking, transportation and selling of milk were done by the women with support mainly from female youth. The women also supported the male counterparts in providing supplementary feeds, water and branding. The male youth participated in grazing, fetching water and tagging.

Milk production was generally low in all the communities. The average milk production was 1,054 litres per season, most of which was consumed at home. Only 18% of the milk was sold. The milk produced was mainly sold to local and urban traders. The key constraints in milk production and marketing were livestock disease, low milk prices, drought, low quality feeds, market information asymmetry, lack of transport, poor livestock breeds and limited access to financial credit. Milk marketing was impeded by limited labor for sourcing and handling milk, low demand, and scarcity of milk in dry season, low prices, and limited funds for investment. The gross margin analysis indicates that milk production and marketing was generally profitable.

The study recommends the following for strengthening the milk value chain: (1) Improved cattle breeds through cross breeding with superior breeds to improve milk productivity; (2) Improved feeding; (3) Provision of sufficient water during the dry season especially for lactating cows; (4) Improved value addition to increase returns to milk produced; (5) Train milk producers and traders on milk handling practices and general hygiene.

Gum Arabic value chain

The main actors in the gum Arabic value chain were producers, local traders, urban traders and gum exporters. Analysis of gender roles revealed that all gender categories participate in gum tapping, collection and marketing. Men dominated tree tapping, provision of food, gum marketing, transportation, and decision making on use of money from gum sales. Women mainly participated in gum collection. They also participated in drying, cleaning, and sorting of the gum, fetching water, gum packaging, transportation and to a smaller extent marketing and decision making on use of money from gum sales. Apart from decision making on use of money from gum sales, the youth provided supportive roles in all gum production and marketing activities. On average, a household collected 5 – 10 Malwa weekly, an equivalent to 15 – 30 Kg (each Malwa is equivalent to three kilograms). In the season of 2018, the average gum collection was 86.7 Malwa (260.1 Kg). The highest collection was recorded by the youth, with 142 Malwa on average compared to 87.8 and 46.8 Malwa among men and women respectively. Key constraints in gum tapping, and collection included limited knowledge on tapping, cleaning, drying and packaging, low generative capacity of gum trees, lack of drinking water, lack of financial services, and poor forest resource management.

Gum tapping and collection takes place in the dry season between January and May. The onset of the season, however, is dependent on when soils in the forests become dry after rains stop towards the end of the year. In a typical tapping and collection season, household members spent most of the time in the forests. They make temporary shelters for cooking and storing collected gum. Gum Arabic is mostly bought sold to traders within South Sudan and Sudan. The marketing channel include local traders, brokers, urban traders, and exporters. The female youth sold their gum through the three channels. The women mainly sold to urban traders and exporters. Majority (64%) of the men cleaned and sold gum arabic to the exporters. The producers obtained positive gross margins from gum sales. All the gender categories obtained positive gross margins with slight differences in the gross margin percentage. Male youth obtained the highest gross margin (50.4%) in a season. However, the producers recorded losses from sale of gum arabic to urban traders, brokers, and exporters. Gum marketing was constrained by low gum prices, information asymmetry, and lack of supportive producer organization.

The following strategic interventions are recommended to strengthen the gum Arabic value chain: (1) Strengthen capacity of producer groups by increasing their access to inputs, and negotiating better prices; (2) Train the producers on tapping, drying, cleaning, sorting, packaging and storing as well as business management skills; (3) Provide equipment for tapping, harvesting, and handling and also protective gears such as gum boots, overalls and eye glasses; (4) Improve marketing of gum through establishing gum collection centers under the management of organized and robust producer groups, and (5) Strengthen collaborations and partnerships between the producers and exporters gum in order to increase market efficiency and marketing margins.

CHAPTER 1: INTRODUCTION

1.1 Background to SALPI Project

Vétérinaires Sans Frontières (VSF) Canada in collaboration with VSF Suisse and Help Restore Youth South Sudan (HeRY) is implementing a three-year project, entitled, "*Sustainable Agriculture and Livestock Production Initiative in the former Northern Bahr el Ghazal State (SALPI)",* funded by the European Union (EU) under ZEAT BEAD Component 2 Sustainable Supply of Agriculture and Livestock Inputs and Services through the Private Sector. The project aims to contribute to improved food and nutrition security, livelihoods and incomes of smallholder agro-pastoralist communities in all the former counties of Northern Bahr el Ghazal states namely Aweil Center, Aweil East, Aweil West, Aweil North and Aweil South. The project targets directly 10,000 households (60,000 individuals) in the five project locations. The project objective is to contribute to improved food and nutrition security, livelihood and incomes of small holder agro-pastoralist communities. It is designed to promote technologically appropriate and economically feasible crop and livestock production, value chain addition and marketing for enhanced food self-sufficiency, employment and income opportunities for agro-pastoral communities in the former Northern Bahr el Ghazal (NBeG) state. The project has four outcomes: (1) Enhanced conflict mitigation resilience mechanisms among targeted communities through local level mediated actions that promote peaceful co-existence (between women, men, boys and girls); (2) Improved food production through increased access to locally sourced productive inputs and adoption of innovative and technologically appropriate production techniques (Women, men, boys and girls); (3) Enhanced access to sustainable community based extension service networks through private-public sector linkages and institutional capacity building; and (4) Improved livelihoods and income opportunities for men, women and youth through livelihood diversification and promotion of crop and livestock value chain addition and marketing infrastructure improvements (Women, men, boys and girls).

As part of the SALPI project, a detailed engendered value chain analysis be conducted to assess actors, participation, gender-based constraints, (GBCs), and opportunities for women, men, and girls and boys in the production, marketing process through to the final consumer has been requested. This is to identify potential opportunities of mainstreaming gender in the value chain process which requires paying constant attention to the gender perspective at every step, from production to the sharing of benefits, and not only in relation to products and services in which women and girls are dominant but also others where women could expand their participation to increase their economic benefits, advance women's empowerment and ensure gender equality.

1.2 Objectives and scope of the Engendered VCA

Through this study, VSF-Canada aims to determine which farming enterprise(s) and livelihood activities hold potential of better livelihood opportunities, product expansion, market viability, value addition opportunities, quality improvement and input availability for women, men, girls and boys. This study provides information about extra-market factors such as power relations, division of labor, and control over resources to help make visible the differential contributions and potentials of women and men in a particular economic activity, thereby providing the basis for developing strategies and actions for promoting equitable benefits from the production

process. Furthermore, the study gives information on women's and men's roles in production, processing, and marketing processes. Such information is critical for enhancing the skills and upgrading the knowledge of both women and men to increase efficiency in the production process and improve the quality of the product, and, hence, to gain more for all gender groups. The study provides insights that will help determine and profile the most appropriate commodity chains to upgrade in each of these counties and proposes detailed plan of interventions to address the gender-based constraints (GBCs) identified among women, men, girls and boys and how to address them.

1.3 Methodology

Research design and study area: This was a mixed-methods study involving qualitative and quantitative approaches. It involved review of project documents, focus group discussions, key informant interviews and individual household interviews for producers in sorghum, groundnuts, milk and gum Arabic value chains. Field work and preliminary analysis of the data took place in all the five counties of the former NBeG state.

Sample selection and size: There were 15 key informant interviews held with traders, consisting of both men and women. Key informant interviews were also held with 4 processors. All processors were men because there were no female processors. Key informant interviews took place with 8 field-based project staff. Meetings that generated insightful information were also held with the county and local leadership in each of the counties. A total of 332 households were randomly selected and interviewed from the five former counties of NBeG state. Of this number, 222 were adults and 110 youth. Among the adults, there were 84 men and 138 women. The selected youth consisted of 44 males and 66 females. Considering sample distribution based on vale chains, there 103 interviews for sorghum, 89 for groundnuts, 85 for milk and 55 for gum Arabic. For more details on sample in each county for the selected value chains, read appendix 1.

Data collection: Data was collected through desk reviews which included project documents and reports and field visits for assessing value chains through interviews with households, key informants and value actors and supporters. Questions in the individual interviews focused on social and demographic characteristics, asset ownership, gender desegregated data on production activities, postharvest handling and marketing activities, costs and revenues, constraints and opportunities in the selected value chains. Copies of the questionnaire is in appendix 2.

Data analysis: Preliminary analysis of qualitative data was done in the field. A final analysis of information from the focus group discussions, key informant interviews and other open-ended questions involved examining the participants' views and using content analysis to summarize the discussions. Analysis teased out common themes and patterns in the transcribed qualitative information.

For quantitative data from household interviews, the data was moved from the KoBoCollect program (Open Data Kit application) in the tablets to Stata (version 13.0) in the computer. Analysis generated frequencies and some measures of central tendency. Comparisons were made by cross tabulations on background characteristics and other key variables of assessment. Tables, graphs, and charts were drawn in Excel to display and present the results. Gender desegregated

cross margins were established among producers and traders. This also included calculation of gross profit margins. A correlation analysis was conducted to establish factors that influence gross margins at producer level in the value chain.

CHAPTER 2: VALUE CHAIN ASSESSMENT FOR SORGHUM

2.1 Socioeconomic and demographic characteristics of sorghum farmers

The average age for men, women and youth were 38, 39 and 25 years respectively. The population was relatively young in general. Education levels were generally low, on average, seven years of formal schooling. The labor capacity, in terms of the number of people that can provide farm labor was 2 two persons per household. Their estimated total access to land for agricultural production averaged 3.02 acres. Men had greater access to land (4.5 acres) than others, followed by girls (3.05). Women had the least access to land at 2.24 acres. The access to land reflects relative participation in production of crops including sorghum. Those with greater participation have more access. Land ownership would present a different scenario altogether.

Table 2:1: Socioeconomic and demographic characteristics of sorghum farmers

Variable	Pooled (Mean)	Adults (Mean)		Youth (Mean)	
		Men	Women	Male	Female
Age	34.0	38.5	39.3	25.3	25.4
Household size	6.6	7.3	6.4	6.4	6.6
Education level	6.7	5.5	7.0	10.0	5.5
Labor capacity	2.2	2.4	2.0	2.4	2.3
Land accessed	3.0	4.5	2.2	2.9	3.1

2.2 Access to land for sorghum production

The average amount of land accessible for sorghum production declined slightly from 2.25 to 2.04 acres between 2018 and 2019 (Figure 2.2). In both years, men and male youth on average had greater access to land for sorghum than did women and female youth. More surprisingly, girls had more access to land for sorghum than women in both years (2.12. acres compared to 1.74 acres in 2018 and 1.97 compared to 1.68 acres).

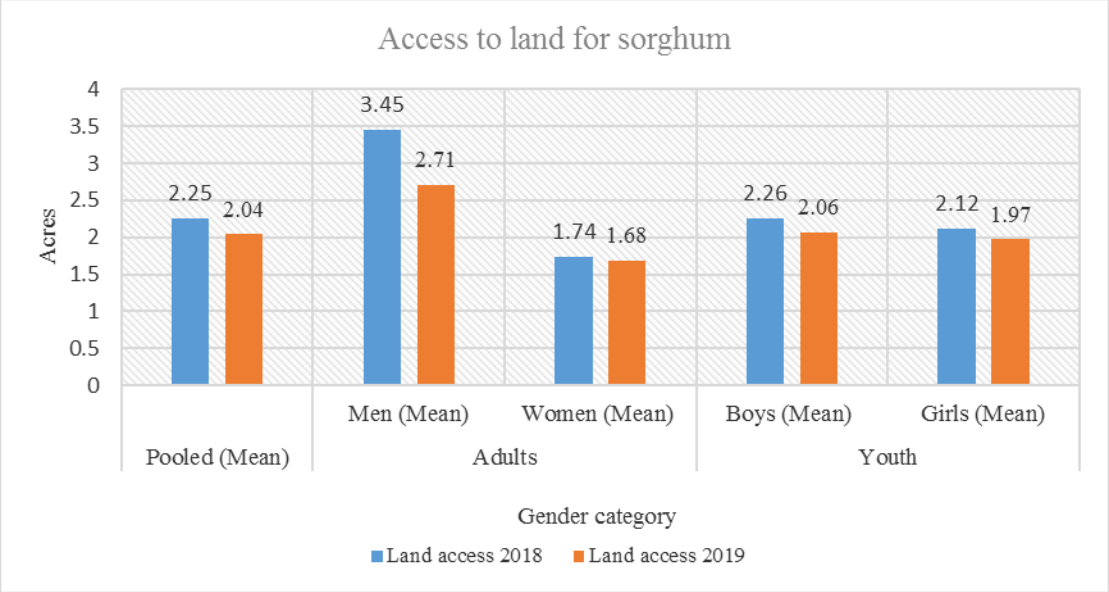

Figure 2.2: Access to land for sorghum production

2.3 Sorghum value chain map, functions, actors and supporters

Value chains (VC) encompass the full range of activities and services required to bring a product or service from its conception to sale in final markets that may be local, national, regional or global. By definition, working along a value chain entails operating along a single commodity to improve profitability and competitiveness of the entire chain of actors. The sorghum value chain includes all the key value chain actors: input suppliers, producers, rural and urban traders, brokers/agents, farmer groups/cooperatives, processors and consumers.

The value chain map in figure 2.3 indicates that most of the sorghum produced by the smallholder farmers was sold to local and urban traders and local consumers. Some sorghum farmers sold directly or through brokers/ marketing agents to urban traders. The local traders and brokers were better placed in the marketing of sorghum. They had higher gross margins. This may partly be attributed to their proximity to the source of sorghum.

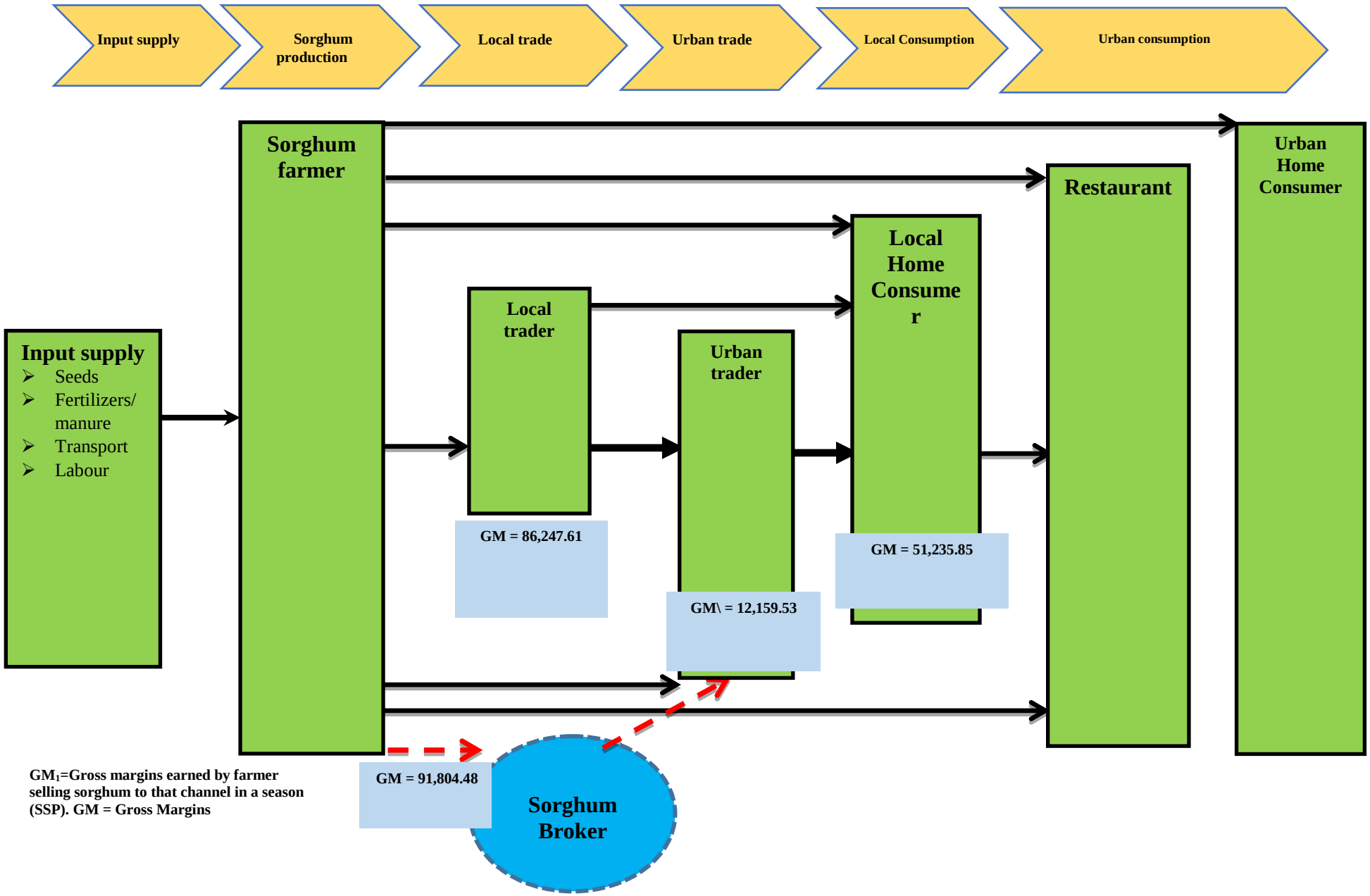

Figure 2. 3: Sorghum Value chain map with chain actors and gross margins

2.4 Primary actors in sorghum value chain

2.4.1 Input access

Access to agricultural inputs for sorghum was generally low in 2018 and 2019 (Figure 2.41). During this period, less than half of those interviewed had access to inputs. Among the youth, there was relatively greater access in 2018 than 2019 and vice versa for adults. Considering the male youth, in 2019, only 9.3% had access down from 40% the previous year. Among the female youth, only 25.9% had access in 2019 compared with 32.1% the previous year. In 2019, women had relative to others, greater access to inputs for groundnuts at 37%.

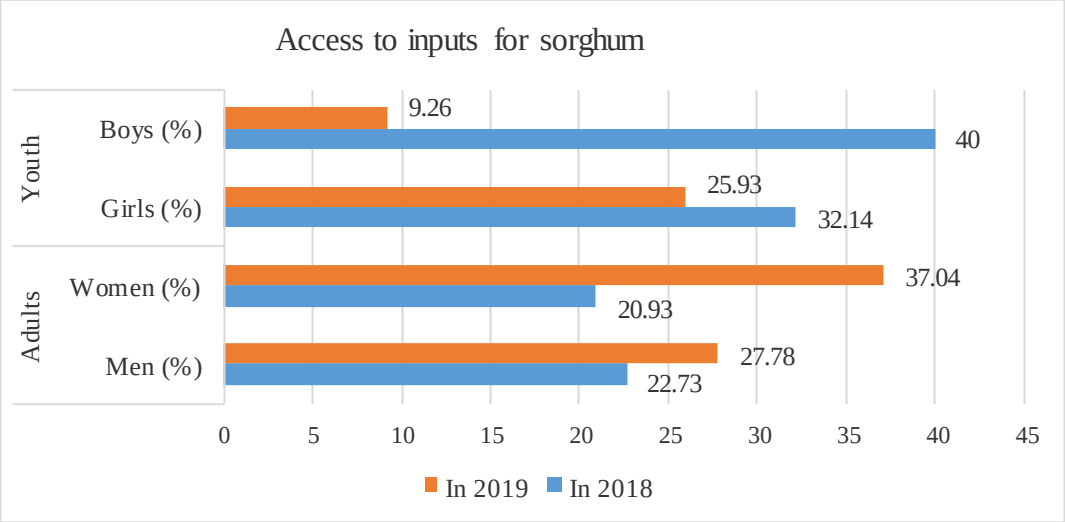

Figure 2.4.1 Access to agricultural inputs for sorghum

The low access is explained by several factors including high input costs that render them unaffordable, unavailability of inputs, high transport costs and adulterated and or poor quality inputs. More women and girls mentioned these constraints than men and boys. The main types of inputs accessed were improved and local seeds and organic manure. Other inputs were tools (hoes, ax, etc.) and implements such ox- and donkey ploughs.

Several sources for inputs were identified and summarized in table 2.41. The main sources were agro-input dealers, fellow farmers and neighbors, own seed or stock, projects by NGOs including SALPI partners (VSF-Canada, VSF-Suisse, HeRY) and ACF. More women than others got inputs from neighbors. The State Agriculture Department gave more support to women and boys than others. SALPI and ACF provided support to the girls.

Table 2.4.1: Source of inputs accessed for sorghum in 2019

Characteristic variable	Adults (%)		Youth (%)	
	Men	***Women***	***Male***	***Female***
Agro-input dealer	33.3	33.3	5.6	27.8
Fellow farm/ neighbor	31.3	37.5	6.3	25.0
Own farm/ stock	30.8	30.8	15.4	23.1
VSF SALPI	0	0	0	100
Village/ local market	28.6	57.1	0	14.3
Other NGOs (ACF)	0	0	0	100
State Agriculture department	0	50.0	50.0	0
Farmer groups	0	50.0	0.0	50.0
Local government	66.7	0.	33.3	0
Own livestock	25.0	37.5	12.5	25.0
Own crop residues	26.3	21.1	15.8	36.9

2.4.2 Production

Gendered roles: Sorghum production and marketing activities were widely shared among household members. Women and men jointly participated in all the activities. The youth and children mostly provided a supportive role (Table 2.421). Weeding was predominantly an activity for women and the female youth, with 31.5% involvement of women compared to 22.2% of men. Women, though not a significant way, were more involved in land preparation, planting, harvesting and postharvest handling and management.

Table 2.4.2.1: Gendered roles in sorghum production and marketing within households

Characteristic variable	Adults		Youth		Children (<18 years)	
	Women (%)	***Men (%)***	***Female (%)***	***Male (%)***	***Girls (%)***	***Boys (%)***
Land preparation	30.9	28.5	16.4	12.9	6.2	5.1
Planting	29.4	25.8	15.4	15.8	7.2	6.4
Weeding	31.5	22.2	17.1	8.6	12.4	8.2
Harvesting	29.0	28.6	15.8	13.5	6.8	6.4
Postharvest handling	31.9	27.8	18.2	13.3	7.1	1.7
Marketing	33.3	33.3	13.4	13.0	4.2	2.8

Production levels: The production levels for sorghum are presented in table 2.4.2.2. There was a drop of 18.8% in the amounts of sorghum harvested and sold in the last two years. On average, farmers harvested 516.8 kg in 2019, down from 636.8 kg in 2018. The male youth had the highest output harvested in the two years, but sold relatively smaller amounts (less than 60%).

Table 2.4.2.2: Sorghum harvested and sold in 2018 and 2019

Year	Pooled (Mean)		Men (Mean)		Women (Mean)		Male youth (Mean)		Female youth (Mean)	
	Harvested	*Sold*	*Harvested*	*Sold*	*Harvested*	*Sold*	*Harvested*	*Sold*	*Harvested*	*Sold*
2018	636.2	529.3	771.4	657.1	390.3	250.0	1013.6	657.0	845.6	737.5
2019	516.8	429.8	641.8	592.6	352.6	200.4	801.3	468	566.1	540.0

2.4.3 Marketing

The main marketing season for sorghum is between April and August every year. Prices for sorghum are generally lower at the beginning of the season and keep rising until they almost double at the end of the season. For instance, some traders in Mondit, Bar-Mayen in Aweil Center reported that in April 2019, the price of sorghum was SSP 400 per Malwa and kept increasing up to SSP 700 per Malwa in August 2019. Farmers sell sorghum at the farm gate, in local markets to traders within and to traders or their agents in the urban markets. Most farmers sell at farm gate and in the rural market or to the rural trader (Figure 3.43). Men tend to sell to urban traders and their agents than women and youth.

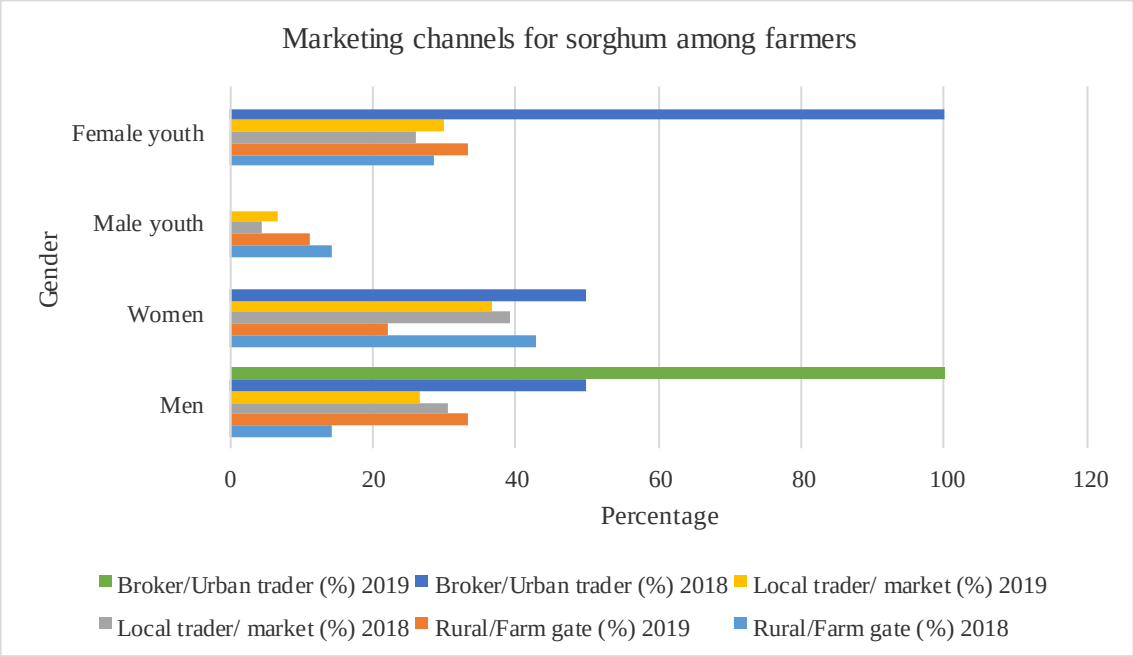

Figure 3.4. 3: Marketing channels for sorghum among farmers

The main marketing challenges for sorghum among traders included poor transport characterized bad roads, low prices and too much bargaining with vulnerable people and cheating by producers that

put less in a Malwa but selling it as a full Malwa. Other constraints identified were high taxes, about 50 SSP per 50kg bag of sorghum, high cost of renting premises and low demand during some periods.

2.4.3.1 Gross margin from sorghum among traders

Most traders interviewed were retailers of sorghum. Although, the costs of trading were high, especially during acquisition of the grain from the producers, trading in sorghum grain was profitable. Other cost drivers were transport, packaging labour and packaging material.

Table 2.4.3.1: Gross margin from sorghum among traders

Revenue & costs	Mean	Standard. deviation
Quantity sold (Kg/ season)	6,500.0	1,000.00
Price (SSP/ Kg)	156.4	90.61
Total Revenue	**1,016,708**	502,166.09
Variable costs		
Cost of produce (SSP/ season)	662,000.0	410,336.45
Transport (SSP/ season)	11,125.0	4,905.35
Loading and Off-loading (SSP)	3,150.0	212.13
Market fees/ taxes (SSP/ season)	4,666.7	3,511.88
Packaging labour	17,000.0	6,245.00
Packaging material (SSP/ season)	15,100.0	7,421.59
Stall/ shelter costs (SSP/ bag)	3,383.3	1,678.04
Total variable costs (SSP/ season)	**716,425**	420,495.18
Gross margin (SSP/ season	**300,283**	214,870.87
	29.53%	

2.4.4 Processing

Sorghum in the state was mostly sold as grains and flour. The main processing activity for sorghum was making it into flour. There were small-scale processors based in local and urban markets that produce much of the sorghum flour sold in the local and urban markets. Their processing capacity was low and the facilities were rudimentary, often make-shift structures. In any of the processing units, food handling procedures and the general level of hygiene tended to be poor.

2.4.5 Consumption

Sorghum is widely eaten in South Sudan as it is an important part of the traditional food. The figures in table 2.45 indicate that on average farmers consumed 90.4 kg and 77.9 kg of the sorghum produced in 2018 and 2018 respectively. Comparing with total harvests and sales (Table 2.42), the proportion of sorghum consumed at home was about 15%.

Table 2.4.5: Sorghum consumption in 2018 and 2019

Year	Pooled (Mean)	Men (Mean)	Women (Mean)	Male youth (Mean)	Female youth (Mean)
2018	90.4	86.3	96.7	73.9	87.5
2019	77.9	72.3	63.6	70.7	105.9

2.5 Value chain support services

2.5.1 Farmer groups and associations

Participation in producer groups or associations was very low among sorghum producers. Most (96.1%) did not belong to any producer group or association. None of the women interviewed belonged to any group or association. A modest level of membership in a group was observed among male youth. Up to 20% of them had membership in a producer group. Among men, only 4.5% belonged to a producer group. Among female youth, 3.6% participated in a Farmer Field School (FFS). Joining a group or association was generally new in the study area. All those who participated had joined within the last one and a half years (From around June 2018).

2.5.2 Access to extension services

Access to extension and advisory services was generally low. About half of women, male and female youth (51.2%, 50% and 50% respectively) received agriculture-related information and extension and advisory services in the past 12 months at the time of data collection. Men had the lowest access with a proportion of 27.3%. The reasons for limited access to extension and advisory services included untimely delivery of information, dissemination of irrelevant information and the high costs involved in accessing services including transport. Other reasons the focus on large scale farmers with resultant neglect of the majority small-scale farmers and the inaccessibility of the delivery channels used for information dissemination such as radio and mobile phones.

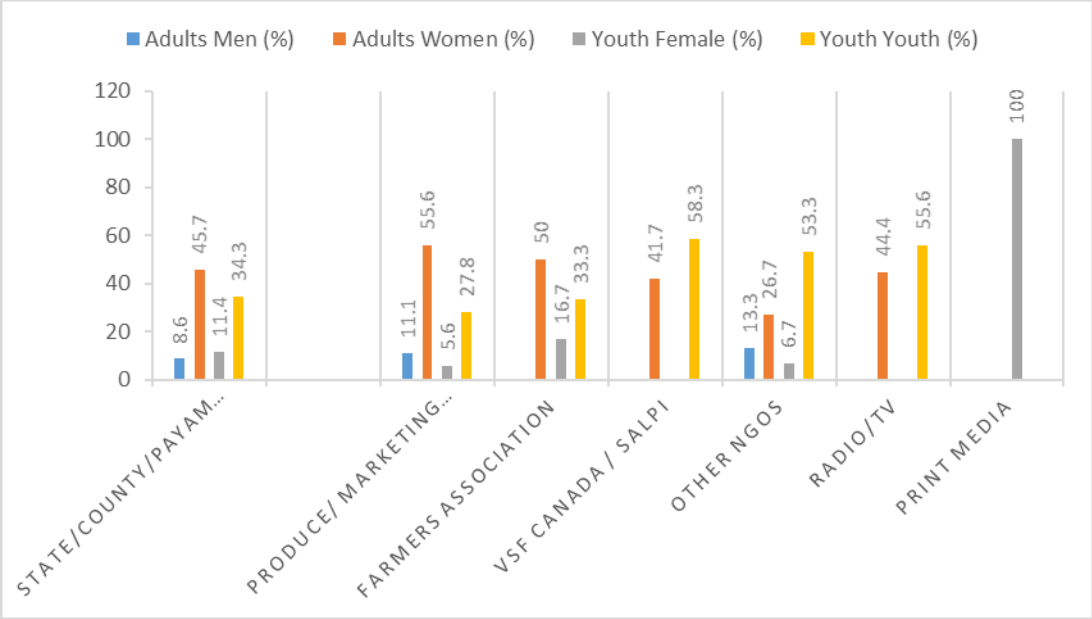

Figure 2.5.2: Sources of extension and advisory services

2.5.3 Access to financial services

There was very low access to financial services among sorghum producers. The majority (95.1%) had no access to financial services. The few among men, women and the male youth that had access mainly borrowed money from relatives and friends. The female youth that had access (3.6%) did not borrow from relatives and friends, but were involved in Village Savings and Loan Association (VSLA) and Rotating Savings and Credit Association (ROSCA). The main reasons for very limited access to financial services were the fear or inability to pay back, the demand for collateral, unavailability of financial services and bureaucratic delays in approvals and disbursements.

2.6 Factors affecting gross margins in sorghum production among farmers

2.6.1 Gross margins levels

Gross margins from sorghum among farmers declined significantly from an average of 65.6% to 37.2% between 2018 and 2019 (Tables 2.6a and 2.6b). The contributory factors to lower gross margins were increased variable costs, reduced output and low produce prices. Variable costs per acre increased from an average of SSP 25,035.3 to SSP 31,479.3. The increment was more pronounced among women and boys. The output per acre declined from an average of 217.4kg to 184.6kg. Similarly, output prices reduced from an average of SSP334.7 to SSP 272.9. Women and male youth were the biggest losers. Their average gross margins declined from 53.1% and 42% in 2018 to 1.2% and 9.3% in 2019 respectively. Men relatively experienced the least decline from 72% to 60.7%. Along with female youth, men tended to get higher prices for their produce which may be related to their greater capacity to move produce to market places where prices are higher. They also had the lowest total variable cost per acre in 2019 compared to women and boys.

Table 2.6.a: Gross margins from sorghum among farmers in 2018

Revenue & costs	Pooled	Men	Women	Male youth	Female youth
Output (Kg/ acre)	217.4	165.9	138.4	226.1	366.8
Price (SSP/ Kg)	334.7	406.3	335.5	243.8	307.5
Total Revenue	***72,763.8***	***67,405.2***	***46,433.2***	***55,123.2***	***112,791.0***
Variable costs					
Cost of inputs (SSP/ acre)	3,534.8	2,140.1	2,248.2	3,960.5	5,407.1
Land preparation (SSP/ acre)	2,948.7	266.7	2,789.4	4,401.8	2,978.1
Planting (SSP/ acre)	3,681.1	2,300.9	2,688.5	4,516.4	5,876.3
Manure application (SSP/ acre)	1,825.2	1,134.9	700.4	4,609.0	1,468.9
Chemical spraying (SSP/ acre)	1,940.8	1,799.6	3,090.8	1,558.2	1,161.2
Weeding (SSP/ acre)	4,831.9	3,496.8	3,938.0	6,240.9	6,382.1
Harvesting (SSP/ acre)	3,061.2	5,090.0	2,415.6	3,757.0	2,292.0
Drying & processing (SSP/ acre)	998.1	1,016.4	1,216.1	783.4	861.2
Packaging & Storage (SSP/ acre)	1,003.1	706.5	1,268.1	811.6	1,001.4
Transport (SSP/ acre)	654.5	435.7	837.6	843.1	596.1
Marketing (SSP/ acre)	555.9	473.6	593.4	477.1	633.7
Total variable costs (SSP/acre)	***25,035.3***	***18,861.2***	***21,786.1***	***31,959.0***	***28,658.1***
Gross margin (SSP/ acre)	**47,728.5**	**48,544.0**	**24,647.1**	**23,164.2**	**84,132.9**
	65.6%	**72.0%**	**53.1%**	**42.0%**	**74.6%**

Table 2.6b: Gross margins from sorghum among farmers in 2019

Revenue & costs	Pooled	Men	Women	Male youth	Female youth
Output (Kg/ acre)	184.6	212.1	132.3	193.7	223.7
Price (SSP/ Kg)	272.9	277.0	266.7	250.0	283.3
Total Revenue	***50,377.3***	***58,751.7***	***35,284.4***	***48,425.0***	***63,374.2***
Variable costs					
Cost of inputs (SSP/ acre)	4,147.4	4,417.1	3,700.4	5,697.6	4,155.1
Land preparation (SSP/ acre)	9,017.3	3,672.1	14,559.0	3,904.9	9,029.6
Planting (SSP/ acre)	1,944.5	1,172.3	1,485.2	3,571.4	2,168.7
Manure application (SSP/ acre)	1,328.5	1,053.8	257.8	632.3	2,706.2
Chemical spraying (SSP/ acre)	2,050.0	3,489.8	2,784.5	680.9	1,405.9
Weeding (SSP/ acre)	4,577.5	2,948.2	4,736.9	11,156.2	3,713.8
Harvesting (SSP/ acre)	2,018.8	2,070.6	1,166.3	5,813.4	1,946.2
Drying & processing (SSP/ acre)	1,939.2	1,113.1	1,572.3	6,425.4	1,529.1
Packaging & Storage (SSP/ acre)	1,161.2	1,028.6	1,325.1	1,502.2	1,031.5
Transport (SSP/ acre)	2,231.7	1,626.9	2,202.0	3,871.6	2,081.0
Marketing (SSP/ acre)	1,063.2	488.4	1,083.0	673.9	2,052.5
Total variable costs (SSP/acre)	***31,479.3***	***23,080.9***	***34,872.5***	***43,929.8***	***31,819.6***
Gross margin (SSP/ acre)	**18,898.0**	**35,670.8**	**411.9**	**4,495.2**	**31,554.6**
	37.2%	**60.7%**	**1.2%**	**9.3%**	**49.8%**

2.6.1.1 Gross margins from sorghum sales to different channels

Generally, sorghum farmers made profits from sales of grains through different marketing channels. The farmers who sold to local traders and brokers made more profits than those who sold to local consumers and urban traders, either directly or through brokers. The quantities sold to urban traders were very small (24.32 Kg) to make reasonable profits.

Table 2.6.1.1: Total variable costs and gross margins for sorghum in a season by marketing channel

Sorghum buyer	Total variable costs (SSP)		Gross margins (SSP)	
	Mean	***Std. Dev.***	***Mean***	***Std. Dev.***
Local trader	24,520.86	24,173.65	86,247.61	125,751.86
Urban trader	8,300.91	7,072.35	12,159.53	0.00
Broker	56,055.30	4,010.94	91,804.48	112,634.96
Local consumer	25,072.58	13,938.21	51,235.85	31,376.60
Pooled sample	25,251.24	22,164.39	74,757.77	104,622.44

2.6.2 Gross margins correlations

To establish the main factors that significantly influence gross margins, correlation analysis was performed. Correlation is an analytical procedure used to examine pair-wise associations between continuous variables. The degree of association is given by the Pearson r coefficient. The sign of the Pearson r coefficient indicates the direction of the effect of the variables on each other while the magnitude of the coefficient indicates the strength of effect. A Pearson r of –1 indicates perfect negative linear association, an r of 0 indicates zero linear association, while an r of +1 indicates a perfect positive linear association between the variables. The P value indicates the level of statistical significance. A P value of 0.05 or less indicates a statistically significant association between the variables and a P value of more than 0.05 indicates non-significance.

Gross margins from sorghum production and marketing was significantly influenced positively by experience of growing sorghum, expenditure of seeds, quantity of output consumed, produce price, access to credit and proportion of that credit spend on crop production (Table 2.62)

Table 2.6.2: Gross margin correlations for sorghum

Variable	Pearson's r coefficient	P-value
Age of respondent	-0.057	0.719
Year of schooling	0.123	0.438
Household size	0.220	0.162
Active members of household	0.213	0.176
Access to land (acres)	0.223	0.157
Land allocated to all crops (acres)	0.138	0.410
Experience growing sorghum (years)	0.466*	0.002
Land allocated to sorghum (acres)	0.226	0.157
Number times grown groundnuts	0.214	0.173
Cost of value addition activities (SSP)	0.134	0.622
Total expenditure on seeds (SSP)	0.394*	0.012
Quantity of output consumed (Kg)	0.512*	0.001
Average price per Kg	0.448*	0.003
Distance to markets (Km)	-0.152	0.355
Amount of credit obtained (SSP)	1.000*	0.000
Proportion of credit spent on crops	1.000*	0.000

2.7 Constraints in sorghum production and marketing among farmers

Several constraints were raised during the individual interviews. These are summarized in table 2.7. The three main constraints identified by each gender category has been highlighted in here. Among the men, limited market demand for sorghum (35.3%), inadequate access to quality inputs (30.3%) and diseases (29.7%) were the top three constraints. It was exploitation by middlemen (50%), poor marketing infrastructure (45.8%), lack of transport (45.4%) and drudgery from farm operations (45.4%) were the main constraints identified by women. Among the male youth, diseases (39.6%), poor marketing infrastructure (12.5%) and poor postharvest handling (10.7%) were the main constraints. For the female youth, it was low prices for sorghum (38.9%), drought (33.8%) and limited access to arable land that constituted the main constraints in sorghum production and marketing.

Table 2.7 Constraints in sorghum production and marketing

Characteristic variable	Adults (%)		Youth (%)	
	Men	Women	Male	Female
Diseases	29.7	9.9	39.6	20.9
Pests/ vermin	20.5	43.4	6.0	30.1
Weather vagaries	20.3	40.6	10.1	30.0
Drought	22.1	36.8	7.3	33.8
Poor crop varieties	18.5	40.7	9.3	31.5
Lack of financial credit	22.6	37.7	9.4	30.2
Lack of transport	15.9	45.4	9.1	29.6
Limited arable land	18.9	43.2	5.4	32.4
Inadequate access to quality inputs	30.3	36.4	9.1	24.2
Poor post-harvest handling	21.4	46.4	10.7	21.4
Poor marketing infrastructure	16.7	45.8	12.5	25.0
Lack of market information	26.1	39.1	8.7	26.1
Drudgery of farm operations	18.2	45.4	4.6	31.8
Low price of crop output	16.7	33.3	11.1	38.9
Limited market demand	35.3	29.4	11.8	23.5
Exploitation by middlemen/ agents	20.0	50.0	0	30.0

2.8 Interventions for increased sorghum production, value addition and marketing

Sorghum is a major food crop in former NBeG state. Demand was high in the local and regional markets. Sorghum can be sold as grain or flour to local markets and traders transporting to distant markets. The on-farm and off-farm interventions that can increase productivity and marketability along the maize value chain include:

- Training in agronomic practices, integrated pest management, post-harvest handling, agribusiness, financial literacy, and life skills for women, men, and female and male youth.
- Support to groups of women, men, and the youth to participate in seed multiplication and input distribution in conjunction with agro-input dealers.
- The youth could be organized to provide on- and off-farm casual labor services as may be demanded in their communities. They could also offer ox- or donkey-ploughing services to the farming community at a fee.
- Increase production of sorghum by increasing access to improved inputs and appropriate technologies.
- Provision of mobile processing services.
- Promotion of affordable and cost-effective technologies e.g. PICS bags, and motorized sorghum sprayers and small-scale irrigation implements for short-term crops.

CHAPTER 3: GROUNDNUTS VALUE CHAIN ASSESSMENT

3.1 Socioeconomic and demographic characteristics of groundnuts farmers

Social and demographic characteristics of groundnuts and sorghum farmers were similar with slight differences. Adults averaged 41 and 39 years of age among men and women respectively (Table 3.1). Both male and female youth were on average 26 years old. The average household size stood at 7 persons per household, slightly higher than that for sorghum farmers. The labor capacity was the same (2 persons) but access to arable land was much higher at 4.8 acres on average among groundnut farmers. Men had disproportionately higher access to land than the rest of the farmers.

Table 3.1: Socioeconomic and demographic characteristics of groundnut farmers

Variable	Pooled (Mean)	Adults (Mean)		Youth (Mean)	
		Men	Women	Male	Female
Age	34.5	40.9	37.8	26.4	25.5
Household size	7.2	6.8	7.0	6.3	8.4
Labor capacity	2.1	2.1	2.1	2.1	2.1
Land accessed	4.8	10.2	2.2	3.5	3.3

3.2 Access to land for groundnut production

On availability of land for groundnuts production, men accessed more than twice the amount of land others had for groundnuts (Figure 3.2). The youth had accessed more land for groundnuts than women in 2019.

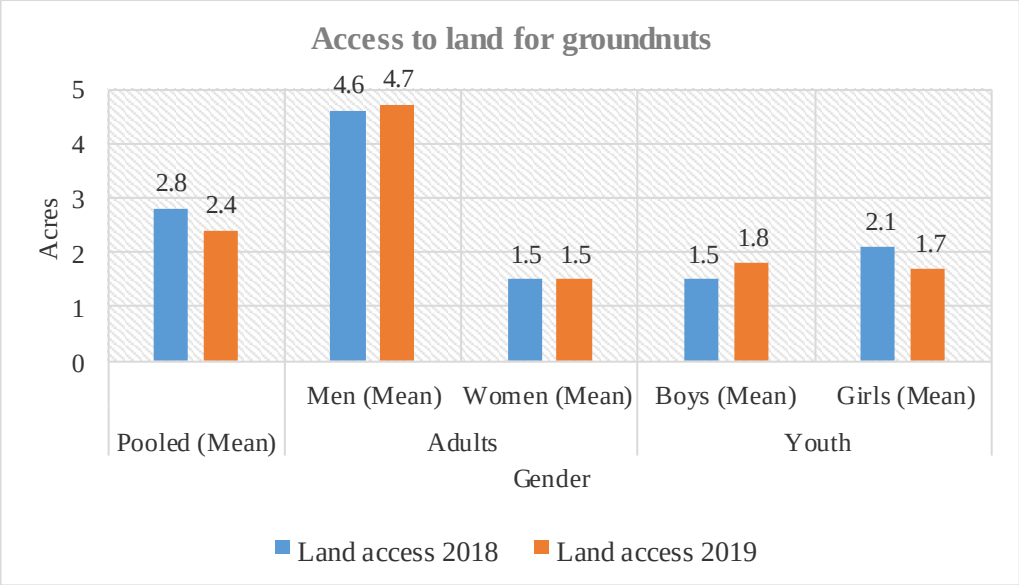

Figure 3.2: Access to land for groundnut production

3.3 Groundnut value chain map, functions, actors, and supporters

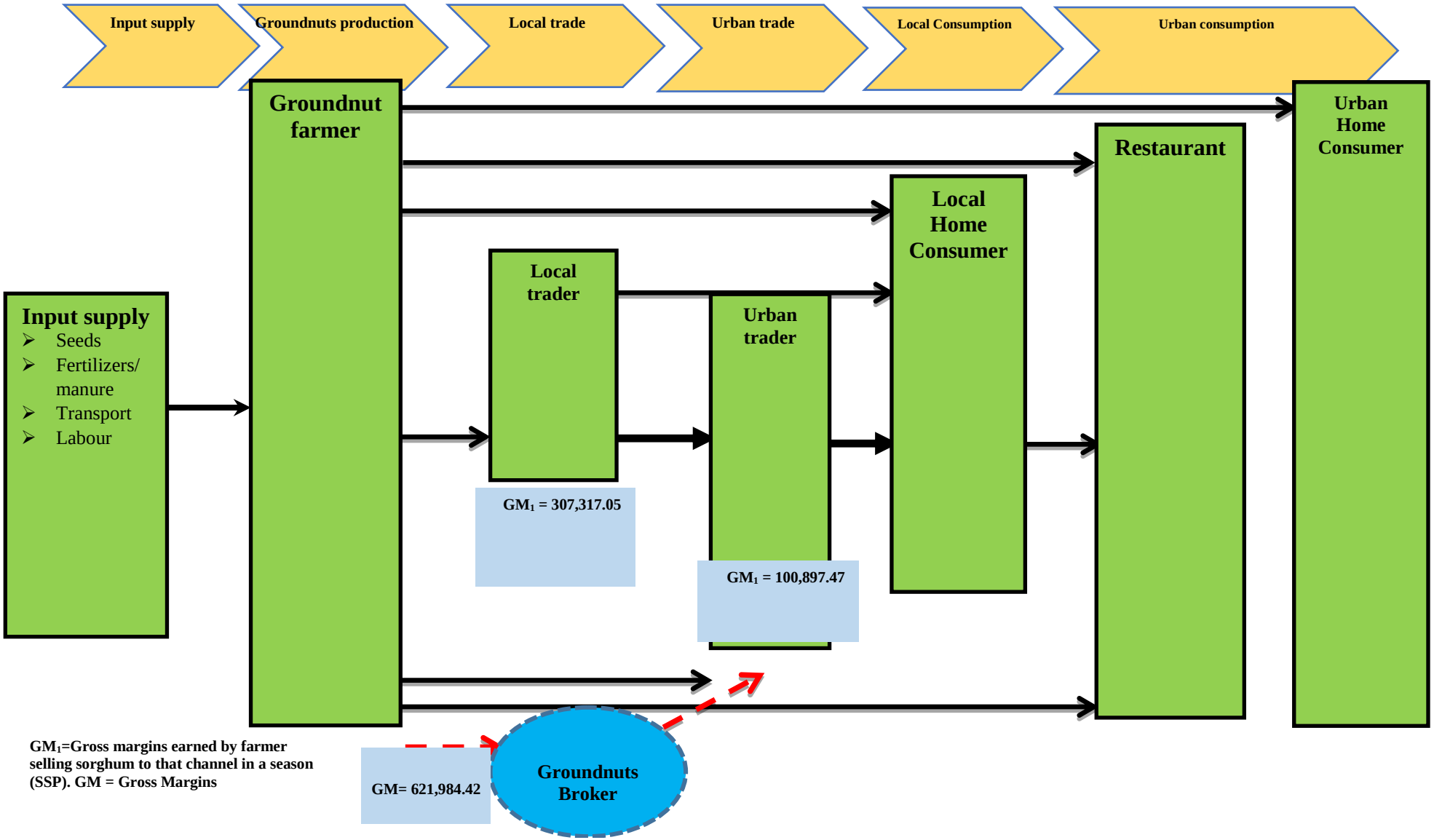

Figure 3.3 Groundnut Value chain map with chain actors and gross margins

3.3 Primary actors in groundnut value chain
3.31 Input access

There was generally low access to inputs for groundnuts. Less than half of all gender categories had access to any input for groundnuts (Figure 3.31). The youth had relatively greater access to inputs for groundnuts in 2019. Among the youth, 46.7% and 40% of females and males respectively had access to inputs compared to 13.5% and 13.6% among men and women respectively. The most widely accessed input was local seeds (by 95.2%). Other inputs were tools and implements (43%), inorganic fertilizers (23.8%), organic manure (23.8%) and improved seeds (19.1%). Furthermore, very few accessed fungicides (9.5%) and donkey plough (9.5%).

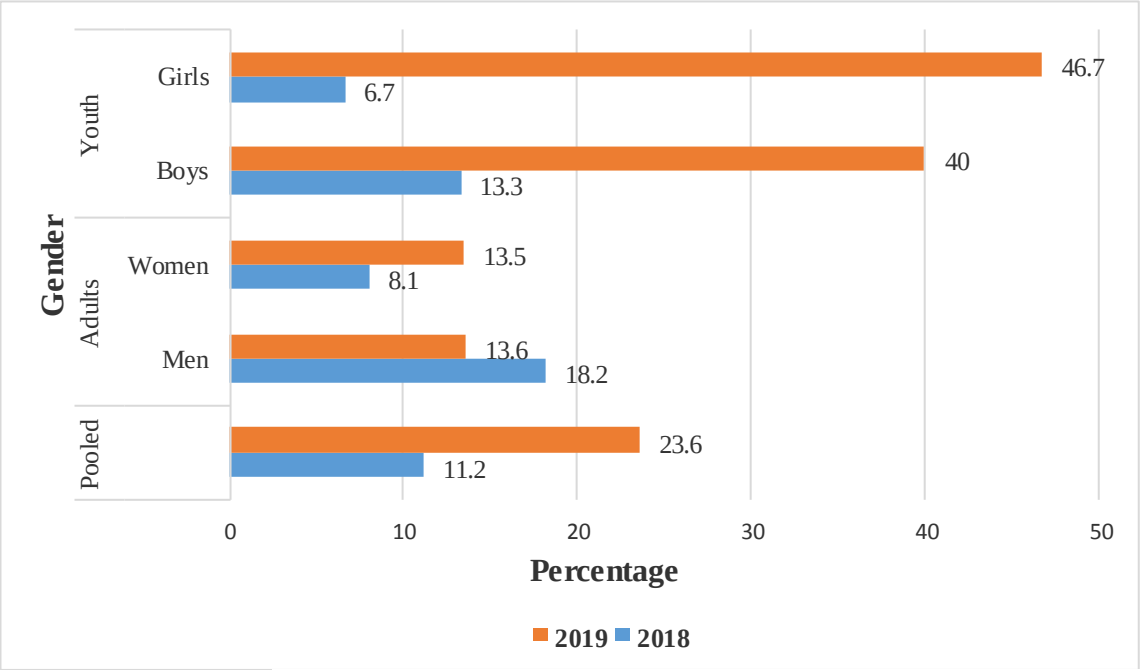

Figure 3.31: Access to inputs among groundnut farmers

There were four main factors limiting access to inputs. These were; the high cost of inputs making them unaffordable (88.1%), inputs not being readily available (59.5%), high transport costs (33.3%) and adulteration and or poor quality (7.1%). There were four main and five minor sources of inputs for groundnuts summarized in table 3.31. The predominant sources were; (1) neighbors and or fellow farmers (52.4%), (2) own saved seeds, stock or residue with 47.6%, 23.8% and 47.6% respectively, (3) agro-input dealers (28.6%) and the village or local market (28.6%).

Table 3.31: Sources of inputs for groundnuts in 2019

Characteristic variable	Pooled (% of cases)	Adults (%)		Youth (%)	
		Men	Women	Male	Female
Agro-input dealer	28.6	33.3	0	33.3	42.9
Fellow farm/ neighbor	52.4	66.7	80	33.3	42.9
Home-saved seeds	47.6	66.7	40.0	16.7	71.4
VSF Germany/ SALPI	9.5	0	0	0	28.6
Village/ local market	28.6	0	20.0	50.0	28.6
State Agriculture Department	19.1	0	20.0	16.7	28.6
Farmer groups	9.5	33.3	20.0	0	0
Own livestock	23.8	66.7	40.0	0	14.3
Own crop residues	47.6	66.7	40.0	66.7	28.6

3.32 Production

Gendered roles: All members of the household are actively involved in groundnuts production and marketing. Women and men generally shared all the activities. Women played a more dominant role in land preparation, planting, weeding and harvesting (Table 3.421). Men played a greater role than women in postharvest handling and marketing. The youth and children in the household play a supportive role in all activities. Children are less involved in agro-chemical application, postharvest handling and marketing groundnuts.

Table 3.321: Gendered roles in groundnut production and marketing within households

Characteristic variable	Adults (%)		Youth (%)		Children (<18 years) (%)	
	Women	*Men*	*Female*	*Male*	*Girls*	*Boys*
Land preparation	33.8	29.8	13.1	10.6	7.1	5.6
Planting	32.2	29.0	13.1	10.7	7.0	7.9
Weeding	33.7	29.2	11.6	10.1	7.5	8.0
Harvesting	30.2	28.3	14.6	11.7	6.8	8.3
Postharvest handling	3	34.5	11.5	12.5	4.5	4.5
Marketing	34.0	37.0	14.0	12.0	2.0	1.0

Levels of production: Groundnut production levels increased by more than three times between 2018 and 2019 (Table 3.322). Women in particular raised their harvested and sold output by 7.8 and 8.2 times respectively. The male youth also increased harvested output by 4.3 times between 2018 and 2019. Even though the increase in output appears to be a great improvement, ultimately, output levels were still far below the potential. There is much room for raising productivity and marketability through appropriate interventions.

Table 3.322: Groundnut harvested and sold in 2018 and 2019

Year	Pooled (Mean)		Men (Mean)		Women (Mean)		Boys (Mean)		Girls (Mean)	
	Harvested (Kg)	*Sold (Kg)*	*Harvested (Kg)*	*Sold (Kg)*	*Harvested (Kg)*	*Sold (Kg)*	*Harvested (Kg)*	*Sold (Kg)*	*Harvested (Kg)*	*Sold (Kg)*
2018	627.4	442.7	778.2	755.2	463.5	225.0	421.5	192.5	866.3	297.5
2019	2015.3	1239.9	769.4	667.7	3555.4	1853.5	1809.3	1680.0	995.5	661.6

3.33 Marketing

The main season for marketing groundnuts runs between September and February every year. Traders and their agents or brokers buy groundnuts from the markets and producers' homes. Traders agreed that they paid slightly more when they bought from the market. Farmers mostly sold groundnuts unshelled. In Pamet, Aweil West, traders indicated that they bought a Malwa at SSP 130 and sold it at SSP 150. Note that 100kg bag accommodates 30 Malwa. This means 100kg bag cost SSP 3,900 and sold at SSP 3,500. They decried high taxes (about SSP 50 per bag) in the market and sometimes on the way when transporting produce. This constituted double taxation for the same produce. Other constraints cited in marketing included stress in transportation of produce along bad roads and low the prices. Most traders relied on motor cycles and bicycles. They also cited cost of renting premises for the business. Most produce was sold in the local market and to local traders (Figure 3.11).

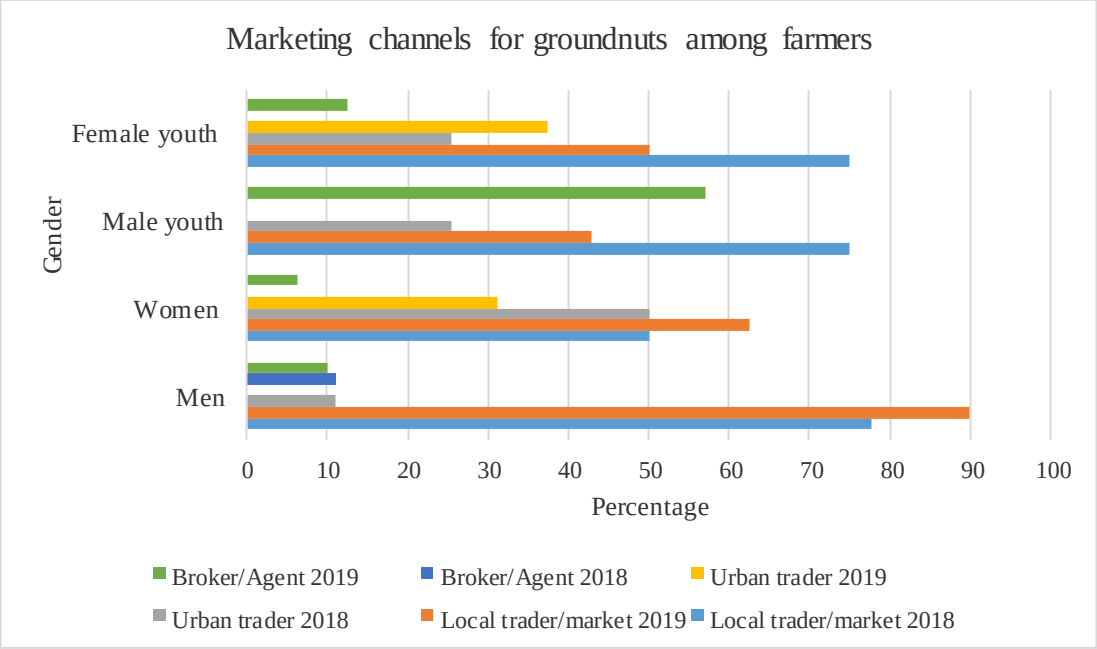

Figure 3.11: Marketing channels among groundnut farmers

3.331 Gross margin from groundnuts among traders

Table 3.431 indicates that traders received high profits from sales of groundnuts. Their main costs were those of produce and transport requirement in sourcing the groundnuts.

Table 3.331: Gross margin from sales of groundnuts among traders

Revenue & costs	Mean	Std. Dev
Quantity sold (Kg/ season)	5,376.0	1,895.6
Price (SSP/ Kg)	95.7	48.2
Total Revenue	**514,304**	169,675.4
Variable costs		
Cost of produce (SSP/ season)	147,168.0	17,206.0
Transport (SSP/ season)	15,000.0	8,485.3
Loading and Off-loading (SSP)	3,600.0	-
Market fees/ taxes (SSP/ season)	5,733.3	3,817.5
packaging material (SSP/ season)	9,040.0	2,230.0
Storage costs (SSP/ season	2,340.0	933.4
Stall/ shelter costs (SSP/ season)	2,900.0	141.4
Total variable costs (SSP/ season)	**185,781**	17,785.0
Gross margin (SSP/ season)	**328,523**	157,009.6
	60.0%	

3.34 Processing

There were two main forms of processing, namely, roasting and making paste. Women roasted groundnuts for sale as snacks and for further processing into paste. The roasted groundnuts sold as snacks were packaged in smaller amounts in white polythene papers with their openings tied to make them air tight. To make paste, women roasted groundnuts and took them to local processing facilities. These facilities were typically housed in make-shift or semi-permanent structures in the local and urban markets. Hygiene and food handling practices were generally poor in these facilities. All groundnut processers accessed were men and all their clients were women. There is an urgent need to improve processing and packaging facilities and food handling practices.

3.35 Consumption

Groundnuts are widely consumed in South Sudan. It is a main part of local diets. People eat groundnuts as snack mostly with tea and as part of soup in main meals. Most of what was produced was eaten locally. It was widely available in all local markets. Table 3.35 indicates that large quantities of produced groundnuts by the adult females and female youth in 2018 and 2019 were consumed at home.

Table 3.35: Groundnut consumption (quantity of groundnut consumed in Kg)

Year	Pooled (Mean)	Men (Mean)	Women (Mean)	Male youth (Mean)	Female youth (Mean)
2018	302.2	198.2	279.7	277.1	643.1
2019	975.6	162.3	1804.5	827.2	588.7

3.4 Value chain support services

3.41 Farmer groups and cooperatives

Participation in farmer groups or associations was very low among groundnut farmers. Only 10.1% had membership in a farmer group or Farmer Field School. More women (13.5%) and female youth (13.5%) relatively had more membership to groups or associations than men (4.5%) and male youth (6.7%). For the few who belonged to a group, adults as expected had been members for a longer period, up to 5 for men and 3.8 years for women. The youth had joined groups in the last one and a half years.

3.42 Access to extension services

There was very low access to extension services. On average, 17.9% had access to extension services. Within this, men had greater access at 31.8% compared to 16.2%, 13.3% and 6.7% among women, male and female youth respectively. Many reasons accounted for the limited access to extension and advisory services. Men (50%) and women (women) said the medium of information dissemination was not readily accessible. Other concerns among women were that the information and advisory services were costly (55%), untimely (47.4%), irrelevant (46.2%) and mostly targeted large farmers (44.4%).

The main sources extension and advisory services were state extension staff (67.9%), farmer groups or association (47.2%), and produce and marketing agents (41.5%) (Figure 3.42). Up to 28%, mostly men, women and girls received extension service from VSF. In addition to VSF, other NGOs were involved in provision of extension and advisory services. Lastly, radio as a channel for extension messages was accessible to 26.4%. More girls than any other group received extension and advisory services from farmers groups (88.7%) and the state (77.8%).

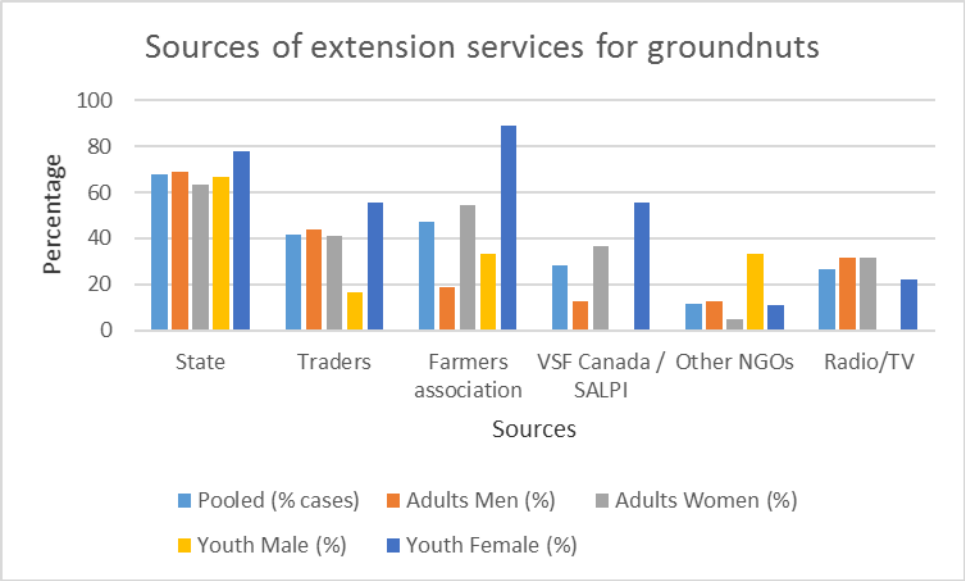

Figure 3.42: Sources of extension and advisory services

3.43 Access to financial services

There was very low access to financial services. Only 10.1% had access to financial services. The main sources of financial services were VSLA and relatives. Up to 66.7% and 55.6% of those that had access received services from VSLA and relatives respectively (Figure 3.53). As previously highlighted, the majority did not have access because of a lack of readily available financial services, high requirements as collateral, fear of defaulting to pay back and delays in processing credit.

3.5 Factors affecting gross margins in groundnuts production among farmers

3.51 Levels of gross margins

There was an increase in overall gross margins among groundnut farmers from 40.7% to 67.3% between 2018 and 2019 (Tables 3.51a and 3.51b). The gross margins in the two years were positive except among girls in 2018 who had very high variable costs and low output per acre. This increased gross margin may be attributed to project interventions that resulted into about threefold increase in output per acre. There were variations among the different gender categories. The male youth had the highest increase in output per acre from 170.2kg to 1,021.4kg in 2019, resulting into a gross margin of 86.8% up from 57.9% in 2018. The increase in output per acre may be attributed to the fact that more boys (40%) had access to inputs in 2019 than 2018 (13.3%). Women also had a big increase in gross margin from 22.6% to 73.6%. However, there was a decline in gross margins among men, from 68.4% to 26.5%. Their average output declined from 320.8kg to 290.9kg in 2019. Fewer men had access to inputs in 2019 (13.6%) than in 2018 (18.2%).

Table 3.51a: Gross margins from groundnut production in 2018

Revenue & costs	Pooled	Men	Women	Male youth	Female youth
Output sold (Kg/ acre)	208.1	320.8	138.6	170.2	107.8
Price (SSP/ Kg)	325.7	338.7	394.3	350.0	340.0
Total Revenue	***67,778.2***	***108,655.0***	***54,650.0***	***59,570.0***	***36,652.0***
Variable costs					
Cost of inputs (SSP/ acre)	10,019.5	7,159.5	11,478.5	1,803.4	6,906.6
Land preparation (SSP/ acre)	3,187.7	3,224.3	3,433.5	3,222.3	226.8
Planting (SSP/ acre)	6,466.0	5,906.5	9,926.2	1,434.8	5,998.7
Manure application (SSP/ acre)	3,915.4	2,391.4	729.6	5,836.6	7,465.9
Chemical spraying (SSP/ acre)	693.1	425.6	729.6	1,215.9	340.5
Weeding (SSP/ acre)	5,726.3	5,702.8	7,948.3	1,495.6	5,512.3
Harvesting (SSP/ acre)	2,531.8	1,985.3	2,772.4	3,761.3	2,642.7
Drying & processing (SSP/ acre)	1,863.4	1,321.3	1,185.8	1,459.1	5,609.6
Packaging & Storage (SSP/ acre)	1,028.0	1,381.2	94.4	498.5	648.5
Transport (SSP/ acre)	3,632.0	2,735.4	3,474.7	3,404.7	6,917.0
Marketing (SSP/ acre)	1,146.5	1,647.4	554.0	972.8	1,313.2
Total variable costs (SSP/acre)	***40,209.7***	***33,880.7***	***42,327.0***	***25,105.0***	***43,581.8***
Gross margin (SSP/ acre)	**27,568.5**	**74,774.3**	**12,323.0**	**34,465.0**	**(6,929.8)**
	40.7%	**68.8%**	**22.6%**	**57.9%**	**(18.9%)**

Table 3.51b: Gross margins obtained from groundnut production in 2019

Revenue & costs	Pooled	Men	Women	Male youth	Female youth
Output sold (Kg/ acre)	621.7	290.9	843.7	1,021.4	474.4
Price (SSP/ Kg)	290.6	285.0	218.6	412.5	362.5
Total Revenue	***180,666.0***	***82,906.5***	***184,432.8***	***421,327.5***	***171,970.0***
Variable costs					
Cost of inputs (SSP/ acre)	14,370.3	16,870.1	13,004.5	17,947.5	9,745.9
Land preparation (SSP/ acre)	6,863.8	4,887.3	8,020.9	4,116.0	10,630.9
Planting (SSP/ acre)	5,437.8	5,253.5	5,769.5	3,775.5	7,243.0
Manure application (SSP/ acre)	1,902.9	2,026.6	2,213.0	1,252.4	0
Chemical spraying (SSP/ acre)	788.6	964.7	603.1	745.8	0
Weeding (SSP/ acre)	10,098.2	6,057.6	10,157.7	12,541.7	15,746.6
Harvesting (SSP/ acre)	4,367.4	4,448.9	3,907.3	5,252.9	4,085.6
Drying & processing (SSP/ acre)	1,885.9	2,475.7	1,264.6	2,496.8	770.1
Packaging & Storage (SSP/ acre)	1,553.2	1,079.1	2,073.8	916.0	2,120.6
Transport (SSP/ acre)	7,278.7	14,587.8	2,957.2	4,195.0	6,262.2
Marketing (SSP/ acre)	5,253.2	2,277.9	845.1	2,415.7	20,471.8
Total variable costs (SSP/acre)	***59,800.0***	***60,929.2***	***50,816.7***	***55,655.3***	***77,076.7***
Gross margin (SSP/ acre)	**121,617.0**	**21,977.3**	**135,815.2**	**365,672.2**	**94,893.3**
	67.3%	**26.5%**	**73.6%**	**86.8%**	**55.2%**

3.52 Gross margins from groundnut sales to different channels

Groundnut farmers made high profits from sale of groundnuts to local and urban traders and brokers (Table 3.52). The final consumers mainly bought groundnuts from channels other than farm gate.

Table 3.52 Gross margins from groundnut sales to different channels

Sorghum buyer	Total variable costs (SSP)		Gross margins (SSP)	
	Mean	***Std. Dev.***	***Mean***	***Std. Dev.***
Local trader	45,918.37	49,604.38	307,317.05	639,849.78
Urban trader	27,508.78	8,567.17	100,897.47	202,345.07
Broker	92,999.58	63,168.26	621,984.42	500,423.70
Pooled sample	47,930.47	49,100.16	294,784.48	556,853.24

3.53 Factors affecting gross margins

Four factors were found to have significant associations with gross margins from groundnuts. The labor capacity of the household (active members), amount of land allocated to crops, cost of

value addition and the quantity of output consumed (Table 3.53). Surprisingly, the more active members of a household, the less gross margin from groundnuts and the greater the quantity consumed at home, the more the gross margin. As expected, the more land allocated to crops, the greater the gross margin and the greater the investment in value addition, the higher the gross margin from groundnuts.

Table 3.53: Gross margin correlations for groundnuts

Variable	Pearson's Correlation coefficient	P-value
Age of respondent	0.240	0.179
Year of schooling	0.155	0.287
Household size	-0.159	0.276
Active members of household	-0.308*	0.031
Access to land (acres)	0.250	0.083
Land allocated to all crops (acres)	0.299*	0.037
Experience growing groundnuts (years)	0.143	0.328
Land allocated to groundnuts (acres)	0.096	0.512
Number times grown groundnuts	0.049	0.738
Cost of value addition activities (SSP)	0.722*	0.012
Total expenditure on seeds (SSP)	0.087	0.554
Quantity of output consumed (Kg)	0.360*	0.011
Average price per Kg	0.238	0.100
Distance to markets (Km)	-0.121	0.474

3.6 Constraints in groundnuts production and marketing

The main constraints in groundnut production and marketing among farmers were associated with pests, diseases, unpredictable weather changes and drought (Table 3.6). Up to 88% and 76% cited pests and diseases respectively as the main constraints. Other major constraints were unpredictable weather changes (70.7%) and drought (57.3%). Many farmers decried poor crop varieties (46.7%), lack of financial credit, transport and market information and low produce prices.

Table 3.6: Constraints in groundnut production and marketing among farmers

Characteristic variable	Pooled (% cases)	Adults (%)		Youth (%)	
		Men	***Women***	***Male***	***Youth***
Diseases	88.0	78.9	89.3	85.7	100
Pests/ vermin	76.0	52.6	85.7	71.4	92.8
Weather vagaries	70.7	63.2	75.0	71.4	71.4
Drought	57.3	63.2	50.0	50.0	71.4
Poor crop varieties	46.7	52.6	46.4	28.6	57.1
Lack of financial credit	38.7	47.4	35.7	28.6	42.9
Lack of transport	34.7	57.9	32.1	21.4	21.4
Lack of market information	34.7	42.1	32.1	28.6	35.7
Low price of crop output	34.7	36.8	35.7	28.6	35.7
Limited arable land	30.7	36.8	32.1	7.1	42.9
Poor marketing infrastructure	24.0	31.6	32.1	14.3	7.1
Inadequate access to	21.3	31.6	25.0	0	21.4
Limited market demand	20.0	36.8	17.8	14.3	7.1
Poor post-harvest handling	16.0	26.3	7.1	14.3	21.4
Exploitation by middlemen	14.7	36.8	3.6	21.4	0
Drudgery of farm operations	8.0	15.8	7.1	0	7.1

3.7 Strategic interventions for increased groundnuts production and marketing and higher incomes

*Strengthen capacity of farmer institutions***:** Individual farmers cannot achieve much by themselves. Build stronger farmers groups and associations to address needs of their members. Provide trainings in group dynamics, organizational management and leadership. Stronger farmer groups and associations can enhance members' access to collective marketing and access to improved inputs and technologies.

Strengthen capacity of individual farmers: Very low levels of education among farmers undermines literacy, numeracy and financial management skills. Without these skills, their participation in economic activities is greatly undermined. There is need to provide training to empower them to participate meaningfully in economic activities. Enhance their knowledge, skills and practices and adoption of innovations and new technologies such disease resistant, early maturing and high yielding varieties.

*Support integrated pest and disease management (IPM)***:** The leading constraint in crop production was pests and diseases. Train extension workers and farmers integrated pest and disease management.

Increase access to improved inputs: Limited access to improved inputs was a major impediment. Increase access to improved inputs by making them readily available and affordable. The project's intervention of mobilizing farmers and local artisans to produce seeds and tools respectively is a great initiative. Establishing a sustainable community seed systems and production of tools locally and supporting marketing of such agricultural inputs would makes them readily available and affordable.

Increase access to agricultural and advisory services: There was limited access to extension and advisory services. The projects intervention in establishing FFS and Farmer Resource Centers (FRC) would be instrumental in providing training services, inputs and information.

Increase access to financial services: Access to financial services was very limited among all farmers. Increase access through strengthening existing and establishing new VSLAs. The project could also build their capacity small business management to make them more bankable and attractive to microfinance institutions.

Promote value addition in groundnuts: We observed a significant correlation between value addition and gross margins. Adding value results into higher gross margins. Strengthen capacity of women and girls to add value to groundnuts. This should be organizing them to form groups whose capacity should be built through training in group dynamics. Members of the group can then be trained in hygienic production of groundnuts paste and avail appropriate machinery for value addition such as pressing machines.

CHAPTER 4: VALUE CHAIN ASSESSMENT FOR MILK

4.1 Socioeconomic and demographic characteristics of livestock farmers

The youth among cattle keepers had a lower average age, 22.3 and 21.2 years, among males and females respectively, than predominantly crop farmers (Table 4.1). Their household sizes appeared to be bigger (7.9) but with similar labor capacity (2.3). They had many years of experience in cattle keeping, on average 6 years. Women were the most experienced, with 8.3 years in cattle rearing activities. Education levels were low, much like among producers in the crop and gum Arabic value chains. The majority (77.6%) never had any formal schooling. All women had never been to a school. Only 3.6% of the men completed secondary education.

Table 4.1: Socioeconomic and demographic characteristics of sorghum farmers

Characteristic variable	Pooled (n=85)	Adults		Youth	
		Men (28)	*Women (33)*	*Male (8)*	*Female (16)*
Age	36.1	43.3	40.6	22.3	21.2
Household size	7.9	7.5	8.3	7.4	8.2
Labor capacity	2.3	2.1	2.3	1.6	2.6
Land accessed	3.2	2.6	3.9	3.3	2.5
Experience cattle rearing	5.9	3.6	8.3	6.0	5.0

4.2 Milk value chain map, functions, actors, and supporters

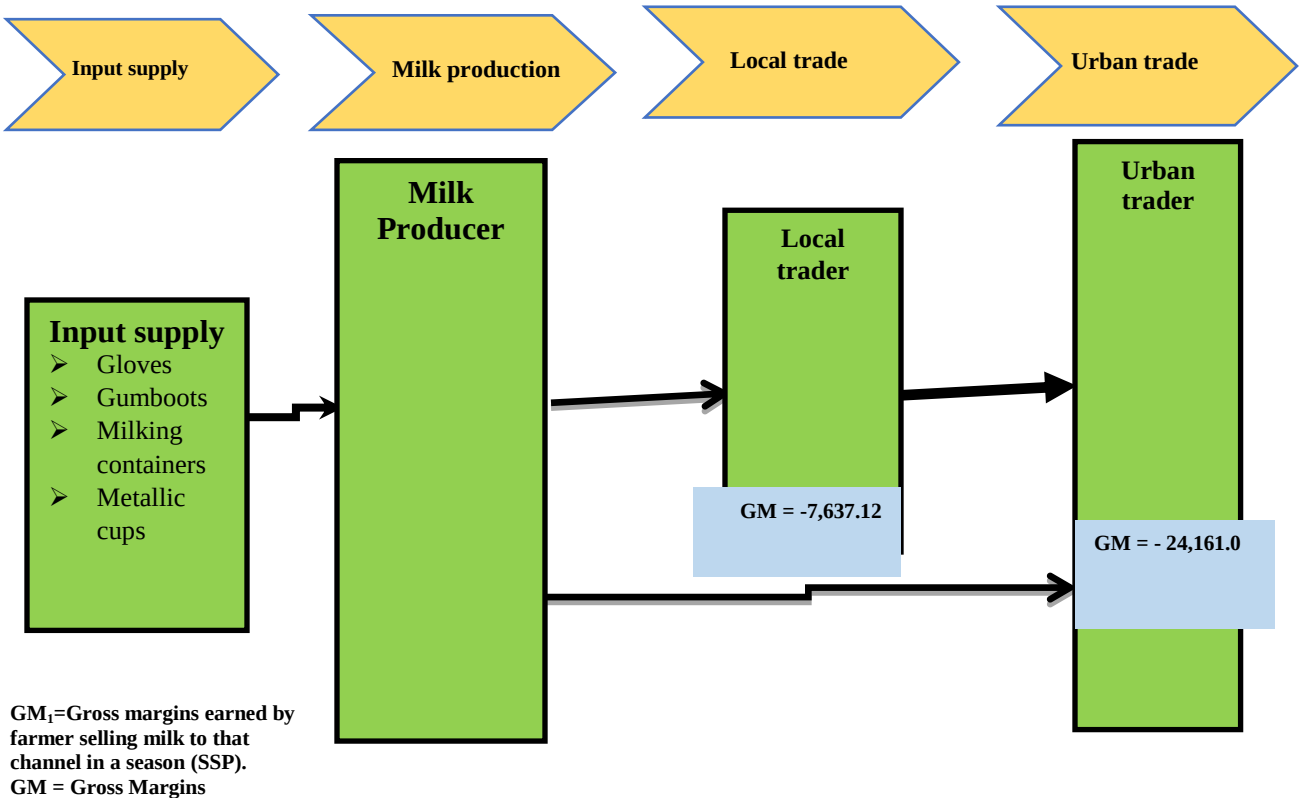

Figure 3.42: Sources of extension and advisory services

4.3 Primary actors in milk value chain

4.31 Production

***Ownership of cattle*:** A household on average kept 21 cattle. Of these more than half (12.6) consisted of local breed, 3.5 pure breed and 5 cross breeds (table 4.31a). Female youth kept on average more cattle (29.9) than adults and male youth. The source of cattle was mostly through inheritance (72.7%). All the bulls, heifers and calves kept by women and female youth came from inheritance. There were those (16.7%) who bought cattle from local livestock markets. It was mainly cows (26.3%), bulls (26.2%) and to a small extend calves (20.6%) that were sourced from livestock markets. Some cattle also came from donations from NGOs (5.2%) and purchases from friends and neighbors (5.2%).

Table 4.31a Number of cattle owned by gender

Characteristic variable	Pooled (mean)	Adults (Mean)		Youth (Mean)	
		Men (mean)	*Women (mean)*	*Male*	*Female*
Cows	13.1	12.5	10.8	12.3	19.2
Bulls	5.4	5.6	5.0	3.3	6.4
Heifers	6.8	7.6	6.5	4.8	7.4
Calves	7.7	6.1	7.0	6.1	12.9
Total owned	*21.1*	*20.1*	*18.0*	*19.9*	*29.9*

There were three main reasons for keeping cattle. Many households kept cattle for milk (44.4%). Others aimed at both milk and beef (33.3%) and for animal draught power or traction (19.4%). Some (25%) female youth kept cattle for beef. Half of the households kept cattle in kraals. Others used the open grounds (36.1%) and had communal grazing (13.9%). Communal grazing involved neighbors and friends bringing all their cattle together to form a herd that grazes together.

Gendered roles in cattle keeping: In cattle keeping activities in households, men were mostly responsible for maintaining the kraal (60%), branding (52.7%), feeding/gazing (40%) and fetching water (36.5%) (Table 4.31b). The women cleaned milk containers (60.6%), milked (50.9%), transported (52.6%) and sold (53.1%) milk. They also participated in providing supplementary fees to cattle, fetching water and branding. The male youth mainly grazed cattle, fetched water, fed supplementary feeds to cattle and tagged them. The female youth worked closely with their mothers milking and milk handling and in fetching water.

Table 4.31b: Gender roles within households in cattle rearing and marketing

Characteristic variable	Adult Men (%)	Adult Women (%)	Male child (%)	Female child (%)	Hired labor (%)	Male relative (%)	Female relative (%)
Fetching water	36.5	17.3	28.9	15.4	0	1.9	0
Cattle herding/ feeding	40.0	10.9	36.4	7.3	1.8	3.6	0
Branding	52.7	16.4	12.7	5.5	1.8	10.9	0
Milking	2.0	50.9	5.9	37.3	0	0	3.9
Providing supplementary feeds (groundnut residue)	33.3	21.2	24.2	21.2	0	0	0
Cleaning milking container	2.8	60.6	4.2	32.4	0	0	0
Transporting milk	10.5	52.6	10.6	26.3	0	0	0
Cattle kraal maintenance	60.0	7.5	15.0	3.8	2.5	8.7	2.5
Selling milk	6.3	53.1	3.1	6.3	6.2	18.8	6.2

***Levels of milk production*:** The level of milk production was very low in all the communities. Less than half (42.4%) of the cattle keepers interviewed (170) produced milk. An average of 1,053.9 liters were produced in a season (Table 2.31c). Among those who produced some milk, only 18.1% sold an average of 148.5 liters of milk in a season.

Table 4.31c: Amount of milk produced and sold in 2019

Pooled		Men		Women		Boys		Girls	
n=59	n=13	n=21	n=6	n=22	n=4	n=6	n=2	n=10	n=1
Produced	Sold	Produced	Sold	Produced	Sold	Produced	Sold	Produced	Sold
1053.9	147.5	1103.3	62.3	1123.3	332.0	736.1	99.0	988.9	18.0

4.32 Marketing

The little milk produced is predominantly for home consumption. On average a household sold 155.7 liters of milk in a season (Table 4.61). The average milk sales among women was the highest at 332 liters and among men the lowest at 190 liters a season. Milk was mainly sold in

the local market to local traders (Figure 4.32). To some extent, men sold milk to the urban traders. The male youth sold milk in the local market only.

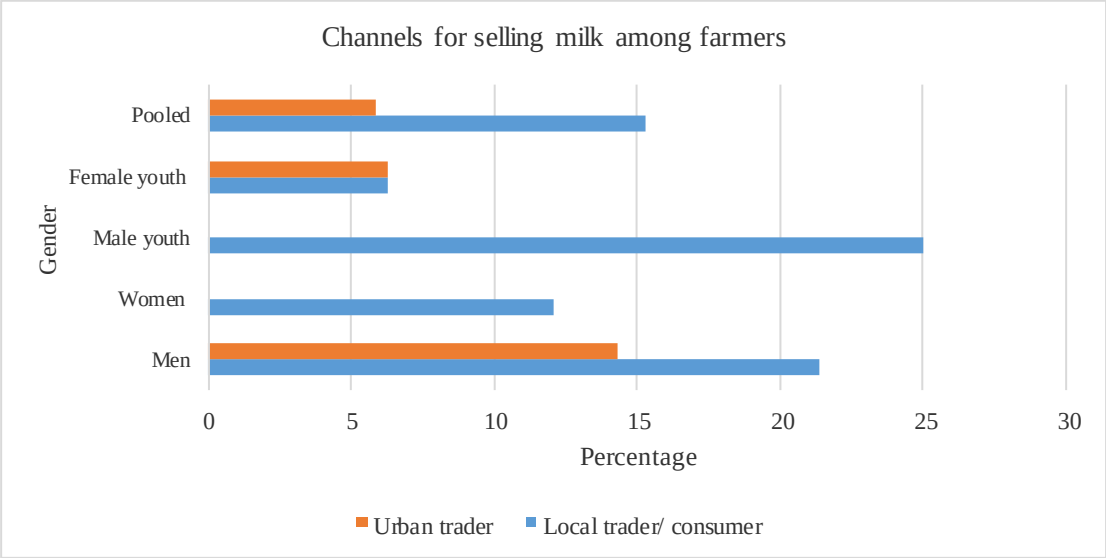

Figure 4.32: Percentage of milk sold through the different channels

The main constraints limiting marketing of milk included: (1) limited labor for sourcing and handling milk; (2) low demand; (3) scarcity of milk during dry season owing to reduced feeding of lactating cows; (4) low milk prices; and (5) limited funds for further investment to boost production and marketing.

4.33 Gross margin from milk among traders

Trading in milk was profitable with an average gross margin of 81% (Table 4.33). The major main costs were in milk production, equipment, transportation and marketing.

Table 4.33: Gross margin from milk sales by traders

Revenue & costs	**Mean**
Quantity sold (Litres/ season)	1,800.0
Price (SSP/ Litre)	75.0
Total Revenue	**135,000**
Variable costs	
Cost of produce (SSP/ season)	2,250.0
Transport (SSP/ season)	12,000.0
Loading and Off-loading (SSP)	3,000.0
Market fees/ taxes (SSP/ season)	6,000.0
Cost of saucepans with cover (SSP/ season)	1,000.0
Cost of bucket (SSP/ season)	1,000.0
Cost of metallic cups	100.0
Total variable costs (SSP/season)	**25,350.0**

Gross margin (SSP/ season)	**109,650.0**
Gross profit margin (%)	**(81.0%)**

4.34 Processing and consumption

There was no milk processing for commercial purposes in the study communities. The little milk sold was mostly for consumed with tea and coffee. There were no appropriate milk handling facilities such as coolers. The containers used in transporting and storing milk before sale could not prolong the shelf life. Milk traders had to buy milk early morning and sell by the afternoon to avoid spoilage. There is need for capacity building through training and milk handling and processing equipment provision.

4.4 Value chain support services

4.41 Farmer groups and cooperatives

Membership in farmers groups and associations was rare. Almost all (97.6%) did not belong to any producer group and or association. None of the youth interviewed belonged to a group or an association for farmers. The rare membership some had was mostly in VSLA.

4.42 Access to extension services

Access to extension and advisory services was low. On average, 37.7% received an extension and advisory service in 2019. Access was relatively higher among men (50%) and much lower among women. Among the youth, those who received extension and advisory services were 37.5% and 31.3% male and female respectively. The services were received from state/county extension staff (43.8%), NGOs including VSF (18.8%), other farmers (15.6%), farmers associations (15.6%) and traders (6.2%). Much of the extension and advisory services centered on disease management (79.4%), livestock feeding (76.5%), milk quality (41.2%), breeding (20.6%), milk marketing (17.7%) and branding/tagging (8.9%).

4.43 Access to financial services

Access to financial services for cattle keepers was very limited. An overwhelming majority (94.1%) had no access to financial services. Out of the very few (5.9%) who had access, no male youth was included. There were 12.5% female youth, 6.1% women and 3.6% men. On average, they borrowed SSP 1,900. The female youth had more than the rest with their average at SSP 3,000. Out of the money borrowed, an average of SSP 650 was spent cattle keeping. This money was mostly used for vaccination (60%) and chemicals (40%).

4.5 Factors affecting gross margins in milk production among farmers

4.51 Gross margin levels

There were positive gross margins for women and male youth and negative for men and female youth (Table 4.51). This reduced the overall gross margin for the season to 26.9%. In interpreting the results, care must be taken to acknowledge the very small numbers of farmers who actually sold milk to avoid erroneous conclusions. In general, milk production and

marketing is a potentially a lucrative undertaking if the main limiting factors are addressed through appropriate interventions.

Table 4.51: Gross margins for milk among farmers

Revenue & costs	Pooled (n=12)	Adults		Youth	
		Men	***Women***	***Male***	***Female***
Milk Output (Liters/ season)	155.7	64.8	332.0	99.0	18.0
Price of milk (SSP/ Liters)	265.4	190.0	340.0	325.0	225.0
Total Revenue	***41,322.8***	***12,312.0***	***112,880.0***	***32,175.0***	***4,050.0***
Variable costs					
Fetching water	450.0	450.0	0	0	0
Cost of labor for herding	5,521.4	2,575.0	7,500.0	6,250.0	6,000.0
Cost of branding	1,750.0	2,000.0	1,500.0	2,000.0	
Cost of milking	3,311.4	5,300.0	1,826.7	2,400.0	7,600.0
Cost supplementary feeding	750.0	500.0	1,000.0	0	0
Cost of cleaning containers	683.0	582.5	300.0	300.0	3,000.0
Transport costs	2,239.0	2,550.0	1,085.0	1,850.0	6,700.0
Cattle kraal maintenance cost	15,507.0	7,931.9	41,666.7	0	4,500.0
Total variable costs (SSP/season)	***30,212***	***21,889***	***54,878***	***12,800***	***27,800***
Gross margin (SSP/ season)	**11,111**	**(9,577)**	**58,002**	**19,375**	**(23,750)**
	26.9%	**-**	**51.4%**	**60.2%**	**-**

4.52 Gross margins correlations

Education and number of people in the household had significant associations with gross margins from milk (Table 4.52). More education and bigger household sizes are associated with bigger profit margins.

Table 4.52: Gross margin correlations for milk among farmers

Variable	Pearson's Correlation coefficient	P-value
Age of respondent	0.793	0.109
Year of schooling	1.000*	0.000
Household size	0.873*	0.050
Active members of household	0.776	0.123
Access to land (acres)	0.267	0.488
Experience (years)	0.814	0.186
Cost of milking equipment (SSP)	-0.416	0.727
Average price per liter	0.577	0.308

4.6 Constraints in milk production and marketing among farmers

Several constraints beset milk production and marketing among farmers. Key among them were livestock diseases (80%), low milk prices (70%), drought (70%), low quality feeds (60%) and limited access to financial services (Table 4.6). Other constraints included lack of market information and transport and poor livestock breeds.

Table 4.6: Constraints in milk production and marketing among farmers

Characteristic variable	Pooled (% cases)	Adults (%)		Youth (%)	
		Men	Women	Male	Female
Livestock diseases	80.0	66.7	100	100	50.0
Low milk prices	70.0	100	50.0	100	50.0
Drought	70.0	66.7	50.0	100	100
Low quality feeds	60.0		75.0	100	100
Limited financial services	60.0	100	50.0	0	50.0
Lack of market info	30.0	66.7	0	0	50.0
Lack of transport	30.0	66.7	25.0	0	0
Poor livestock breeds	10.0	0	25.0	0	0

4.7 Strategic interventions for increased milk production, marketing and incomes

In addition to capacity building interventions for farmer institutions and members suggested in previous chapters, the following can be done to increase milk productivity, marketability and incomes:

Improve cattle breeds: We established that most of the cattle kept are local breeds with low milk production capacity. Their potential to give milk is limited even under favorable conditions. To increase milk productivity, cross breeding with superior milk producing breeds could be considered as a strategic intervention.

Improve feeding in the dry season: Long travels in search for water and relatively scarce pastures during dry season reduces milk production further. Interventions to increase access to water and animal feeds to lactating cows could raise milk output levels.

Add value to milk: There was virtually no value addition to milk. The milk was consumed in tea or coffee and in sour form. There is need to build capacity among farmers, traders and processors in adding value to milk to make products such as yoghurt and ghee.

Provide milk handling equipment: Appropriate equipment for milking, transporting and storing milk were lacking. Provide appropriate milk handling equipment to farmers for milking and milk to traders for transporting and storing milk.

Train milk producers and traders: Milk handling practices and the general hygiene was found to be poor among farmers and traders. Train milk producers and traders in hygienic handling of

milk and value addition for improved food safety and diversified milk products and higher incomes.

Construct milk shades: There were no facilities for appropriate handling on milk. The project's proposed intervention of establishing milk shades will greatly improve quality of milk and milk products and increase incomes.

CHAPTER 5: VALUE CHAIN ASSESSMENT FOR GUM ARABIC

5.1 Socioeconomic and demographic characteristics of gum Arabic producers

Apart from the average age, the socioeconomic and demographic characteristics of gum Arabic producers appear to differ slightly from crop farmers considered in previous chapters. The average household size was over seven (7.3) persons per household and a labor capacity of about three (Table 5.1). Education levels seem lower, about 80% without a single year of formal schooling and 14.6% primary education in which 9.1 never completed.

Table 5.1: Socioeconomic and demographic characteristics of gum Arabic farmers

Characteristic variable	Pooled (Mean)	Adults (Mean)		Youth (Mean)	
		Men	*Women*	*Male*	*Female*
Age	40.9	41.2	37.9	65.5	26.4
Household size	7.3	7.3	7.6	5.4	8.0
Labor capacity	2.9	3.6	2.4	2.1	3.7

5.2 Access to and land under agricultural production

In access to land for agriculture, it was interesting to note that women in these communities that mostly depend on gum Arabic, had greater access to land for agriculture than men (5.3 acres compared to 3.6 acres among men) (Figure 5.2). This may be because women are more active in crop growing. Men and youth tend to spend more time in tapping and collecting gum as their main activity. Many (56.4%) of the households also kept livestock. Livestock ownership was greater among male youth (87.5%) and men (66.7%) than women (44%) and female youth (50%). On average, households owned about 9 cattle, 10 goats and 9 sheep.

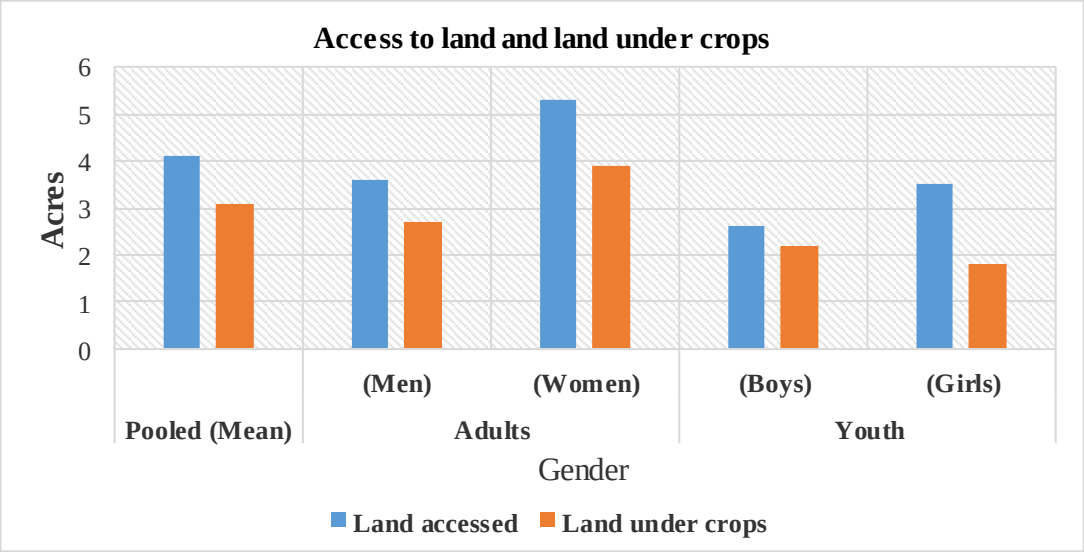

Figure 5.2: Land accessed and under crops among gum Arabic producers

5.3 Gum Arabic value chain map, functions, actors, and supporters

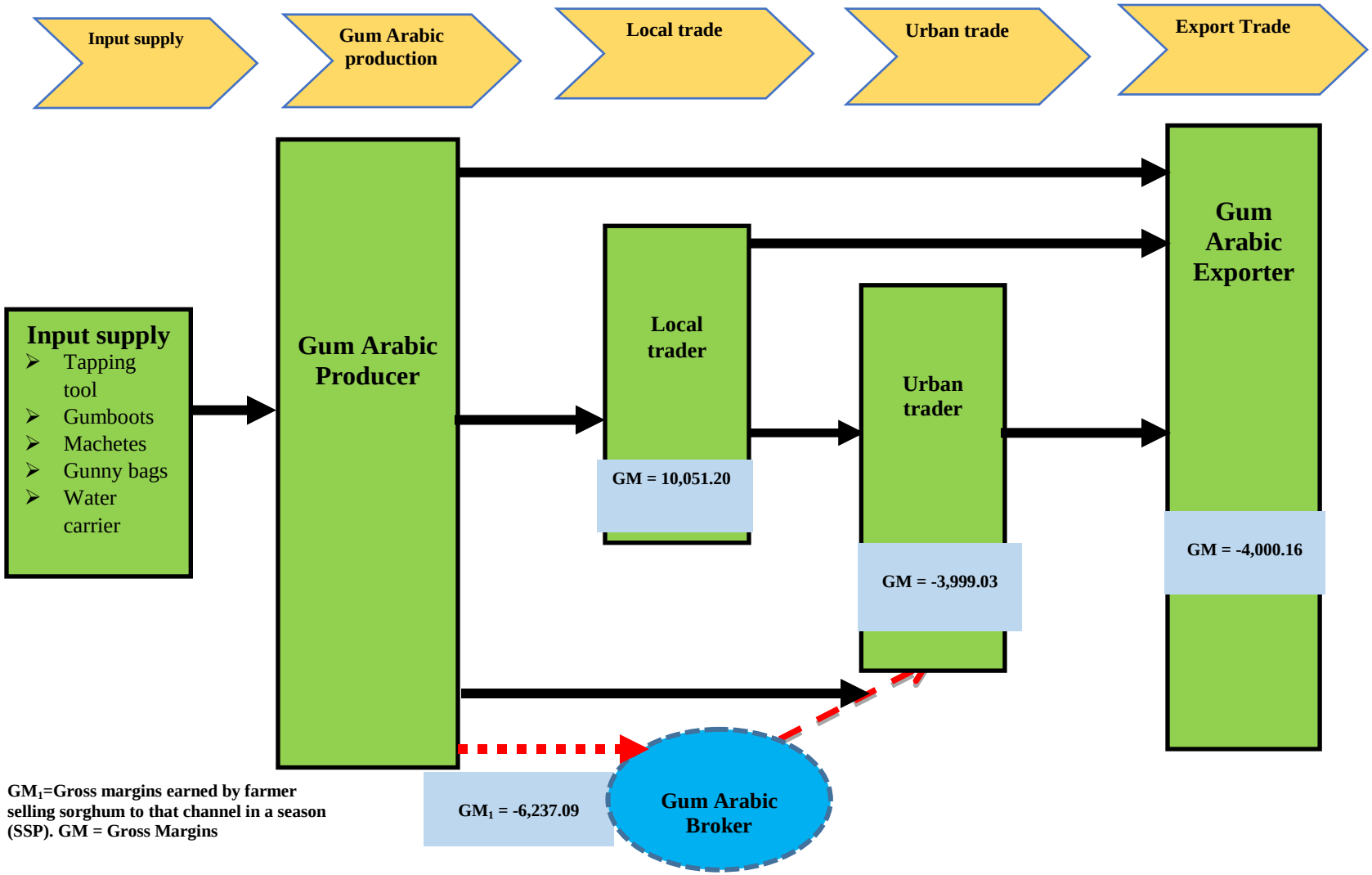

Figure 5. 3 Gum Arabic Value chain map with chain actors and gross margins

5.4 Primary actors in gum Arabic value chain

5.41 Production

Gendered roles in production and marketing: As previously discussed, all household members were involved in gum Arabic production and marketing. A detailed analysis of gender roles within households in gum production and marketing indicates the relative contribution of household members in various tasks is summarized in table 5.41a. Men dominate aspects of decision-making on the use of money from gum sales (66.7%), marketing (64.3%), transporting gum (58.8%), purchase of food (63.6%) and tree tapping (32.5%). The women lead narrowly in gum collection and come second to girls in fetching water during gum collection. The youth did not lead in any particular task but participated in all aspects except in decision-making on how to use the money from gum sales and purchase of food among male youth.

Table 5.41a: Gender roles within households in gum Arabic production and marketing

Characteristic variable	Adults (%)		Youth (%)		Children (%)	
	Men	***Women***	***Male***	***Female***	***Boys***	***Girls***
Tree tapping	32.5	15.0	25.0	12.0	10.0	5.0
Gum collection	18.4	23.8	18.3	19.3	11.0	9.2
Drying, cleaning and sorting	0	35.7	25.0	7.1	10.7	21.4
Purchase food	63.6	9.1	0	18.2	9.1	0
Fetching water	0	29.4	23.5	0	5.	41.2
Packaging gum	36.8	15.8	31.6	10.5	5.3	0
Transporting	58.8	11.8	5.9	17.7	5.9	0
Marketing	64.3	21.4	7.1	7.2	0	0
Decision-making on use of money from gum sales	66.7	33.3	0	0	0	0

Levels of gum Arabic production: Tapping and collection of gum Arabic takes place during the dry season, roughly between January and May each year. The start of the season depends on when floods drain and soils become dry in the forest to permit easy movement. Collection of gum continues until when the rains start in April or May. During the period of gum collection, in some households, everyone moves to the forest very early in the morning and returns late in the evening every day. The household moves with food to cook in the forest and water for drinking. In the forest, they set up temporary shelter for cooking. Men move far from the shelter in search for gum, whereas the women cook and together with the children collect gum within the vicinity of the temporary shelter. The men return for lunch and again move deep in the forest until evening when the household leaves the forest to head back home at the end of the day.

In other communities surrounding South Sudan-Sudan border, men organize in groups to move to the forests for one week. They travel on their bicycles with food and water enough to survive for a week in the forest. They set up temporary shelters to act as a home in the forest to return to in the evening after the day's collection. It is here that they cook food, sleep and leave their

property, mostly bicycles, as they roam the forests for gum Arabic. In the mornings, the group disperses in different directions in search of gum Arabic and converge later in the evenings. Sometimes they get lost and fail to locate the temporary homes. After a week, they return home, mostly on a market day and sell off the week's collection and prepare to return to the forest the following week. This pattern continues until the end of the season.

On quantities collected, each week's collection can amount to 5-10 Malwa. One Malwa is an equivalent of three kilograms. Overall, in the 2018 season, the average collection was 86.7 Malwa (Table 5.42a). Out of this about 82.4 Malwa was sold after cleaning, sorting and packaging. The highest collections were realized by the youth. They collected on average 142 Malwa compared to 87.8 and 46.8 Malwa among men and women respectively.

Table 5.41b: Gum Arabic collected and sold in 2018 (malwa/ season)

Pooled (Mean)		**Men (Mean)**		**Women (Mean)**		**Male youth (Mean)**		**Female Youth (Mean)**	
Collected	*Sold*	*Collected*	*Sold*	*Collected*	*Sold*	*Collected*	*Sold*	*Collected*	*Sold*
28.9	27.5	29.2	26.3	15.6	15.6	47.4	45.5	47.5	44.8

5.42 Marketing

The market for gum Arabic was controlled by a clique of traders in South Sudan and Sudan. There was secrecy on how prices paid to producers were determined. Interviews with traders in South Sudan indicated that prices for gum Arabic were determined by the traders who bought from producers. Gum producers had four channels through which to sell. These were the local trader, urban trader, broker/agent and the exporter. Most men (63.6%) and male youth (71.4%) preferred to sell directly to the exporter (Table 5.42 b). Women mostly sold to the urban trader (66.7%) and the exporter (28.6%). The female youth actively used three channels; the exporter (42.9%), local (28.6%) and the urban (28.6%) traders.

Table 5.42: Percentage that sold gum Arabic sold through the different channels

Gender	**Pooled (%)**	**Local trader**	**Urban trader**	**Broker/Agent**	**Exporter**
Men	10.9	18.2	9.1	18.2	63.6
Women	34.8	4.8	66.7	0	28.6
Boys	10.9	0	14.3	14.3	71.4
Girls	45.6	28.6	0	28.6	42.9

5.43 Gross margin from gum Arabic among traders

Trading in gum Arabic was highly profitable with gross margins of up to 80% among traders (Table 5.43). The major drivers of costs in gum Arabic trade were cost of gum acquisition, loading and off-loading, packaging material and assorted taxes/ fees (permits, market dues, state taxes/fees)

Table 5.43: Gross margin from gum arabic sales by traders

Revenue & costs	Mean	Std. Dev
Quantity sold (Malwa/ season)	220,710.00	260,625.42
Price (SSP/ Malwa)	366.50	94.05
Total Revenue	**80,890,215.00**	74,762,498.97
Variable costs		
Cost of gum Arabic	91,695,500.00	118,517,460.49
Cost of cleaning (SSP/ season)	130,900.00	110,874.34
Loading and Off-loading (SSP)	1,403,400.00	75,519.00
Packaging labor	540,000.00	
packaging material (SSP/ bag)	4,992,000.00	3,241,377.48
Storage costs (SSP/ season)	271,050.00	380,352.74
Taxes/ fees (SSP/ season)	4,317,000.00	4,195,971.64
Permits/ passes (Directorate of Forestry)	5,000.00	
Agent/ messenger costs	16,800.00	
Security (SSP/season	14,000.00	
Market dues (SSP/ season)	1,080,000.00	
Total variable costs (SSP/acre)	11,942,250.00	6,123,191.17
Gross margin (SSP/ acre)	**68,947,965.00**	80,885,690.14
	85.0%	

5.5 Value chain support services

5.51 Farmer groups and cooperatives

Consistent with previous findings, membership in farmers' groups and associations was very low at an average of 12.7%. More men (25%) and male youth (25%) belonged to groups than women (4%) and female youth (10%). The few with membership belonged to producers' groups and or VSLA and ROSCAs. Joining groups has been a recent undertaking among gum Arabic producers within the last three years.

5.52 Access to extension services

Similar to earlier observations, access to extension and advisory services among gum Arabic producers was very low. Only 10.9% had access to extension and advisory services. Of these, 37.5% were male youth, 16.7% men and 4% women. No female youth received any extension and advisory service in 2018. Those few producers who received extension and advisory services were in touch with traders and some NGOs. Much of the advice centered on gum collection (83.3%), tree tapping (66.7%) and gum marketing (33.3%). Other sources of information among gum producers were other gum producers and the State/County extension staff. In addition to gum collection, tapping and marketing, the information received also focused on gum cleaning, packaging and storage and gum tree and environmental management.

5.53 Access to financial services

On average, 29.1% gum producers had access to financial services. Within this, the women had relatively greater access at 44% compared to men (33.3%) and male youth (12.5%). The female youth did not receive any financial services. The average amounts of money received were modest, SSP 2,130 overall. Men had a higher average at SSP 2,325 compared to women (SSP 2,100) and male youth (1,500). The credit was mostly used to buy food (50%), pay school fees (18.8%), business (12.5%), medical expenses (12.5%) and for buying food (6.3%). Women mostly used the credit for buying food (72.7%).

5.6 Factors affecting gross margins in gum Arabic production among farmers

5.61 Gross margins levels

Gum Arabic production and marketing was generally a profitable undertaking with an average gross margin of 39.3% in 2018 (Table 5.61). There were differences in gross margins received among the various categories of producers. Male youth received the highest gross margins (50.4%) in a season. This has to do with harsh conditions for gum tapping and collection in the forests. Male youth are more adventurous and so they tapped and collected more gum in a season than the rest. The female youth should have had a higher gross margin than the 20.4% had it not been because of other very high operational costs, especially costs of feeding, labor, tapping tools, construction of camp and transport. They paid for these items much more than others. They also sold their produce at a much lower price on average than others. Women had on average a gross margin of 36.3%. This was the second highest gross margin even though they tapped and collected the least amount of gum (46.7 malwa compared to the highest 134.3 malwa among male youth). They made more money by selling at the highest price (SSP 279 per malwa compared to SSP 189.8 for male youth).

5.62 Gross margins from gum Arabic sales to different channels

Overall, the producers of gum Arabic made losses from sale of gum Arabic through all channels except through the local trader. This may partly be attributed to low prices and high costs of tapping, collection, drying, cleaning and packaging as shown in Table 5.62. The producers only made profits from sale of the gum to local traders some of whom doubled as collectors.

Table 5.61: Gross margins from gum Arabic production in 2018

Revenue & costs	Pooled	Men	Women	Male youth	Female youth
Output (Malwa/ season)	82.4	78.8	46.7	136.5	134.3
Price of gum Arabic (SSP/ *Malwa)	238.5	218.9	279.0	201.3	189.8
Total Revenue	***19,652.4***	***17,249.3***	***13,029.3***	***27,477.5***	***25,490.1***
Variable costs					
Cost of feeding (SSP/ season)	3,343.8	3,708.3	2,389.6	2,900.0	6,825.0
Cost of labor (SSP/ season)	2,565.9	2,823.6	1,219.0	3,815.7	5,125.0
Cost of tapping tools (SSP/ season)	1,617.4	1,381.2	1,525.0	1,513.3	2,375.0
Medical treatment costs (SSP/ season	2,086.7	2,681.8	1,804.7	2,587.5	1,572.2
Taxes and fees (SSP/ season)	530.0	772.5	314.4	863.3	500.0
Cost of camp construction (SSP/season)	1,009.1	783.3	627.5	771.4	2,425.0
Transport costs (SSP/ season	779.6	675.5	421.4	1,185.7	1,481.2
Total variable costs (SSP/season)	***11,932.5***	***12,826.2***	***8,301.6***	***13,636.9***	***20,303.4***
Gross margin (SSP/ season)	**7,719.9**	**4,423.1**	**4,727.7**	**13,840.6**	**5,186.7**
	39.3%	**25.6%**	**36.3%**	**50.4%**	**20.4%**

**1 Malwa = 3 Kg*

Table 5.62 Total variable costs and gross margins for gum arabic by marketing channel

Gum arabic buyer	Total variable costs (SSP)		Gross margins (SSP)	
	Mean	Std. Dev.	Mean	Std. Dev.
Local trader	20,206.00	4,546.23	10,051.20	27,884.51
Urban trader	12,491.25	7,975.81	-3,999.03	11,647.86
Broker	27,060.00	7,492.02	-9825.00	12,766.71
Exporter	24,441.91	13,568.85	-6237.09	21,382.53
Pooled sample	20,052.39	11,928.90	-4,000.16	18,860.01

5.63 Gross margins correlations

Gross margin correlations did not yield any significant association with various factors (Table 5.63). All the factors investigated had positive associations but non-significant statistically at 95% confidence level.

Table 5.63: Gross margin correlations for gum Arabic among producers

Variable	Pearson's correlation coefficient	P-value
Age of respondent	0.210	0.349
Year of schooling	0.181	0.421
Household size	0.194	0.387
Active members of household	0.196	0.382
Access to land (acres)	0.404	0.108
Land allocated to all crops (acres)	0.129	0.621
Average price per malwa	0.050	0.722
Amount of credit obtained (SSP)	0.520	0.369
Proportion of credit spent on crops	0.488	0.512

5.7 Constraints in gum Arabic production and marketing

Several constraints affected gum production and marketing (Table 5.7). The most widely cited was low gum prices (98.1%), lack of knowledge on tapping, cleaning, drying, sorting and packaging (54.7%) and financial services (45.3%). Other constraints were the low generative capacity of gum tree due to poor management (18.9%) and lack of drinking water (35.8%). Lack of water was particularly acute among female youth (77.8%). More youth identified poor resource management as a key constraint than adults. Among the youth, males were males (62.5%) than their female counterparts (44.4%).

Table 5.7: Constraints in gum Arabic production and marketing

Characteristic variable	Pooled (% cases)	Adults (%)		Youth (%)	
		Men	***Women***	***Male***	***Female***
Low gum prices	98.1	91.7	100	100	100
Lack of knowledge on tapping, cleaning, drying and sorting	54.7	75.0	37.5	62.5	66.7
Lack of market information	52.8	75.0	41.7	37.5	66.7
Lack of financial services	45.3	50.0	37.5	62.5	44.4
Low generative capacity of gum trees	18.9	16.7	12.5	50.0	11.1
Lack of drinking water	35.8	33.3	16.7	50.0	77.8
Lack of supportive producers' organization	37.7	58.3	20.8	50.0	44.4
Poor resource management	22.6	16.7	4.2	62.5	44.4

In focus group discussions, the problem of insecurity involving trans-border conflicts over control of forest products was raised. There were also complaints about low levels of output from

the forests due to several factors including lack of water and food, getting lost in the forest and injuries especially from thorny shrubs. Other constraints highlighted were loss of property resulting from rampant bush burning and lack of protective wear. Of more concern to gum producers was the low prices for gum. They complained that the low market prices are dictated by traders within South Sudan from South Sudan arbitrarily. The government ban on gum export two years ago had greatly affected production levels.

5.8 Strategic interventions in Gum Arabic production and marketing

To increase production, marketing and incomes from gum Arabic, the main limiting factors discussed in section 5.7 need to be addressed. The following interventions may be considered:

Strengthen producer groups: Membership in groups was very low. Form new producer groups and strengthen their capacities together with existing groups. Stronger groups will fight for better input and produce prices for their members. Emphasize participation of women in these groups by identifying and addressing factors that limit their involvement.

Train producers: Lack of knowledge on gum production and marketing was a key constraint. Train producers including women, men and female and male youth on tapping, drying, and cleaning, sorting, packaging and storing and small business management skills.

Provide equipment: Low levels of production has been mainly explained by lack of appropriate equipment for tapping, harvesting and handling. Inappropriate equipment for tapping has damaged acacia trees and has been halted in many communities. Provision of appropriate tapping equipment will boost production in such communities. Other equipment provided could include gum boots, overalls, and protective classes for the eyes, machetes, weighing scales, pallets, gunny bags and water carriers.

Improve marketing: The marketing infrastructure was poor. There was an outcry about low prices, reportedly as result of cheating of producers by traders. The project's proposed intervention of establishing three gum collection centers will significantly improve gum marketing. Such a center should be managed by strong farmer groups.

Strengthen collaborations and partnerships: There is a cartel that controls the trade in gum Arabic. Producers could be assisted by establishing strategic partnership directly between their groups and importers of gum Arabic in Sudan

APPENDIX 1: SAMPLE DISTRIBUTION FOR INDIVIDUAL HOUSEHOLD INTERVIEWS

Number and categories of producers along sorghum value chain

Characteristic variable	Pooled (Count)	Adults		Youth	
		Male	Female	Boys	Girls
Aweil East					
Aweil South	20	4	13	3	
Aweil Center	34	8	15	1	10
Aweil West	21	4	5	6	6
Aweil North	28	6	10	3	9
Total	**103**	**22**	**43**	**13**	**25**

Number and categories of producers along groundnuts value chain

Characteristic variable	Pooled (Count)	Adults		Youth	
		Male	Female	Boys	Girls
Aweil East					
Aweil South	14	2	5	2	5
Aweil Center	29	7	13	5	4
Aweil West	21	6	9	4	2
Aweil North	25	7	10	4	4
Total	**89**	**22**	**37**	**15**	**15**

Number and categories of producers along gum arabic value chain

Characteristic variable	Pooled (Count)	Adults		Youth	
		Male	Female	Boys	Girls
Aweil East	55	12	25	8	10
Aweil South					
Aweil Center					
Aweil West					
Aweil North					

Number and categories of producers along milk value chain

Characteristic variable	Pooled (Count)	Adults		Youth	
		Male	Female	Boys	Girls
Aweil East	26	6	13	3	4
Aweil South	21	11	7	2	1
Aweil Center	17	5	9	1	2
Aweil West	21	6	4	2	9
Aweil North	0	0	0	0	0
Total	**85**	27	33	8	16

Total number interviewed = 332

Total number of adults = 222
Total number of youth = 110
Total number of men = 84
Total number women =138
Total number of male youth = 44
Total number of female youth = 66

APPENDIX 2: HOUSEHOLD QUESTIONNAIRES FOR SORGHUM, GROUNDNUTS, MILK AND GUM ARABIC VALUE CHAINS

HOUSEHOLD QUESTIONNAIRE
ANALYSIS OF ENGENDERED VALUE CHAIN ANALYSIS OF SORGHUM

Confidentiality Clause/ introduction

I am……., here on behalf of VSF Germany, that is implementing the Sustainable Agriculture and Livestock Production Initiative (SALPI) in the former Northern Bahr El Ghazal state in the counties of Aweil East, Aweil West, Aweil Central, Aweil South and Aweil North. Your household has been randomly selected to participate in this interview. The purpose of this interview is to obtain information on **groundnuts production, postharvest handling, processing, marketing and access to institutional services with focus on gender.** The study seeks to analyze and understand farming enterprise and livelihood activities that can improve livelihood opportunities, product expansion, market viability, value addition and input availability in your communities for women, men, girls and boys. Participation in this study is voluntary and there is no risk associated with participation of your household's. Your responses will only be used to generate value chain related information to benefit the people of Northern Bahr el Gazal State and South Sudan at large. The information you share will be kept confidential and will not be shared with anyone in this community or anyone not related to this research.

Could you please spare about 45 minutes for the interview? Consent sought and participation agreed; 1. Yes 2. No. (**If No, terminate the interview and go to the next respondent**).

SECTION A1: IDENTIFICATION DATA

A01 Name of the enumerator			A02 Date of interview		
A03 County		A04 Payam		A05: Boma	
A06 GPS coordinates of household	Easting: …….....		Northings: …….	Altitude: ……..	
A07 Name of respondent			A08 Tel. contact		
A09 Name of household head			A10 Tel. contact		
A11 Gender of respondent	1 = Female Youth (18-30 years) 2= Male Youth (18-30 years) 3= Adult Female 4= Adult Male		A12 Age of respondent		
A13: Is respondent head of household	1= Yes 2 = No	A14: If no, relationship to household head (codes)	1.Spouse 2.Son 3.Daughter 4.Parent 5.Sibling 6.Farm worker 7.Other (specify)		
A15: Educational level Respondent (codes)			A16 Education level - Household head (codes)		
Codes: 1.None 2.Attended, never completed primary level 3.Completed primary 4. Attended, never completed secondary level 5.Completed secondary level 6.Attended, never completed tertiary level 7.Completed tertiary level 8. Attended, never completed university 9.Completed university 10.Other, specify					
A17: Years of education -Respondent:			A18 Years of education - Household head		
A19: Marital status (codes)	1.Married (Monogamous) 2.Married (Polygamous) 3.Divorced/Separated 4.Widowed 4.Single				
A20: Disability status	1.Yes 2.No	Type of disability	1.Physical 2. Mental 3. Deaf and Dumb		
A21: Occupation other than farming	0.None 2.Salaried employment 3.Self-employed on-farm 4.Self-employed off-farm 5.Casual labor on-farm 6.Casual labor off-farm 7.Household chores 8.Handcraft, 9.Brewing 10.Produce trade 11.Bee keeping 12.Student/Pupil 13.Other (specify)				

SECTION A2: FARM HOUSEHOLD CHARACTERISTICS

A22: Household size indicating details by gender	A22 Total:	A23 No. of females:	A24 No. of males
A25: How of the household members are actively in agricultural production and marketing?			
A26: Household composition by age			

A27a: Age category	**A27a: Males**	**A27a: Females**
Number of members between 0 and 5 years		
Number of members between 6 and 17 years old (Not in school)		
Number of household members between 6 and 17years in school		
Number of household members of between 18 and 30 years		

Number of household members of between 31 and 64 years		
Number of household members of 65 years and above		
Number of household member living outside (e.g. migration for school, work)		

SECTION B CROP PRODUCTION AND MARKETING

B1: LAND ALLOCATION AND USE

B1.1: Do you have access to land?	1.Yes 2.No		
B1.2 How many feddans of land do you have access to?	……Square meter		
B1.3 What is the acre equivalent a feddan?	1 acre =…..Feddans		
B1.4 Type of land tenure ownership?	1.Customary, 2.Squatter, 3.Free hold, 4.Rented, 5.Lease hold, 6.Public land		
B1.5 Do you use all the land for agriculture?	1.Yes 2.No		
B1.6 If no to B1.4, what limits use of all the land?	1.Limited money to invest in it 2.Unproductive for agriculture 3.Land wrangles 4.No idea on how to use the land 5.Others (specify)		
B1.7 Who makes decisions on how to allocate land for production?	1.Husaband 2.Wife 3.Both 4.Male Child 5.Female child 6.Other family member 7.Clan 8.Other, specify		
B1.8 Do you hire/ rent in land for agricultural production?	1.Yes 2.No	B1.9 If yes, how many acres of the land you use on annual basis is hired?	
B1.10 What is the cost of hiring a feddan or square meter of land per year in SSD?			
B1.11 What is the equivalent cost of hiring an acre of land per year in SSD?			
B1.12 Do you rent out land to others?	1.Yes 2.No	B1.11 If yes, how many acres of land do you normally rent out annually?	
B1.13 How much do you charge for a feddan of land rented out per year in SSD?			

B2 CROP PRODUCTION

B21 List five (5) most important food and/ or cash crops grown by your household in the first season of 2018 and second season of 2019?

Provide details of acreage, rank in order of importance to the household food and income security and purpose for growing the crop? *Please probe for groundnuts*

#	Crop	Feddans	Equivalence in acres	Rank	Purpose (1.Food, 2.Cash, 3.Both food and cash, 4.Other (specify)
	B22	B23	B24	B25	B26
1.					
2.					
3.					
4.					
5.					

B27 Condition: Household grows the following selected crops: 1.Sorghum 2. Groundnuts

B28 How long have you been growing sorghum in this household?

B29 How long have you been growing groundnuts in this household?

SECTION B3 Crop production, inputs and marketing

Crops	Number of times grown crop in year	Average land size (2nd season 2018)				Average land size (1st season 2019)			
		No. of plots/ Feddans	Average size (m2)	Production system used 1.Pure stand	If intercrop, proportion of land occupied	No. of plots	Average size (m2)	Production system used 1.Pure stand	If intercrop proporti of land occupied

				2.Intercrop				**2.Intercrop**	
	B31	**B32**	**B33**	**B34**	**B35**	**B36**	**B37**	**B38**	**B39**
Sorghum									
Groundnuts									

B4 Did you apply organic or inorganic fertilizers, pesticides and herbicides in B27 production? 1.Yes 2.No

Quantity and costs of agricultural inputs used in 2nd season 2018 and 1st season 2019											
Crops	Type of chemical used	Source of input	Is this source reliable 1.Yes 2.No	Qty purchased	Unit of qty purchased	Qty used/ applied	Unit of qty used	Unit cost of quantity used	Conversion to standard unit litres or Kg	Is the input accessible 1.Yes 2.No	If not accessible, state the reasons
	B40	**B41**	**B42**	**B43**	**B44**	**B45**	**B46**	**B47**	**B48**	**B49**	**B10**
Sorghum											
G/nuts											

Codes for B40: 1.Improved seed 2.Local seed 3.Fertilizers (granule) 4.Fertilizer (folia)/ plant booster e.g. super gro 5.Organic manure (solid) 6.Organic Manure (liquid) 7.Fungicides (liquid) 8.Fungicides (powder) 8.Tools (hoes. Gumboots, machetes) 9.Implement (e.g ox-plough) (2018/2019) (NB:salvage value) 9.Other (specify)

Codes for sources (B41): Agro-input dealers, 2.Fellow farmer/neighbour, 3. Own farm, 4.VSF Germany, 5.Village/ local market, 6.Other NGO (specify), 7.State Agriculture Department or CAD, 8.Farmer group/ Association, 9.Local government, 11.Own livestock, 13.Own crop residues, 12.Other (specify)

Codes for inaccessibility of inputs: 1.Not affordable 2.Limited access to agro-input dealers/ stockiest 3.High transport costs 4.Adulterate / poor quality 5.Untimely delivery 6. Other (specify)

B5: Did you purchase farm tools and implements in 2nd season 2018 or 1st season 2019 for production? 1.Yes 2.No

Crops	If yes, type of tool or implement	Source of tool/ implement	Is this source reliable 1.Yes 2.No	Number purchased	Unit cost of tool/implement purchased	No. of years tool/implement can be used	Is the input accessible 1.Yes 2.No	If not accessible, state the reasons B410
	B51	**B52**	**B53**	**B54**	**B55**	**B56**	**B57**	**B58**
Sorghum								
G/nuts								

Codes for tools/implements: 1.Hoes 2.Gumboots 3.Shade 4.Machetes 5.Slasher 6.Ox-plough 7.Other (specify)

B6 Details of cost of labor employed and farm operation costs incured in production

Quantity and costs of agricultural tools and implements used in 2nd season 2018 and 1st season 2019			
Type of farm operation	Type of labour used 1.Hired casual labour, 2.Hired permanent workers 3.Family paid labour, 4 Family unpaid Labour 5.Own oxen 6.Oxen hire 7.Ox-plough hire 8.Tractor hire 9.Other	Quantity used	Unit cost of labor (SSP)
B61	**B62**	**B63**	**B64**
Land clearing/ destumping			
Land preparation/ploughing			
Disc harrowing			
Planting			
Inorganic fertilizer			

application			
Organic fertilizer application			
Spraying			
First Weeding			
Second Weeding			
Third Weeding			
Fourth Weeding			
Harvesting			
Output transport from field to home			
Drying			
Threshing			
Winnowing			
Packing for Storage			
Transport to market			
Marketing			
Other (specify_			

SECTION B7: Crop harvest and sales in 2nd season, 2018 1st season 2019 (repeat table)

Crop	Quantity harvest (Put zero (O) if not harvest	Unit of harvest	Quantity consumed at home	Unit of qty consumed at home	Quantity sold	Unit of qty sold	Quantity given out as gifts or reimbursements for land, labour, oxen etc?	Unit of qty given away	Qty kept in stock/ seed	In case there was no harvest i.e. 0 in Column B71. What was the main reason for the pre-harvest loss?
	B71	B72	B73	B74	B75	B76	B77	B78	B79	B10
Sorghum										
Groundnuts										

Codes of unit of harvest: 1=*Cup (0.5Kg), 2=Kg, 3=2 Kg, 4=5 Kg bag, 5=10 Kg bag, 6=20Kg bag, 7=Bag (100Kg), 8=Extra-large bag (120Kg), 9=Basins (15Kg), 10=Big tin/Debe (15Kg), 11=Trough/Katasa (5Kg), 12=Small tin (Nomi/Paint-3Kg), 13=1 ton, 14=2.5 ton*
1.Pest, 2.Destruction by stray animals, 3.Floods, 4.Drought, 5.Hailstones, 6.Other (Specify)

B8: Details of buyers of crop produce in 2nd season 2018 and 1st season 2019 (repeat table)

Crop	**Quantity sold**	**Price (SSP/Kg)**	**Place of sale of crop output**	**Buyer of the produce**	**Reasons for selling to the particular buyer**	**How to do transport to the selling point**	**What is average cost of transport to selling point per 100 Kg**
	B81	**B82**	**B83**	**B84**	**B85**	**B86**	**B87**
1.Sorghum							
2. Groundnuts							

Codes for place of sale: 1.Farm-gate, 2. Local/rural market, 3. Urban market, 4.Border market, 5.Other(specify)
Codes of buyers of crop output: 1.Local trader, 2.Urban trader, 3.Producer buyer/ middlemen, 4. Local consumers, 5.Urban consumers, 6. Processors, 7. NGOs, 8.Other (specify)
Codes for reasons for selling to the particular buyers: 1. Better price 2. Prompt payment 3.Buys in bulk 4.Buyer easily available (ready market) 5. Contractual (contract farming/ bulking agreement 6. Other (specify)

B9.1 What foam of value addition do you carry out before selling groundnuts or sorghum?	1.Drying 2.Cleaning/sorting 3.Packaging 4.Primary processing 5.Other (specify)
B9.2 How much do you incur on each value addition activity?	
B9.3 How do you market your sorghum or groundnut produce?	1.Individually 2. Collectively 3. Both
B9.4 Do you have any prior contractual agreement with buyers	
B9.5 If yes, state the details	
B9.7 Who sets the price of sorghum or groundnut produce?	1.Processor 2.Middlemen 3.Farmer group 8.Other specify
B9.8 How far is the nearest market (Km) where you normally sell your crops?	
B9.9 How much time (in hours) do you take to reach the nearest market? …….. Hours.	
B9.710Did you experience any problems in marketing your crop output in 2018A and 2019A?	1.Yes 2.No
B9.11 If yes, what were the main constraints your household faced in marketing?	tick

Codes for marketing constraints***:*** *1.Poor roads 2.Hight transport costs 3.Low prices 4.Low market demand 5.Limited market information 6.High postharvest losses 7.High local taxes (market dues, loading and off-loading fees 8.Lack of infrastructure Other (specify)*

SECTION C1: HOUSEHOLD GENDER RELATIONS AND ACCESS TO, OWNERSHIPS AND DECISION ON RESOURCES

C1.1: Household decision-making on production and income

Activity	Household member participation in productive activities						Who makes the primary decision for the household members to participate in each activity
	Adult female (>35 yrs)	Adult men (>35 yrs)	Female youth (18 – 35)	Male youth (18 – 35)	Females under 18 years	Males under 18 years	
	C1.1a	C1.1b	C1.1c	C1.1d	C1.1e	C1.1f	C1.1g
Land preparation							
Planting							
Weeding							
Spraying							
Thinning/ gap filling							
Harvesting							
Postharvest management							
Selling/ marketing							

C1.2: Who the primary decisions on use of productive resources within the household?

Activity	**Who makes the primary decision for the household members to participate in each activity**
Allocation of land for agriculture	
Household labor use	
Hiring in labor	
Sell out labor/ hire out	
Income from crop production or livestock	
Income earned by men	
Income earned by women	
Income received by children	

C1.3: Access to productive capital

Activity	Household member participation in productive activities					
	Adult female (>35 yrs)	Adult men (>35 yrs)	Female youth (18 – 35)	Male youth (18 – 35)	Females under 18 years	Males under 18 years
Personally, owns land owned/ cultivated by HH						
Ownership large livestock						
Ownership small livestock						
Ownership of poultry						
Mechanized farm equipment (e.g. tractor-plough)						
Non-mechanized equipment e.g. hoes, ox-plough						
Non-farm business equipment (e.g. solar panels						
Access to production loans						
Loan payment decision-making						

C1.4: Access to extension advisory services

C1.41 In last 12 months, did you receive agriculture-related information and extension advisory services on crop production (sorghum and groundnuts)?	1.Yes 2.No
C1.42 Please list the sources of agriculture-related information and extension advisory services	1.State/county/Payam extension staff 2.Produce/ marketing agents 3.Farmers association 4. VSF Canada 5. Other INGOs (specify) 6.NGOs (specify) 7.Radio/TV 8. Print media 9.FBO
C1.43 Types of information and extension services do you receive on sorghum, groundnuts or gum arabica	1.Source/ supply of inputs 2.Crop management advice 3. Postharvest handling 4. Marketing 5.Soil/ environment management 6.Farm planning 7.Other (specify)
C1.44 Are you satisfied with information and extension services provided by different sources	1.Very satisfied 2.Somewhat satisfied 3. Not satisfied
C1.45 If does not access information and extension services or not satisfied with current services, state the reasons	1.Not provided timely 2.Irrelevant information 3.Costly services 4.Target large farmers 5.Media not accessible 6.Other (specify)
C1.46 Have you ever attended a training on production and marketing of sorghum, groundnuts or gum	1.Yes 2.No
C1.47 If yes, who provided the training?	1.State/county/Payam extension staff 2.Produce/ marketing agents 3.Farmers association 4. VSF Canada 5. Other INGOs (specify) 6.NGOs (specify) 7.Radio/TV 8. Print media 9.FBO

C1.48 What was the focus of the training? State your level of satisfaction with each of the training content delivered

C1.48a Training content	Participation 1.Yes 2.No	Level of satisfaction	If not satisfied with the training, state the reason
1.Soil/seedbed preparation 2.Seed preparation/ coating 2.Row planting and spacing 3.Making manure and mulch 4.Weed control 5.Disease/ pest management 6.Chemical handling/ disposal 7.Harvest and postharvest handling 8. Farming as a business 9.Gender roles 10.Conservation farming			1.Short training duration; 2.Training difficult to understand; 3.Facilitators did not explain well, 4.Training was irrelevant; 5.High cost of attending training 6.others (specify)

C1.49 How have you adopted the skills acquired during the trainings

Training (see codes for C1.48a)	Have you adopted 1.Yes 2.No	Main reason for adopting the skill 1.High yield expectation 2.Easy to practice 3.Improve quality of produce 4. Attracts high prices 5.Reduces drudgery/ labor need 6.Enhances unit at household 7.Diversifying income 8. Improved farm management 9. Improves soil fertility 10.Other (specify)	Main reason for not adopting the skill 1.None, 2.Skills Difficult To Practice, 3.Lack Of Equipment; 4.Lack Of Labour, 5.Lack Of Markets, 6.Inputs Very Expensive, 7.Inputs Not Readily availabe, 8.lack of capital 9.Other (Specify)

C1.410a How you ever been visited by an extension advisory agent in the last 12 months	1.Yes 2.No

C1.410b If yes, how many times has the extension agent visited in the last 12 months	
C1.40c Please describe the content of extension agent's message during the visits	1.Source/ supply of inputs 2.Crop management advice 3. Postharvest handling 4. Marketing 5.Soil/ environment management 6.Farm planning 7.Other (specify)

C1.5 Access to financial services in last 12 months for agricultural production and marketing

C1.51 Did you access Credit/ financial services in the last 12 months				1.Yes 2.No
If no, state the reasons 1.Fear of inability to pay back in time 2.High required 3.Limited access 4.Bureaucracy tendencies 5.Other specify	If yes, mention the source of credit (C1.52) 1.Commercial banks 2.Microfinance/MDIs 3.Cooperative society/farmer organization 4.VSLA 5.ROSCAs 6.Agricultural insurance 7.Friends/ relatives 8. NGOs 9.Other (specify)	C1.53 How much credit (SSP) did you get in last 12 months?	C1.54 What was the main purpose of the credit 1.Buy seeds/ other inputs 2.Buy animal feed 3.Buy pesticides/ herbicides 4.Livestock vaccination 5.Hiring labor 6.Hiring farm equipment 7.Paying marketing costs 8.Other (specify)	C1.55 How much of the credit did you use in production of sorghum or groundnuts

C1.6 Farmer association/ group membership

C1.61 Does any member of the household belong to a farmer group/ association or cooperative?	
C1.62 If yes, state the type of the association/ group	1.Farmer/ producer group 2. Cooperative 3. Collective marketing group 4.Labor exchange group 5.Farmer Field School 6. Other (specify)
C1.63 What is the main production and marketing activity conducted by the association/ group	1.Crop production 2.Input supply 3.Financial service/ agricultural insurance 4.Collective marketing 5.Postharvest handling/ produce sale 6.Other (specify)

SECTION D Constraints to crop production and marketing

D1.1 What are main constraints/ challenges you face in the production sorghum or groundnuts	Constraints	Coping mechanism
Codes: 1.Pests/ vermin 2.Diseases 3.Wather vagaries 4. Limited arable land 5.Lack of access to credit 6.Low yields Other specify		
D1.2 What are main constraints/ challenges you face in accessing inputs for production sorghum or groundnuts? *1.Shortage of inputs 2.Not affordable 3.Limited access to suppliers 4.Poor quality/ adulteration 5.Other (specify)*	Constraints	Coping mechanism
D1.3 What are main constraints/ challenges you face in the marketing sorghum or groundnuts produce? 1.Unstable prices 2.Low market demand 3.Poor infrastructure 4.Competition for chain actors 5.Exploitation by middlemen 6.	Constraints	Coping mechanism
D1.4 What are main value addition/ postharvest handling constraints/ challenges you face in handling of sorghum or groundnuts produce	Constraints	Coping mechanism
D1.5 What gender-related constraints/ challenges faced in the production and marketing of sorghum or groundnuts	Constraints	Suggested solution
D1.6 Are there policy/ state-related constraints to production and marketing of sorghum or groundnuts	Constraints	Suggested solution
D1.17 State the policy/ state-related constraints faced in the production and marketing of sorghum or groundnuts	Constraints	Suggested solution

Section E Business networks and interaction

Indicate the actors you have done business/ transacted with in the last 12 months?	How many times did you or your agent transact with the actor in the last 12 months?	Have received repeated contracts from the same actor? 1.Yes 2.No	What services do you offer to the actors	What services do you receive for the actors
1.Middlemen/ commission agents 2.Retailers 3.Transporter 4.Processor 5.Wholesalers 6.Extension workers/ government entity 7.INGO, specify 7.NGO, specify 8.CBO, specify 9.Producer cooperative 10.Institutions 11.Agro-inout dealers 12.Other specify		Types of contracts 1. Marketing Contract (Guaranteed Delivery) 2.Production Contract (Grower Supplied Inputs) 3.Basis Contract (based current and future price difference) 4.Technology Use Agreement 5.Generic Agreement of Purchase and Sale after Harvest	1.Market for products 2.Supply produce 3.Taxes/ fees	1.Buers of produce 2.Advisory services 3.Market linkage 4.Promotions 5.Affordable inputs 6.Collective marketing 7.Other (specify)

General comment on the production and marketing of sorghum or groundnuts ……

……..……..

……...

Thanks for your participation!

HOUSEHOLD QUESTIONNAIRE
ANALYSIS OF ENGENDERED VALUE CHAIN ANALYSIS OF GROUNDNUTS

Confidentiality Clause/ introduction

I am……., here on behalf of VSF Germany, that is implementing the Sustainable Agriculture and Livestock Production Initiative (SALPI) in the former Northern Bahar El Ghazal state in the counties of Aweil East, Aweil West, Aweil Central, Aweil South and Aweil North. Your household has been randomly selected to participate in this interview. The purpose of this interview is to obtain information on **groundnuts production, postharvest handling, processing, marketing and access to institutional services with focus on gender.** The study seeks to analyze and understand farming enterprise and livelihood activities that can improve livelihood opportunities, product expansion, market viability, value addition and input availability in your communities for women, men, girls and boys. Participation in this study is voluntary and there is no risk associated with participation of your household's. Your responses will only be used to generate value chain related information to benefit the people of Northern Bahar el Gazal State and South Sudan at large. The information you share will be kept confidential and will not be shared with anyone in this community or anyone not related to this research.
Could you please spare about 45 minutes for the interview? Consent sought and participation agreed; 1. Yes 2. No. (**If No, terminate the interview and go to the next respondent**).

SECTION A1: IDENTIFICATION DATA

A01 Name of the enumerator			A02 Date of interview		
A03 County		A04 Payam		A05: Boma	
A06 GPS coordinates of household	Easting: …….....		Northings: …….	Altitude: ……..	
A07 Name of respondent			A08 Tel. contact		
A09 Name of household head			A10 Tel. contact		
A11 Gender of respondent	1 = Female Youth (18-30 years) 2= Male Youth (18-30 years) 3= Adult Female 4= Adult Male		A12 Age of respondent		
A13: Is respondent head of household	1= Yes 2 = No	A14: If no, relationship to household head (codes)	1.Spouse 2.Son 3.Daughter 4.Parent 5.Sibling 6.Farm worker 7.Other (specify)		
A15: Educational level Respondent (codes)			A16 Education level - Household head (codes)		
Codes: 1.None 2.Attended, never completed primary level 3.Completed primary 4. Attended, never completed secondary level 5.Completed secondary level 6.Attended, never completed tertiary level 7.Completed tertiary level 8. Attended, never completed university 9.Completed university 10.Other, specify					
A17: Years of education - Respondent:			A18 Years of education - Household head		
A19: Marital status (codes)	1.Married (Monogamous) 2.Married (Polygamous) 3.Divorced/Separated 4.Widowed 4.Single				
A20: Disability status	1.Yes 2.No	Type of disability	1.Physical 2. Mental 3. Deaf and Dumb		
A21: Occupation other than farming	0.None 2.Salaried employment 3.Self-employed on-farm 4.Self-employed off-farm 5.Casual labor on-farm 6.Casual labor off-farm 7.Household chores 8.Handcraft, 9.Brewing 10.Produce trade 11.Bee keeping 12.Student/Pupil 13.Other (specify)				

SECTION A2: FARM HOUSEHOLD CHARACTERISTICS

A22: Household size indicating details by gender	A22 Total:	A23 No. of females:	A24 No. of males
A25: How of the household members are actively in agricultural production and marketing?			
A26: Household composition by age			
A27a: Age category	**A27a:**	**A27a: Females**	

	Males	
Number of members between 0 and 5 years		
Number of members between 6 and 17 years old (Not in school)		
Number of household members between 6 and 17years in school		
Number of household members of between 18 and 30 years		
Number of household members of between 31 and 64 years		
Number of household members of 65 years and above		
Number of household member living outside (e.g. migration for school, work)		

SECTION B CROP PRODUCTION AND MARKETING

B1: LAND ALLOCATION AND USE

B1.1: Do you have access to land?	1.Yes 2.No		
B1.2 How many feddans of land do you have access to?	……Square meter		
B1.3 What is the acre equivalent a feddan?	1 acre =…..Feddans		
B1.4 Type of land tenure ownership?	1.Customary, 2.Squatter, 3.Free hold, 4.Rented, 5.Lease hold, 6.Public land		
B1.5 Do you use all the land for agriculture?	1.Yes 2.No		
B1.6 If no to B1.4, what limits use of all the land?	1.Limited money to invest in it 2.Unproductive for agriculture 3.Land wrangles 4.No idea on how to use the land 5.Others (specify)		
B1.7 Who makes decisions on how to allocate land for production?	1.Husaband 2.Wife 3.Both 4.Male Child 5.Female child 6.Other family member 7.Clan 8.Other, specify		
B1.8 Do you hire/ rent in land for agricultural production?	1.Yes 2.No	B1.9 If yes, how many acres of the land you use on annual basis is hired?	
B1.10 What is the cost of hiring a feddan or square meter of land per year in SSD?			
B1.11 What is the equivalent cost of hiring an acre of land per year in SSD?			
B1.12 Do you rent out land to others?	1.Yes 2.No	B1.11 If yes, how many acres of land do you normally rent out annually?	
B1.13 How much do you charge for a feddan of land rented out per year in SSD?			

B2 CROP PRODUCTION

B21 List five (5) most important food and/ or cash crops grown by your household in the first season of 2018 and second season of 2019?

Provide details of acreage, rank in order of importance to the household food and income security and purpose for growing the crop? *Please probe for groundnuts*

#	Crop	Feddans	Equivalence in acres	Rank	Purpose (1.Food, 2.Cash, 3.Both food and cash, 4.Other (specify)
	B22	B23	B24	B25	B26
1.					
2.					
3.					
4.					
5.					

B27 Condition: Household grows the following selected crops: 1.Groundnuts 2. Groundnuts

B28 How long have you been growing groundnuts in this household?

B29 How long have you been growing groundnuts in this household?

SECTION B3 Crop production, inputs and marketing

Crops	Numbe	Average land size (2nd season		Average land size (1st	

	r of times grown crop in year	2018)				season 2019)			
		No. of plots/ Feddans	Average size (m2)	Production system used 1.Pure stand 2.Intercrop	If intercrop, proportion of land occupied	No. of plots	Average size (m2)	Production system used 1.Pure stand 2.Intercrop	If intercrop, proportion of land occupied
	B31	B32	B33	B34	B35	B36	B37	B38	B39
Groundnuts									
Groundnuts									

B4 Did you apply organic or inorganic fertilizers, pesticides and herbicides in B27 production? 1.Yes 2.No

Quantity and costs of agricultural inputs used in 2nd season 2018 and 1st season 2019											
Crops	Type of chemical used	Source of input	Is this source reliable 1.Yes 2.No	Qty purchased	Unit of qty purchased	Qty used/ applied	Unit of qty used	Unit cost of quantity used	Conversion to standard unit litres or Kg	Is the input accessible 1.Yes 2.No	If not accessible, state the reasons
	B40	B41	B42	B43	B44	B45	B46	B47	B48	B49	B10
Groundnuts											
G/nuts											

Codes for B40: 1.Improved seed 2.Local seed 3.Fertilizers (granule) 4.Fertilizer (folia)/ plant booster e.g. super gro 5.Organic manure (solid) 6.Organic Manure (liquid) 7.Fungicides (liquid) 8.Fungicides (powder) 8.Tools (hoes. Gumboots, machetes) 9.Implement (e.g ox-plough) (2018/2019) (NB:salvage value) 9.Other (specify)

Codes for sources (B41): Agro-input dealers, 2.Fellow farmer/neighbour, 3. Own farm, 4.VSF Germany, 5.Village/ local market, 6.Other NGO (specify), 7.State Agriculture Department or CAD, 8.Farmer group/ Association, 9.Local government, 11.Own livestock, 13.Own crop residues, 12.Other (specify)

Codes for inaccessibility of inputs: 1.Not affordable 2.Limited access to agro-input dealers/ stockiest 3.High transport costs 4.Adulterate / poor quality 5.Untimely delivery 6. Other (specify)

B5: Did you purchase farm tools and implements in 2nd season 2018 or 1st season 2019 for production? 1.Yes 2.No

Crops	If yes, type of tool or implement	Source of tool/ implement	Is this source reliable 1.Yes 2.No	Number purchased	Unit cost of tool/implement purchased	No. of years tool/implement can be used	Is the input accessible 1.Yes 2.No	If not accessible, state the reasons B410
	B51	B52	B53	B54	B55	B56	B57	B58
Groundnuts								
G/nuts								

Codes for tools/implements: 1.Hoes 2.Gumboots 3.Shade 4.Machetes 5.Slasher 6.Ox-plough 7.Other (specify)

B6 Details of cost of labor employed and farm operation costs incured in production

Quantity and costs of agricultural tools and implements used in 2nd season 2018 and 1st season 2019			
Type of farm operation	Type of labour used	Quantity	Unit cost of

	1.Hired casual labour, 2.Hired permanent workers 3.Family paid labour, 4 Family unpaid Labour 5.Own oxen 6.Oxen hire 7.Ox-plough hire 8.Tractor hire 9.Other	used	labor (SSP)
B61	**B62**	**B63**	**B64**
Land clearing/ destumping			
Land preparation/ploughing			
Disc harrowing			
Planting			
Inorganic fertilizer application			
Organic fertilizer application			
Spraying			
First Weeding			
Second Weeding			
Third Weeding			
Fourth Weeding			
Harvesting			
Output transport from field to home			
Drying			

Type of farm operation	Type of labour used 1.Hired casual labour, 2.Hired permanent workers 3.Family paid labour, 4 Family unpaid Labour 5.Own oxen 6.Oxen hire 7.Ox-plough hire 8.Tractor hire 9.Other	Quantity used	Unit cost of labor (SSP)
Threshing			
Winnowing			
Packing for Storage			
Transport to market			
Marketing			
Other (specify_			

SECTION B7: Crop harvest and sales in 2nd season, 2018 1st season 2019 (repeat table)

Crop	Quantity harvest (Put zero (O) if not harvest	Unit of harvest	Quantity consumed at home	Unit of qty consumed at home	Quantity sold	Unit of qty sold	Quantity given out as gifts or reimbursements for land, labour, oxen etc?	Unit of qty given away	Qty kept in stock/ seed	In case there was no harvest i.e. 0 in Column B71. What was the main reason for the pre-harvest loss?
	B71	B72	B73	B74	B75	B76	B77	B78	B79	B10
Groundnuts										
Groundnuts										

Codes of unit of harvest: 1=*Cup (0.5Kg), 2=Kg, 3=2 Kg, 4=5 Kg bag, 5=10 Kg bag, 6=20Kg bag, 7=Bag (100Kg), 8=Extra-large bag (120Kg), 9=Basins (15Kg), 10=Big tin/Debe (15Kg), 11=Trough/Katasa (5Kg), 12=Small tin (Nomi/Paint-3Kg), 13=1 ton, 14=2.5 ton*
1.Pest, 2.Destruction by stray animals, 3.Floods, 4.Drought, 5.Hailstones, 6.Other (Specify)

B8: Details of buyers of crop produce in 2nd season 2018 and 1st season 2019 (repeat table)

Crop	Quantity sold	Price (SSP/Kg)	Place of sale of crop output	Buyer of the produce	Reasons for selling to the particular buyer	How to do transport to the selling point	What is average cost of transport to selling point per 100 Kg
	B81	**B82**	**B83**	**B84**	**B85**	**B86**	**B87**
1.Groundnuts							
2. Groundnuts							

Codes for place of sale: 1.Farm-gate, 2. Local/rural market, 3. Urban market, 4.Border market, 5.Other(specify)
Codes of buyers of crop output: 1.Local trader, 2.Urban trader, 3.Producer buyer/ middlemen, 4. Local consumers, 5.Urban consumers, 6. Processors, 7. NGOs, 8.Other (specify)
Codes for reasons for selling to the particular buyers: 1. Better price 2. Prompt payment 3.Buys in bulk 4.Buyer easily available (ready market) 5. Contractual (contract farming/ bulking agreement 6. Other (specify)

B9.1 What foam of value addition do you carry out before selling groundnuts or groundnuts?	1.Drying 2.Cleaning/sorting 3.Packaging 4.Primary processing 5.Other (specify)
B9.2 How much do you incur on each value addition activity?	
B9.3 How do you market your groundnuts or groundnut produce?	1.Individually 2. Collectively 3. Both
B9.4 Do you have any prior contractual agreement with buyers	
B9.5 If yes, state the details	
B9.7 Who sets the price of groundnuts or groundnut produce?	1.Processor 2.Middlemen 3.Farmer group 8.Other specify
B9.8 How far is the nearest market (Km) where you normally sell your crops?	
B9.9 How much time (in hours) do you take to reach the nearest market? …….. Hours.	
B9.710Did you experience any problems in marketing your crop output in 2018A and 2019A?	1.Yes 2.No
B9.11 If yes, what were the main constraints your household faced in marketing?	tick

Codes for marketing constraints*: 1.Poor roads 2.Hight transport costs 3.Low prices 4.Low market demand 5.Limited market information 6.High postharvest losses 7.High local taxes (market dues, loading and off-loading fees 8.Lack of infrastructure Other (specify)*

SECTION C1: HOUSEHOLD GENDER RELATIONS AND ACCESS TO, OWNERSHIPS AND DECISION ON RESOURCES

C1.1: Household decision-making on production and income

Activity	Household member participation in productive activities						Who makes the primary decision for the household members to participate in each activity
	Adult female (>35 yrs)	Adult men (>35 yrs)	Female youth (18 – 35)	Male youth (18 – 35)	Females under 18 years	Males under 18 years	
	C1.1a	C1.1b	C1.1c	C1.1d	C1.1e	C1.1f	C1.1g
Land preparation							
Planting							

Weeding							
Spraying							
Thinning/ gap filling							
Harvesting							
Postharvest management							
Selling/ marketing							

C1.2: Who the primary decisions on use of productive resources within the household?

Activity	**Who makes the primary decision for the household members to participate in each activity**
Allocation of land for agriculture	
Household labor use	
Hiring in labor	
Sell out labor/ hire out	
Income from crop production or livestock	
Income earned by men	
Income earned by women	
Income received by children	

C1.3: Access to productive capital

Activity	Household member participation in productive activities					
	Adult female (>35 yrs)	Adult men (>35 yrs)	Female youth (18 – 35)	Male youth (18 – 35)	Females under 18 years	Males under 18 years
Personally, owns land owned/ cultivated by HH						
Ownership large livestock						
Ownership small livestock						
Ownership of poultry						
Mechanized farm equipment (e.g. tractor-plough)						
Non-mechanized equipment e.g. hoes, ox-plough						
Non-farm business equipment (e.g. solar panels						
Access to production loans						
Loan payment decision-making						

C1.4: Access to extension advisory services

C1.41 In last 12 months, did you receive agriculture-related information and extension advisory services on crop production (groundnuts and groundnuts)?	1.Yes 2.No
C1.42 Please list the sources of agriculture-related information and extension advisory services	1.State/county/Payam extension staff 2.Produce/ marketing agents 3.Farmers association 4. VSF Canada 5. Other INGOs (specify) 6.NGOs (specify) 7.Radio/TV 8. Print media 9.FBO
C1.43 Types of information and extension services do you receive on groundnuts, groundnuts or gum arabica	1.Source/ supply of inputs 2.Crop management advice 3. Postharvest handling 4. Marketing 5.Soil/ environment management 6.Farm planning 7.Other (specify)

C1.44 Are you satisfied with information and extension services provided by different sources	1.Very satisfied 2.Somewhat satisfied 3. Not satisfied
C1.45 If does not access information and extension services or not satisfied with current services, state the reasons	1.Not provided timely 2.Irrelevant information 3.Costly services 4.Target large farmers 5.Media not accessible 6.Other (specify)
C1.46 Have you ever attended a training on production and marketing of groundnuts, groundnuts or gum	1.Yes 2.No
C1.47 If yes, who provided the training?	1.State/county/Payam extension staff 2.Produce/ marketing agents 3.Farmers association 4. VSF Canada 5. Other INGOs (specify) 6.NGOs (specify) 7.Radio/TV 8. Print media 9.FBO

C1.48 What was the focus of the training? State your level of satisfaction with each of the training content delivered

C1.48a Training content	Participation 1.Yes 2.No	Level of satisfaction	If not satisfied with the training, state the reason
1.Soil/seedbed preparation 2.Seed preparation/ coating 2.Row planting and spacing 3.Making manure and mulch 4.Weed control 5.Disease/ pest management 6.Chemical handling/ disposal 7.Harvest and postharvest handling 8. Farming as a business 9.Gender roles 10.Conservation farming			1.Short training duration; 2.Training difficult to understand; 3.Facilitators did not explain well, 4.Training was irrelevant; 5.High cost of attending training 6.others (specify)

C1.49 How have you adopted the skills acquired during the trainings

Training (see codes for C1.48a)	Have you adopted 1.Yes 2.No	Main reason for adopting the skill 1.High yield expectation 2.Easy to practice 3.Improve quality of produce 4. Attracts high prices 5.Reduces drudgery/ labor need 6.Enhances unit at household 7.Diversifying income 8. Improved farm management 9. Improves soil fertility 10.Other (specify)	Main reason for not adopting the skill 1.None, 2.Skills Difficult To Practice, 3.Lack Of Equipment; 4.Lack Of Labour, 5.Lack Of Markets, 6.Inputs Very Expensive, 7.Inputs Not Readily availabe, 8.lack of capital 9.Other (Specify)

C1.410a How you ever been visited by an extension advisory agent in the last 12 months	1.Yes 2.No
C1.410b If yes, how many times has the extension agent visited in the last 12 months	
C1.40c Please describe the content of extension agent's message during the visits	1.Source/ supply of inputs 2.Crop management advice 3. Postharvest handling 4. Marketing 5.Soil/ environment management 6.Farm planning 7.Other (specify)

C1.5 Access to financial services in last 12 months for agricultural production and marketing

C1.51 Did you access Credit/ financial services in the last 12 months				1.Yes 2.No
If no, state the reasons 1.Fear of inability to pay back in time 2.High required 3.Limited access 4.Bureaucracy tendencies 5.Other specify	If yes, mention the source of credit (C1.52) 1.Commercial banks 2.Microfinance/MDIs 3.Cooperative society/farmer organization 4.VSLA 5.ROSCAs 6.Agricultural insurance 7.Friends/ relatives 8. NGOs 9.Other (specify)	C1.53 How much credit (SSP) did you get in last 12 months?	C1.54 What was the main purpose of the credit 1.Buy seeds/ other inputs 2.Buy animal feed 3.Buy pesticides/ herbicides 4.Livestock vaccination 5.Hiring labor 6.Hiring farm equipment 7.Paying marketing costs 8.Other (specify)	C1.55 How much of the credit did you use in production of groundnuts or groundnuts

C1.6 Farmer association/ group membership

C1.61 Does any member of the household belong to a farmer group/ association or cooperative?	
C1.62 If yes, state the type of the association/ group	1.Farmer/ producer group 2. Cooperative 3. Collective marketing group 4.Labor exchange group 5.Farmer Field School 6. Other (specify)
C1.63 What is the main production and marketing activity conducted by the association/ group	1.Crop production 2.Input supply 3.Financial service/ agricultural insurance 4.Collective marketing 5.Postharvest handling/ produce sale 6.Other (specify)

SECTION D Constraints to crop production and marketing

D1.1 What are main constraints/ challenges you face in the production groundnuts or groundnuts	Constraints	Coping mechanism
Codes: 1.Pests/ vermin 2.Diseases 3.Wather vagaries 4. Limited arable land 5.Lack of access to credit 6.Low yields Other specify		
D1.2 What are main constraints/ challenges you face in accessing inputs for production groundnuts or groundnuts? *1.Shortage of inputs 2.Not affordable 3.Limited access to suppliers 4.Poor quality/ adulteration 5.Other (specify)*	Constraints	Coping mechanism
D1.3 What are main constraints/ challenges you face in the marketing groundnuts or groundnuts produce? 1.Unstable prices 2.Low market demand 3.Poor infrastructure 4.Competition for chain actors 5.Exploitation by middlemen 6.	Constraints	Coping mechanism
D1.4 What are main value addition/ postharvest handling constraints/ challenges you face in handling of groundnuts or groundnuts produce	Constraints	Coping mechanism
D1.5 What gender-related constraints/ challenges faced in the production and marketing of groundnuts or groundnuts	Constraints	Suggested solution
D1.6 Are there policy/ state-related constraints to production and marketing of groundnuts or groundnuts	Constraints	Suggested solution
D1.17 State the policy/ state-related constraints faced in the production and marketing of groundnuts or groundnuts	Constraints	Suggested solution

Section E Business networks and interaction

Indicate the actors you have done business/ transacted with in the last 12 months?	How many times did you or your agent transact with the actor in the last 12 months?	Have received repeated contracts from the same actor? 1.Yes 2.No	What services do you offer to the actors	What services do you receive for the actors

1.Middlemen/ commission agents 2.Retailers 3.Transporter 4.Processor 5.Wholesalers 6.Extension workers/ government entity 7.INGO, specify 7.NGO, specify 8.CBO, specify 9.Producer cooperative 10.Institutions 11.Agro-inout dealers 12.Other specify		Types of contracts 1. Marketing Contract (Guaranteed Delivery) 2.Production Contract (Grower Supplied Inputs) 3.Basis Contract (based current and future price difference) 4.Technology Use Agreement 5.Generic Agreement of Purchase and Sale after Harvest	1.Market for products 2.Supply produce 3.Taxes/ fees	1.Buers of produce 2.Advisory services 3.Market linkage 4.Promotions 5.Affordable inputs 6.Collective marketing 7.Other (specify)

General comment on the production and marketing of groundnuts or groundnuts ……

……

……

……

Thanks for your participation!

HOUSEHOLD QUESTIONNAIRE
ENGENDERED VALUE CHAIN ANALYSIS OF MILK PRODUCTION AND MARKETING
Household questionnaire

Confidentiality Clause/ introduction

I am……., here on behalf of VSF Canada, VSF Suisse and HERY implementing the Sustainable Agriculture and Livestock Production Initiative (SALPI) in the former Northern Bahar El Ghazal state in the counties of Aweil East, Aweil West, Aweil Central, Aweil South and Aweil North. Your household has been randomly selected to participate in this interview. The purpose of this interview is to obtain information on **milk production, postharvest handling, processing, marketing and access to institutional services with focus on gender.** The study seeks to analyze and understand farming enterprise and livelihood activities that can improve livelihood opportunities, product expansion, market viability, value addition and input availability in your communities for women, men, girls and boys. Participation in this study is voluntary and there is no risk associated with participation of your household's. Your responses will only be used to generate value chain related information to benefit the people of Northern Bahar el Gazal State and South Sudan at large. The information you share will be kept confidential and will not be shared with anyone in this community or anyone not related to this research.

Could you please spare about 45 minutes for the interview? Consent sought and participation agreed; 1. Yes 2. No. (**If No, terminate the interview and go to the next respondent**).

SECTION A1: IDENTIFICATION DATA

A01 Name of the enumerator			A02 Date of interview		
A03 County		A04 Payam		A05: Boma	
A06 GPS coordinates of household	Easting: ……...		Northings: …….	Altitude: ……..	
A07 Name of respondent			A08 Tel. contact		
A09 Name of household head			A10 Tel. contact		
A11 Gender of respondent	1 = Female Youth (18-30 years) 2= Male Youth (18-30 years) 3= Adult Female 4= Adult Male		A12 Age of respondent		
A13: Is respondent head of household	1= Yes 2 = No	A14: If no, relationship to household head (codes)	1.Spouse 2.Son 3.Daughter 4.Parent 5.Sibling 6.Farm worker 7.Other (specify)		
A15: Educational level Respondent (codes)			A16 Education level - Household head (codes)		
Codes: 1.None 2.Attended, never completed primary level 3.Completed primary 4. Attended, never completed secondary level 5.Completed secondary level 6.Attended, never completed tertiary level 7.Completed tertiary level 8. Attended, never completed university 9.Completed university 10.Other, specify					
A17: Years of education - Respondent:			A18 Years of education - Household head		
A19: Marital status (codes)	1.Married (Monogamous) 2.Married (Polygamous) 3.Divorced/Separated 4.Widowed 4.Single				
A20: Disability status	1.Yes 2.No	Type of disability	1.Physical 2. Mental 3. Deaf and Dumb		
A21: Occupation other than farming	0.None 2.Salaried employment 3.Self-employed on-farm 4.Self-employed off-farm 5.Casual labor on-farm 6.Casual labor off-farm 7.Household chores 8.Handcraft, 9.Brewing 10.Produce trade 11.Bee keeping 12.Student/Pupil 13.Other (specify)				
A2.2 Livelihood options	1.Diary farming 2. Other livestock/beef rearing 3.Crop farming 4.Non-farm income generating activities				

SECTION A2: FARM HOUSEHOLD CHARACTERISTICS

A22: Household size indicating details by gender	A22 Total:	A23 No. of females:	A24 No. of males
A25: How of the household members are actively in agricultural production and marketing?			
A26: Household composition by age			

A27a: Age category	**A27a: Males**	**A27a: Females**
Number of members between 0 and 5 years		
Number of members between 6 and 17 years old (Not in school)		
Number of household members between 6 and 17years in school		
Number of household members of between 18 and 30 years		
Number of household members of between 31 and 64 years		
Number of household members of 65 years and above		
Number of household member living outside (e.g. migration for school, work)		

SECTION B LAND OWNERSHIP

Land type	**Feddans or Sqm**	**Land acquisition method**	**If rented, how much do you pay per year**	**Land tenure system**
Arable land				
Pasture land				
Forest land				
Fallow land				
Other				

Codes for land acquisition method: 1.Inherited 2.Given by clan 3.Given by government 4.Rented land 5. Borrowed (free) 6.Purchased

Codes for land tenure system: 1.Customary 2.Freehold 3.Leased 4.Public

SECTION C1 LIVESTOCK PRODUCTION AND MARKETING

C1.1 During the last 2 years, has any member of your household raised large livestock (cattle)?	1.Yes 2.No
C1.2 If yes, how long have you been rearing large livestock (cattle)?	
C1.3 What is the main purpose of rearing cattle? 1.Milk production (diary) 2.Beef 3.Dual purpose 4.Draught/ traction 5.Prestige	
C1.4 Where do you keep the livestock?	1.Open ground 2.Kraal 3.Communial Kraal 4.Other (specify)

SECTION C2 Number of cattle kept

Category of cattle	Breed of cattle (Number)			**Source**
	Local	**Cross**	**Pure**	
Cows				
Bulls				
Heifers				
Calves				

Codes for source of livestock: 1.Own stock/ inherited 2.Market 3.Donation from NGO 4. Friend/Neighbor/ relative; 6. Other (specify)

SECTION: COSTS OF FEEDING, TREATMENT AND OTHER MANAGEMENT PRACTICES

Item	**Who does it?**	**Quantity/month**	**Unit cost/month**	**Total cost**
Water fetching				
Cattle herding/feeding				
Branding				
Milking				

Groundnut residue				
Milk container				
Transporting milk				
Kraal maintenance				

SECTION: MILK PRODUCTION AND MARKETING

Do you sell milk? 1. Yes, 2.No

If no, why?

1. Little milk obtained that is all consumed at home
2. Cattle kept for beef only
3. Other (Specify) ……..
4. If yes, how much milk from your cows do you sell per day?

Breed	**Number lactating**	**Milk yield (liters/day)**			**average yield/day**
		At calving	*During peak period*	*Towards the end*	
Local					
Cross					

Code for person responsible: 1.Husband 2.Wife 3.Male worker 4.Female worker 5.Both male and female workers 6.Male children 7.Female worker

Who were the buyers of your milk?

Milk buyer	**Quantity sold (Liters)**		**Price (SSP)**
	Peak period	Low period	
Local trader/consumer			
Trader through broker (Middlemen)			
Urban trader			

Do you sell other livestock products other than milk? 1. Yes, 2.No

If yes, what other livestock products do you mainly sell?

Other livestock product sold	**Quantity/month**	**Price/unit**	**Amount**
Live cattle			
Meat			
Hides and skins			

SECTION E: ACCESS TO AGRICULTURAL EXTENSION

E1: Did you have access to any extension worker on gum livestock and milk production in the past one year? 1.Yes 2.No

E2: If yes, from which organization did the extension worker come?

1. State/County extension staff
2. Traders
3. Other livestock farmers
4. Farmers' groups or associations
5. NGO staff
6. Other (Specify) ----------

E3: What did the extension worker provide advice on?

1. Livestock feeds and feeding
2. Livestock diseases and treatment
3. Milking and milk quality
4. Branding
5. Livestock breeding
6. Livestock marketing (Prices)
7. Other (Specify) ----------

E4: Have you received any information on livestock production and marketing in the past one year? 1.Yes 2.No

E5: If yes, what were your sources information on gum arabic production and marketing?

1. State/County extension staff
2. Traders
3. Other Gum Arabic producers
4. Farmers' groups or associations
5. NGO staff
6. Radio
7. Other (Specify) ----------

E6: What types of information do you generally receive?

1. Tapping
2. Gum collection
3. Gum cleaning
4. Gum packaging and storage
5. Gum transportation
6. Gum marketing (Prices)
7. Credit sources
8. Environmental management
9. Other (Specify) ----------

SECTION D: ACCESS TO CREDIT SERVICES

D1: In the last 12 months (December 2018-November 2019), DID you access any credit? 1.Yes 2.No

D2: If yes, fill the following table:

Credit source	Did you access credit from any of these sources **1 = Yes** **2 = No**	If **yes**, how much (SSP) did you get in the last 6 months from the source?	What was the **main purpose** of the credit 1=Buy new stock, 2= Buy feed 3=Vaccination 4=pay school fees 5=build a house, 6= Buying food 7=Buy vegetable seeds 8=Buy chemicals 9= Other, specify	How much of this credit did you use gum arabic production and marketing (SSP)?
	(a)	(b)	(c)	(d)
D21 Commercial bank				
D22 Microfinance				
D23 NGOs				
D24 ROSCAS (*Rotating Savings & Credit Association)*				
D25 VSLA *(Village Savings & lending Association)*				

D26 Friends & relatives				
D27 Agricultural Insurance				
D28 Other sources (Specify)				

SECTION E: PARTICIPATION IN PRODUCER GROUPS AND ASSOCIATIONS

E1: Are you a member of a producer groups/ association/cooperative/ or organizations? 1.Yes 2.No
E2: If yes, fill the table below:

E2: Participation in producer groups and organizations (Tell us about each of the organizations that you belong to)

Organization	A(a) Do you belong to this group/ Association? 1.Yes 2.No	(b) How long have you been a member (years)?	(c) Do you sell Gum arabic through this group/ Association? ***1.Yes 2. No***
Producers' association			
Primary Cooperative			
Cooperative Union			
Money lender group			
Rotating Savings & Credit Association)			
VSLA *(Village Savings & lending Association)*			

SECTION F: MAJOR CONSTRAINTS FACED IN LIVESTOCK MARKETING AND PRODUCTION

F1: What are the main constraints you face in livestock production and marketing?

1. Livestock diseases
2. Low quality of feeds
3. Low milk prices
4. Drought
5. Poor breed of livestock
6. Low milk demand
7. Lack of market information
8. Lack of financial credit
9. Lack of drinking water
10. Lack of producers' organization
11. Lack of transport
12. Other (Specify) ----------

Thank you for your time and cooperation

ENGENDERED VALUE CHAIN ASSESSMENT FOR GUM ARABIC IN FORMER NORTHERN BAHAR EL GHAZAL STATE, SOUTH SUDAN

QUESTIONNAIRE FOR GUM ARABIC PRODUCERS

Confidentiality clause:

"My name is [Enumerator Name]. I am, here on behalf of VSF Germany, that is implementing the Sustainable Agriculture and Livestock Production Initiative (SALPI) in the former Northern Bahar El Ghazal state in the counties of Aweil East, Aweil West, Aweil Central, Aweil South and Aweil North. Your household has been randomly selected to participate in this interview. The purpose of this interview is to obtain information on **GUM ARABIC production, postharvest handling, processing, marketing and access to institutional services with focus on gender.** The study seeks to analyse and understand farming enterprise and livelihood activities that can improve livelihood opportunities, product expansion, market viability, value addition and input availability in your communities for women, men, girls and boys. Participation in this study is voluntary and there is no risk associated with participation of your household. Your responses will only be used to generate value chain related information to benefit the people of Northern Bahar el Gazal State in particular and South Sudan at large. The information you share will be kept confidential and will not be shared with anyone in this community or anyone not related to this research."

Could you please spare about 45 minutes for the interview? Consent sought and participation agreed; 1. Yes 2. No. (**If No, terminate the interview and go to the next respondent**).

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A07 Name of respondent			A08 Tel. contact		
A09 Name of household head			A10 Tel. contact		
A11 Gender of respondent	1 = Female Youth (18-30 years) 2= Male Youth (18-30 years) 3= Adult Female 4= Adult Male		A12 Age of respondent		
A13: Is respondent head of household	1= Yes 2 = No	A14: If no, relationship to household head (codes)	1.Spouse 2.Son 3.Daughter 4.Parent 5.Sibling 6.Farm worker 7.Other (specify)		
A15: Educational level Respondent (codes)			A16 Education level - Household head (codes)		
Codes: 1.None 2.Attended, never completed primary level 3.Completed primary 4. Attended, never completed secondary level 5.Completed secondary level 6.Attended, never completed tertiary level 7.Completed tertiary level 8. Attended, never completed university 9.Completed university 10.Other, specify					
A17: Years of education - Respondent:			A18 Years of education - Household head		
A19: Marital status (codes)	1.Married (Monogamous) 2.Married (Polygamous) 3.Divorced/Separated 4.Widowed 4.Single				
A20: Disability status	1.Yes 2.No	Type of disability	1. Physical 2. Mental 3. Deaf and Dumb		
A21: Occupation	0.None 2.Salaried employment 3.Self-employed on-farm 4.Self-employed off-farm				

other than farming	5.Casual labor on-farm 6.Casual labor off-farm 7.Household chores 8.Handcraft, 9.Brewing 10.Produce trade 11.Bee keeping 12.Student/Pupil 13.Other (specify)

SECTION A2: FARM HOUSEHOLD CHARACTERISTICS

A22: Household size indicating details by gender	A22 Total:	A23 No. of females:	A24 No. of males
A25: How many of the household members are actively in agricultural production and marketing?			
A23: Do you have access to land?			1.Yes 2.No
A24: How many feddans of land do you have access to?			……Square meter
A25: State the type of land tenure ownership?			*1=Customary, 2=Squatter, 3=free hold, 4=Rented, 5=Lease hold, 6=Public land*
A26: How much of this land is under crop production in 2018?			…….Feddans
A27: Do you keep livestock?			1.Yes 2.No
If yes, A27: How cattle do you keep? A28: How many goats do you keep? A29: Hoe many sheep do you keep?			 …… cattle …… goats ……...sheep

SECTION B: ACTIVITIES AND COSTS IN GUM ARABIC PRODUCTION AND MARKETING

B0: What were the main costs associated with production and marketing of gum arabic in 2018-19 season?

Main activity	**(a) Quantity/season**	**(b) Unit cost**	**(c) Total cost**
B1 FOOD COSTS			
B11 Posho			
B12 Fish			
B13 Vegetables (assorted)			
B14 Meat			
B15 Groundnuts			
B15 Cooking oil			
B16 Sweet potatoes			
B17 Other foods (Specify) ……			
B2 LABOR COSTS			
B18 Tree tapping			
B19 Gum collection			
B20 Gum drying, cleaning and sorting			
B21 Gum packaging			
B22 Gum transportation			
B23 Others (Specify) ……..			

B23 COST FOR TAPPING TOOLS			
B231 Ax			
B232 Others (Specify) ……			
B24 MEDICATION			
B241 Malaria treatment cost			
B242 Typhoid treatment cost			
B243 Diarrhoea treat cost			
B244 others (Specify) ……			
B25 FEES/TAXES PAID			
B251 State tax			
B252 Others (Specify) ……			

SECTION C: GUM ARABIC HARVESTS AND SALES

B1 How much were Gum Arabic harvests and sales in seasons 2018-19 and 2019-20 (Current)?

Year	**Quantity (Gunter)**	**Quantity (kgs)**	**Quantity (Gunter)**	**Quantity (kgs)**
B11 2018-19				
B12 2019-20				

B2 Who were the buyers of Gum Arabic and at what prices in seasons 2018-19 and 2019-20?

Gum Arabic buyer	**2018-19**		**2019-20**	
	Quantity sold (Kg)	Price (SSP/Kg)	Quantity sold (Kg)	Price (SSP/Kg)
B21 Local trader				
B22 Urban trader				
B23 Trader through brokers				
B24 Exporters				

SECTION D: HOUSEHOLD GENDER ROLES IN GUM ARABIC PRODUCTION AND MARKETING

D1: Could you tell me which household member does what activity in gum arabic production and marketing?

Activity	Do household members participate in the following activities at home during Arabic gum production and marketing? Use code: **1=Yes; 0=No**			
	Men	Women	Boys	Girls
	a	**b**	**c**	**d**
D11 Tree tapping				
D12 Gum collection				
D13 Gum drying, cleaning and sorting				

D14 Buying food during gum arabic production				
D15 Fetching water during gum arabic production				
D16 Packaging gum				
D17 Transporting gum				
D18 Selling gum				
D19 Decision on using money from gum arabic				

SECTION E: ACCESS TO AGRICULTURAL EXTENSION

E1: Did you have access to any extension worker on gum arabic production and marketing in the past one year? 1.Yes 2.No

E2: If yes, from which organization did the extension worker come?

7. State/County extension staff
8. Traders
9. Other Gum Arabic producers
10. Farmers' groups or associations
11. NGO staff
12. Other (Specify) ----------

E3: What did the extension worker provide advice on?

8. Tapping
9. Gum collection
10. Gum cleaning
11. Gum packaging and storage
12. Gum transportation
13. Gum marketing (Prices)
14. Other (Specify) ----------

E4: Have you received any information on gum arabic production and marketing in the past one year? 1.Yes 2.No

E5: If yes, what were your sources information on gum arabic production and marketing?

8. State/County extension staff
9. Traders
10. Other Gum Arabic producers
11. Farmers' groups or associations
12. NGO staff
13. Radio
14. Other (Specify) ----------

E6: What types of information do you generally receive?

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11. Gum collection
12. Gum cleaning
13. Gum packaging and storage
14. Gum transportation
15. Gum marketing (Prices)
16. Credit sources
17. Environmental management
18. Other (Specify) ----------

SECTION D: ACCESS TO CREDIT SERVICES

D1: In the last 12 months (December 2018-November 2019), DID you access any credit? 1.Yes 2.No
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Credit source	Did you access credit from any of these sources **1 = Yes 2 = No**	If **yes**, how much (SSP) did you get in the last 6 months from the source?	What was the **main purpose** of the credit 1=Buy new stock, 2= Buy feed 3=Vaccination 4=pay school fees 5=build a house, 6= Buying food 7=Buy vegetable seeds 8=Buy chemicals 9= Other__specify	How much of this credit did you use gum arabic production and marketing (SSP)?
	(a)	(b)	(c)	(d)
D21 Commercial bank				
D22 Microfinance				
D23 NGOs				
D24 ROSCAS (*Rotating Savings & Credit Association)*				
D25 VSLA *(Village Savings & lending Association)*				
D26 Friends & relatives				
D27 Agricultural Insurance				
D28 Other sources (Specify)				

SECTION E: PARTICIPATION IN PRODUCER GROUPS AND ASSOCIATIONS

E1: Are you a member of a producer groups/ association/cooperative/ or organizations? 1.Yes 2.No
E2: If yes, fill the table below:

E2: Participation in producer groups and organizations (Tell us about each of the organizations that you belong to)

Organization	A(a) Do you belong to this group/ Association? 1.Yes 2.No	(b) How long have you been a member (years)?	(c) Do you sell Gum arabic through this group/ Association? ***1.Yes 2. No***
Producers' association			
Primary Cooperative			
Cooperative Union			
Money lender group			
Rotating Savings &			

Credit Association)			
VSLA *(Village Savings & lending Association)*			

SECTION F: MAJOR CONSTRAINTS FACED IN VEGETABLE FARMING

F1: What are the main constraints you face in Gum arabic production and marketing?

13. Low gum prices
14. Lack of training on tree tapping, drying, cleaning and sorting
15. Lack of market information
16. Lack of financial credit
17. Low regenerative capacity of gum tree
18. Lack of drinking water
19. Lack of producers' organization
20. Poor tree resource management
21. Other (Specify) ----------

Thank you for your time and cooperation