

# FOOD SECURITY THROUGH AGRIBUSINESS IN SOUTH SUDAN PROJECT (SSADP II)



## AGRICULTURAL VALUE CHAIN ANALYSIS REPORT



Report By:  
Teshale Endalamaw  
Godfrey Omondi  
Lokule Yengi



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## **Disclaimer**

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## **Executive Summary**

Food Security Through Agribusiness in South Sudan Project (SSADP II) is a five-year project that runs from late 2018 to July 2023 designed and funded by the Embassy of the Kingdom of the Netherlands (EKN) in South Sudan. The overall goal of the project is to improve food security, income and employment of 10,000 farmer households in Yambio, Torit and Bor Counties. The project is implemented by a consortium of NGOs including Cordaid, SPARK and Agriterra. Cordaid is the lead agency. We work closely with the concerned ministries of the Government of South Sudan and key stakeholders including local and international NGOs, UN Agencies, and private sector. Through Making Market's Work for the Poor (M4P) approach, the project largely supports the strengthening of market functions and market players to make the local markets more inclusive and more enabling for agribusiness. Moreover, the project strives to increase farmers and agribusiness (Micro Small and Medium Enterprises (MSMEs), Cooperative, Village Saving and Loan Associations (VSLA), youth and women entrepreneurs access to organization, technology, markets and finance. M4P utilizes the following in combination with complementary and mutually reinforcing principles, approaches, methods, and tools: Conflict Sensitivity and Do no Harm approach; Value Chain Development (VCD); Cooperative Development (CD); Community Managed Disaster Risk Reduction (CMDRR); Farmer Economy and Market Association (FEMA); Village Economy, Market and Social Association (VEMSA); Resilient Business Development Services (RBDS); and Action Research (AR).

The main sub-sectors in the three counties are sorghum, maize and groundnuts. Cassava is also a staple food in both Yambio and Torit counties. Vegetables and fruits are also grown in the counties but at a lower scale. The main fruits in the three counties are mangoes, bananas and pawpaw's. Pineapple is mainly planted in Yambio county while lemons and guavas are planted in Bor county. The main vegetables grown in the counties are okra with onions, Kundra, tomatoes and cabbages being planted in Bor. Farming is mainly rainfed and the counties of Yambio and Torit enjoy bi-modal rainfall patterns, while Bor has only uni-modal long rainfall seasons. However, the counties have unleashed potential and opportunities on other sub-sectors that can help the households to diversify their livelihood options in general and contribute for the project to achieve the intended goal.

This value chain analysis sought to generate adequate baseline information (quantitative and qualitative) for selected sub-sectors focused on pre-production, production and post-harvest handling, processing and input/output markets including actors involved each value chain (main actors, enablers and supporters). The survey was fully-fledged and conducted by the project team. A sub-sector analysis was done by the field team and 10 commodities (maize, sorghum, groundnut, cassava, okra, poultry, honey, pineapple, fish and goat) were selected for detail value chain analysis. Probability and non-probability sampling techniques were employed to draw sample value chain actors from each county, which included input suppliers, farmers, product

traders, processor, transporter, and other supporters. A farmer's survey was conducted following multi-stage stratified sampling technique. Sampling was done according to the population (using the estimates of population statistics for the respective counties provided by GoSS).

### **Key findings of the VCA for main crops (maize, sorghum and ground nuts)**

- In Bor County, groundnut was found to be the most popular and important agricultural commodity (cash-earner) produced by most farmers (67%) followed by sorghum and maize crops which are produced by 62% and 53% of the farmers, respectively.
- In Torit County, sorghum was found to be the most important agricultural commodity produced by 97% of the farmers followed by maize (63%), groundnut (53%), local chicken (31%) and local goats (31%).
- In Yambio County, maize was found to be the most important agricultural commodity with 100% of the farmers interviewed stating that they grow maize, 93% grow groundnut, 70% produce cassava.
- Lack of agricultural inputs (especially seeds and farm tools), unpredictable rainfall pattern, lack knowledge on Good Agricultural Practices (GAP), pests and diseases infestation, low price of agricultural commodities, insecurity and access to finance, lack of market for farm produce, high transport cost and high post-harvest loss were found to be the major bottle necks to that prevent enhanced agricultural production.
- Further, the value chain analysis showed that between 2017 to 2019 area under maize, sorghum and groundnuts production per farmer increased by 64%, 35% and 49%, respectively.
- In all the three project locations (Bor, Torit and Yambio), yield of maize, sorghum and groundnuts per feddan was found to be increasing steadily over the three years period (i.e. 2017 – 2019).
- Analysis of the average cost of production of maize, sorghum and groundnuts per farmer shows a gradual increase in cost. This can be attributed to the increase in feddans under production that is accompanied by corresponding increase in cost of production.
- 70%, 78% and 46 % of the maize, sorghum and groundnuts produced in the three counties is consumed at the household level, respectively
- 98%, 100% and 100% of the farmers interviewed in Bor, Torit and Yambio respectively are currently engaged in crop production; 36%, 81% and 42% of farmers in Bor, Torit and Yambio respectively are involved in basic value addition activities at the farm gate

level; 56%, 50 % and 37% of farmers in Bor, Torit and Yambio respectively involved in marketing.

- 79% of farmers in Bor, 69% in Torit and 41% in Yambio consider themselves engaged in agribusiness (farming as a business). However only 13%, 4% and 10% of the farmers produce maize, sorghum and groundnuts respectively only for marketing. Whereas 96%, 97% and 94% farmers in Bor, Torit and Yambio respectively has access to market price information, low commodity price, poor road network, low production and insecurity respectively are the main marketing challenges encountered by the farmers.
- The main commodities being processed in the counties include grain (maize and sorghum) and cassava; these are milled into flour (60%), fruit processed into Juice (30%) and groundnut into groundnut paste (10%).
- Across the counties, 96% of the business people are retailers while 8% are wholesalers. 4% of the respondents function both as producers and traders. 89% of the traders have agribusiness skills and 77% have value addition experience such as sorting, bulking and grading.
- The transport fee is dependent on the distance covered and weight of the commodities being transported. The main transport problem experienced by transporters in the counties include loss due to poor road infrastructure (tare and ware), theft and high operational costs. Other problems incurred include illegal payment on roads and product damage while in transit.
- Among the farming households, husbands own most of the high value assets compared to wives; however, they make joint decision on type of crops to be produced, on mode of agricultural practices to be employed and on marketing and income utilization.
- Most production functions are handled by the husbands while most of the value addition activities are undertaken by wives; the husbands has more social role which are outside homestead whereas most of the inside activities are done by the wives.

### **Summary of the recommendation for main crops (maize, sorghum and ground nuts)**

Analysed data indicates that sorghum, maize, groundnut and cassava are priority value chains with great growth potential in terms of production, value addition, employment, income and marketing. Others important sub-sectors are local poultry and tomato. Based on the value chain analysis, we recommend the following value chain upgrading strategy in order to formalize the sub-sectors and turn them into profitable economic ventures:

## Process/Product Upgrading

The use of better agricultural production technology coupled with effective on-farm technology transfer mechanism is advocated to increase yield of the identified value chains.

Such technologies include:

- Facilitate access to high quality planting materials. Possible agricultural intervention should include either initiating (in collaboration respective line ministries -GoSS and seed companies) community-based seed production and/ or promotion availability of high quality seeds via the emerging agro-dealer traders in the respective counties. The agro-dealers would need to be trained on the importance of proper handling and storage of seeds.
- Facilitate availability of affordable lines of credit to farmers and farmer-based Micro, Small and Medium Enterprises (MSME). Towards this end, we recommend that credits to be provided to the farmers and other value chain players at affordable interest rate to stimulate agricultural development and growth. Where possible, we discourage blanket issuance of free agricultural inputs that negate the development of sustainable MSME agri-businesses in the project locations. Right from the start farmers need to be trained on farming as a business.

## Functional Upgrading

We recommend establishment of bulking and primary-level processing at farmer-level to reduce post-harvest and other transaction losses. We also encourage joint marketing of agricultural produce to reduce transportation and other transactions. In addition, we would strive to encourage other development organizations to support rehabilitation of road infrastructure and constructing road where non exist to open the market centers.

## Upgrading of Coordination and Business Models

We recommend provision of timely and relevant market information through community-based extension agents and other value chain actors in the respective sub-sectors. Further, the capacity of value chain actors (especially the farmers) should be built on how to monitor their performance. The use of Market Information System (M.I.S) platforms and radio programs to relay information on crucial agricultural production and season, harvesting and post-harvesting should also be emphasized.

Additionally, there is a need to foster trust and long-term relationships among value chain stakeholders through quarterly Multi-Stakeholder Platforms (MSP) where critical issues such as project implementation, crop production and market price are discussed in details, and challenges facing farmers are identified and sorted out, and opportunities are tapped in to by the respective value chain players.

## Improving Business Enabling Environment

There is a need to support the GoSS Ministry of Agriculture, agricultural research institutions and plant health inspectorate department to develop Agricultural Input Policy (AIP);

There is a need to support the strengthening of the GoSS weight and measures departments to champion introduction of standard units of measurements. Standardize units of measurements (including use of ISO measurement standards such as “Kg” instead of “Malwa”, buckets, cups and basins) and to enhance clarify in calculation of taxes, market licenses and fees.

# Chapter One

## Introduction

### 1. Project and Value Chain Assessment Background

Even though 85 percent of South Sudanese are engaged in agriculture, the vast majority only grow enough food for their subsistence. Hence, the year-round availability of food on local markets is limited and not very diverse. Much of the food in urban markets is imported, resulting in high food prices. The increase in agricultural production and productivity is hampered by lack of quality seeds, fertilizers, pesticides, equipment, storage facilities and capital and limited knowledge about improved farming techniques, water harvesting and irrigation methods and how to reduce post-harvest losses. No matter how the above picture is outright bleak, agribusiness development can still have great impact in the South Sudan context, not in the least because of the ample availability of fertile land. Disperse findings suggest that the recovery of local agricultural and food markets could help vulnerable individuals and HHs overcome the adverse legacies of armed conflict by encouraging affected people to move beyond subsistence agriculture, re-join exchange markets and perhaps reduce the appeal of illegal activities.<sup>1</sup>

Therefore, the Food Security Through Agribusiness in South Sudan Project (SSADP II) is a five-year project that runs from late 2018 to July 2023 designed and funded by the Embassy of the Kingdom of the Netherlands (EKN) in South Sudan. The overall goal of the project is to improve food security, income and employment of 10,000 farmer households in selected counties namely Yambio, Torit and Bor. The project is implemented by a consortium of NGOs including Cordaid, SPARK and Agriterro. Cordaid is the lead agency. We work closely with the concerned ministries of the Government of South Sudan and key stakeholders including local and international NGOs, UN Agencies, and private sector. Through Making Market's Work for the Poor (M4P) approach, the project largely supports the strengthening of market functions and market players to make the local markets more inclusive and more enabling for agribusiness. Moreover, the project strives to increase farmers and agribusiness (Micro Small and Medium Enterprises (MSMEs), Cooperative, Village Saving and Loan Associations (VSLA), youth and women entrepreneurs) access to organization, technology, markets and finance. M4P utilizes the following in combination with complementary and mutually reinforcing principles, approaches, methods, and tools: Conflict Sensitivity and Do no Harm approach; Value Chain Development (VCD); Cooperative Development (CD); Community Managed Disaster Risk Reduction (CMDRR); Farmer Economy and Market Association (FEMA); Village Economy, Market and Social Association (VEMSA); Resilient Business Development Services (RBDS); and Action Research (AR).

#### **A. Agricultural Production and Determining Factors in project target Counties**

In Bor, Torit and Yambio counties Agricultural development is still seen as the engine that spur economic growth and reduce poverty and food insecurity. Nearly 90 percent of the population in

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<sup>1</sup> P. 15 FOOD SECURITY, PEACEBUILDING AND GENDER EQUALITY: CONCEPTUAL FRAMEWORK AND FUTURE DIRECTIONS. PATRICIA JUSTINO , HICN WORKING PAPER 257, SEPTEMBER 2017



these counties depends on agriculture, livestock or forestry for their livelihood. Yet incidence of poverty in these areas are high while large tracts of fertile land remain un-ploughed. Weak regulatory framework and lack of economic infrastructure impedes development and diversification of agricultural productivity and production. Lack of access to financing especially among the farmers precludes entrepreneurial growth in agriculture. Progress towards economic development has been very uneven in these counties.

Agriculture is the main economic activity in Bor, Torit and Yambio counties. Other important alternative economic activities include charcoal making, firewood and petty (small-scale) trading. Further, given the fact that South Sudan has faced periods of conflicts, several households are without sustainable income sources. The SSADP-II baseline report alludes that 14% of the households in Bor County, 10% of the households in Yambio County and 7% of the households in Torit County do not have income sources (SSADP-II Baseline, 2018). As at the end of 2018, the average household income in Bor County stood at SSP24,656 (\$107.2). In Torit County, the average HH income stood at SSP17,504 (\$76.1) and Yambio at SSP 11,560 (\$50.26), same period (SSADP-II Baseline, 2018). On average in the three Counties, household income for female headed households is significantly lower than that of male headed households. Male Headed HH earned an average of SSP 22, 078 (\$95.99) while female headed HH earned SSP 7,959 (\$34.60) (SSAP-II Baseline, 2018).

Agricultural practices in the three counties is highly influenced by the level of household income and food security. Land is communally owned; total size of land cultivated per household on average is 1.4 Feddans (0.588 ha) which is very small, and in turn results to lower production levels. Only HHs in Torit cultivated a marginally bigger piece of land at 1.5 Feddans (0.63 ha) compared to 1.4 Feddans (0.588 ha) in the other two counties (SSADP-II Baseline, 2018). Lack of capital among farmers is the main impediment to land expansion in the three counties. The high cost of hiring tractors hinders uptake of agricultural mechanization services. In Yambio county, for instance, the heavy forest cover limits use of ordinary tractors: clearing of this forest require use of heavy agricultural machinery. In Torit county, farming is mainly done by hand, and in Bor county, there is intermittent use of ox-drawn ploughs (SSADP-II Baseline, 2018).

The main sub-sectors in the three counties are sorghum, maize and groundnuts. Cassava is also a staple food in both Yambio and Torit counties. Vegetables and fruits are also grown in the counties but at a lower scale. The main fruits in the three counties are mangoes, bananas and pawpaw's. Pineapple is mainly planted in Yambio county while lemons and guavas are planted in Bor county. The main vegetables grown in the counties are okra with onions, Kundra, tomatoes and cabbages being planted in Bor. Farming is mainly rainfed and the counties of Yambio and Torit enjoy bi-modal rainfall patterns, while Bor has only uni-modal long rainfall season. The rainfall season in Bor occurred from May to mid-November while the two seasons for Yambio occurred from March to June for the first season and from August to November for the second season. In Torit, the rainfall season are from May to June and from July to December. The three counties have seen recent rains coming late in some areas (SSADP-II Baseline, 2018).

Seeds and farm implements distribution by most agricultural NGOs creates a culture of over-dependence on free inputs and ruins agricultural input businesses. Private sector agro-dealer input outlets are present in the three counties; however, they are quite few and mostly retailing

vegetable seeds and agro-chemicals procured mainly from Uganda. The quality of these products in most cases cannot be verified. South Sudan does not have Agricultural Input Inspectorate Department (AIID) nor an Agro-Pesticide Control Board (APCB). This state of affair means that agricultural inputs entering the country via the porous borders are not certified due to capacity challenges in the respective line ministries. However, progress has been made in recent times to develop seed industry in the country. Currently the GoSS in collaboration with development actors are working on a seed policy strategy document. The consortium is headed by FAO and other NGOs (including Cordaid). In the consortium Cordaid was selected to be in the “Building Resilience of Seed System Team” together with World Vision. Areas identified as critical components of the strategy document include development of seed and grain market information system, development of early-warning systems on drought, improved seed and grain storage technologies, seed bulking and promotion of PP-partnership.

Crop productivity and production in the three counties is quite low and cannot sustain households during off-season. Overall, on average, households produced an average of 2,035 Kgs of sorghum from 0.588 Ha of land cultivated and 390kg of maize from 0.504 Ha land cultivated per season. On average, the seasonal production of groundnuts stands at 1,175 Kg and cassava 1,250 Kg (SSADP-II Baseline, 2018). Outdated post-harvesting technologies are mostly used: for example, in most household’s, maize is shelled using hands which is deemed tedious and time-consuming. Drying of both maize and sorghum is mainly done on the ground exposed to wind and dust. This impacts negatively on the quality of the grain available to the household for consumption or reaching the market. Traditional jute bags are used to store the produce but are prone to attack by storage pests. Storage facilities are mainly traditional granaries constructed using poles (and earthen in cases) hoisted a few meters above the ground and grass thatched. Produce stored in these facilities are usually attacked by pests such as rats and weevils. On average, a farming household lose 155 kg of sorghum, 30 Kg of maize, 0.4 20 Kg of cassava and 30 Kg of groundnuts per season (SSADP-II Baseline, 2018) (SSADP-II Baseline, 2018).

## **B. Cross-Border Agricultural Commodity Trading Patterns**

Given the low productivity level in the agricultural sector in South Sudan, a lot of agricultural commodities cross the border into the country from Uganda to meet the high demand for these products. The current trading pattern between Uganda and South Sudan is highly skewed in favour of Uganda; the rapid growth in trans-boundary trade comes solely from a skyrocketing increase in Uganda’s agricultural export to South Sudan. The trading pattern is also largely informal, disorganized and lacking in governance system. The high demand for agricultural commodities in South Sudan together with lack of local production capacity has led to a sharp increase in cross-border trade from Uganda to South Sudan. The leading exports, both formal and informal, from Uganda to South Sudan include food and other consumer non-durables; namely, maize flour, maize grain, wheat flour, cassava chips, cassava flour, rice and sugar. Most of the agricultural products pass through Nimule border posts, a principal post along Uganda-South Sudan border. The flow of agricultural commodities to South Sudan from Uganda is part of a large volume of informal cross-border trade coming from neighbouring countries, which though not captured by official statistics is well recognized for its scale and implication on agribusiness development in the country.

### **C. Agricultural Commodity Market**

Each of the counties (Bor, Torit and Yambio) has a main market centre and smaller markets within the payams. The main markets are segmented into stalls for selling grains, vegetable, meat, fish, live local chicken, clothes and other attires, and the retail and wholesale business for selling domestic consumables (sugar, tea leaves, salts, water, wheat flour, cooking oil and soft drinks, etc.. This form of organisation in the market make is easier to locate sellers in the market as seller are in designated areas within the main markets. The main market centres have artisanal grain millers offering milling services, tailors and sellers of apparels and clothes, metalwork and welding operators, and sellers of fuel (located outside the markets).

The main market for cereals is WFP and the local wholesale and retail markets. In Yambio County, the physical markets are Yambio market, Nabiapai and Masia market and are highly characterized by concrete buildings and numerous wooden stalls. The main market in Bor County is the Merol market, while in Torit County, the main markets is Torit and Melekia markets (SSADP-II Baseline, 2018). The main institutional stakeholders in the agricultural sector are the government through ministries and the RRC, WFP, FAO and NGOs. The government provide limited extension services, the RRC is the coordinating body for NGOs and other humanitarian organizations, and WFP provides sustainable market for grain while FAO is active in the provision of inputs (seeds and farm implement) and early warning information.

### **D. Service Markets**

The devaluation of the South Sudanese Pound (SSP) in 2015 severely affected traders in the Bor, Torit and Yambio counties. The devaluation of the SSP increased the cost of doing business significantly. Currently, businesspeople spend a lot of money when sourcing goods. Fuel cost has also increased significantly. Consequently, this has led to an increase in transportation cost. The impact of the devaluation of the SSP is still being felt severely in the markets in the three counties.

Most market are currently operating below capacity and this is a consequence of the economic downturn due to devaluation of the SSP and the direct effect of the conflict in the country. Most traders cope with devaluation of the SSP by having credit arrangement with their suppliers. Others resort to borrowing from the informal financial market as the formal banking institutions offer credit at high interest rate. Where these informal mechanism for financial access exist, the loans are usually offered at exorbitant interest rate. Most of the producers therefore borrow from relatives and friends. Repayment terms depends on negotiation at the time of borrowing.

### **E. Business Development Services**

There are a few formal financial institutions that can offer financial services to the SME and the agricultural sectors. Informal moneylenders exist although they offer this service at high interest rate. Most SME owners and individuals, therefore, resort to borrowing money from friends and relatives. In the agricultural sector, the agricultural input business is still an infancy stage. Subsequently, most inputs (e.g. seeds, agro-pesticides and farm implements) are being offered by the NGOs operating in economic/ agricultural development projects.

## **2. Definition of Terms Used in the Report**

**VALUE CHAIN:** A value chain describes the full range of activities that are required to bring a product or service from conception, through the intermediary phases of production and delivery to final consumers, and final disposal after use. The process of VCA consists of breaking a value chain into its constituent parts in order to better understand its structure and function. Value chain analysis scrutinizes interactions and synergies among actors and the business and policy environment. The analysis results provide a platform for developing sub-sector interventions.

**MARKET SYSTEM:** A market system refers to the multi-player, multi-function arrangement comprising of core rules and regulations and supporting functions undertaken by different actors, through which exchanges take place. An analysis of a market system goes beyond VCA and it entails carrying a critical assessment of each actor in market; this include determining services provided by the actors, markets are being supplied, inputs-output functions and inter-relations.

**RULES AND REGULATIONS:** Rules and regulations refer to all sorts of laws, standards and regulations as well as informal rules and norms that govern actions and interactions of market players. Next to the core transactions of value chains and supporting functions, rules and regulations are an integral part of the market system.

**SUPPLY CHAIN:** The term supply chain, like the term value chain, means the process of bringing a product to the end consumer. Supply chains are usually analyzed and developed from the perspective of a main buyer and often focus on the logistics involved in supplying product and how products move from supply market to demand market

**INTERVENTION:** Intervention refers to a set of actions, initiatives, assistance, projects or policy purposely designed to intervene in and change a value chain either directly or indirectly to affect work and/ or employment. Interventions in chains are known as upgrading or leverage and include sustainable schemes.

## **Chapter Two**

### **Value Chain Assessment Methodology**

#### **1. Study Purpose and Objectives**

In November 2018, the project conducted a baseline survey and identified four sub-sectors for further value chain development aimed to improve household food security, increase income and create job for agribusiness. The main value chains in Bor County were Sorghum, maize and groundnuts; maize groundnuts and cassava in Yambio and Sorghum, maize and groundnuts in Torit. However, the counties have unleashed potential and opportunities on other sub-sectors that can help the households to diversify their livelihood options in general and contribute for the project to achieve the intended goal.

Therefore, this value chain analysis sought to generate adequate baseline information (quantitative and qualitative) for selected sub-sectors focused on pre-production, production and post-harvest handling, processing and input/output markets including actors involved each value chain (main actors, enablers and supporters). The survey was full-fledged and conducted by the project team (Teshale – SPM; Godfrey – VCAS and Lokule – MFS with unreserved support from the field team) in the counties of Yambio, Bor and Torit.

#### **2. Sub-Sector Selection Strategy**

Based on the below generic selection criteria the field team coached by the core team to carried out a rapid appraisal and to give rate 1 to 3 (3 = If performance is excellent; 2 = If performance is average; 1 = if performance is below average; 0 = if performance is poor) the identified possible sub-sectors against the following criteria:

- Contribution to HH Food Security
- Contribution to HH income
- Job Creation Opportunity
- Value Addition Potential
- Opportunity for Youth and Women Engagement
- Ease of Production
- Does not Require Use of Inputs (Fert., Seeds)

Accordingly, the field team scoring the following sub-sectors identified for further value chain assessment and development. Then after the value chain analysis findings are validated the project will decide the commodities considered for further action and inclusion (for detail sub-sector analysis please see Annex 1).

**Table 1: Selected Sub-sectors per county**

Nr	Subsector	Torit	Yambio	Bor
1	Maize			
2	Sorghum			
3	Groundnuts			
4	Cassava			
5	Okra			
6	Poultry			
7	Honey			
8	Pineapples			
9	Fish			
10	Goat			
<b>Total Subsector</b>		<b>7</b>	<b>6</b>	<b>6</b>

### 3. Sampling Methodology

Probability and non-probability sampling techniques were employed to draw sample value chain actors from each county, which included input suppliers, farmers, product traders, processor, transporter, and other supporters including. A farmer’s survey was conducted following multi-stage stratified sampling technique. Sampling was done according to the population (using the estimates of population statistics provided by GoSS). Probability Proportionate to Size (PPS) method was used to arrive at a suitable sample for selection from the sampling frame; thereafter, random sample were collected from four locations (Bor, Torit and Yambio counties). The probability to proportional sampling method guarantees representation of the sample size in the population and improves inference accuracy made to the whole population. By referring Karjan and Morgan (1970), sample size was calculated using the following formula:

$$n = \frac{(X^2 * N * p * q)}{(ME^2 * (N - 1)) + (X^2 * p * q)}$$

Where:  $n$  = Sample Size;  $N$  = Number dairy farmers in urban and peri-urban towns;  $X^2$  = Chi-square for the specified confidence level at 1 degree of freedom (for 95%  $X^2=1.96$ );  $p$  = the probability for an event to occur (the rate of household add value to raw milk, 0.5);  $q$  = the probability for an event not to occur (the rate of household does not add value to raw milk, 0.5); and ME = desired margin of error (0.05)

As a result, the total sample size was 128 farmers were selected. However, the survey collected from 136 farmers. Table 2 shows the sample size of farmers selected from each county.

**Table 2: Sampled farmers per County**

Nr	County	Total Household	Proportion	Sample Size	Interviewed Farmers
1	Bor	50137	47%	60	61
2	Torit	25723	24%	31	32
3	Yambio	31179	29%	37	43
<b>Total</b>		<b>107039</b>		<b>128</b>	<b>136</b>

In addition to farmers the team collected data from different key actors as shown below (table 3):

**Table 3: Sampled distribution of other key VC Actors**

<b>Actor</b>	<b>Bor</b>	<b>Torit</b>	<b>Yambio</b>	<b>Total Sample Size</b>	<b>Interviewed Farmers</b>
Traders	18	21	18	57	26
Processors	18	21	18	57	20
Transporters	18	21	18	57	20
Agric officers	3	3	3	9	6
Govt. Trade Staff	3	3	3	9	6
NGOs	3	3	3	9	6

### **3. Data Collection Methodology**

The approach to data collection was participatory, involving interviewing different persons and stakeholders and gathering relevant data. The study used a combination of both qualitative and quantitative data collection tools and techniques and analysis. The researcher also triangulated information from several sources of information including conducting interviews with key informants (respective county administration, agricultural officers, NGO managers, traders’ transporters, consumers and private sector industry players). This approach ensured accuracy and reliability of data collected. Relevant literature and secondary data were reviewed and analysed through desk-top research and review of existing NGOs’ project reports, research data and baseline information’s. Primary data was also collected through a series of interviews and discussion with farmers, traders, government officials and development practitioners.

Data collection was carried out by a team comprising of the SPM, VC & AS and Microfinance specialist supported with field office project team support including (local partners and SSAPU field staffs). Structured interview schedules were used to collect data from targeted communities and other industry value chain players, and this was through face to face interviews. The interview guides administered to the agricultural producers focused mainly on the issues of crop production, value addition, pricing scenarios and marketing, challenges and opportunities, and commodity quantity and quality parameters.

A total of 7 interview questionnaires and checklist were developed and refined by a team. The following tools were developed and administered to the respondents; Interview Schedule For Farmers, Interview Schedule for Traders, Interview Schedule for Processors, Interview Schedule for Market Assessment, Interview Schedule for Government Departments, Interview Schedule for Transporters and Partners Interview Schedule (for detail tool see [Annex 2](#)).

### **4. Data Processing and Analysis**

Collected data was captured using structured interview questionnaire and checklist. After capturing the data, we export it to SPSS version (Statistical Package for Social Scientists). Data analysis was done in SPSS. The data was analysed using descriptive statistics (tables, graphs and summary measures). Secondary quantitative data was extracted from various sources and these were also analysed. The result was presented as tables, graphs and figures and generic value chain map was plotted to shows the main value chain actors’, their linkages and functions for each value chains across the county.

## Chapter Three

### Value Chain Assessment Findings and Discussion

#### 1. Producers Analysis

##### 1. Socio-Economic Assessment of Farmers

As shown below in table 4; in three counties the study team interviewed 55% male and 45% female of agricultural producers. Among the respondents 41% were between 36-45 and 40% between 18-35 years old, while 88% and 76% were married and household heads respectively. The average family size was  $6.7 \pm 2.39$  persons in Bor,  $7.2 \pm 2.66$  persons in Torit and  $10.8 \pm 3.48$  persons in Yambio with almost similar number of male and female members in the household.

**Table 4: Socioeconomic Characteristics of Farmers**

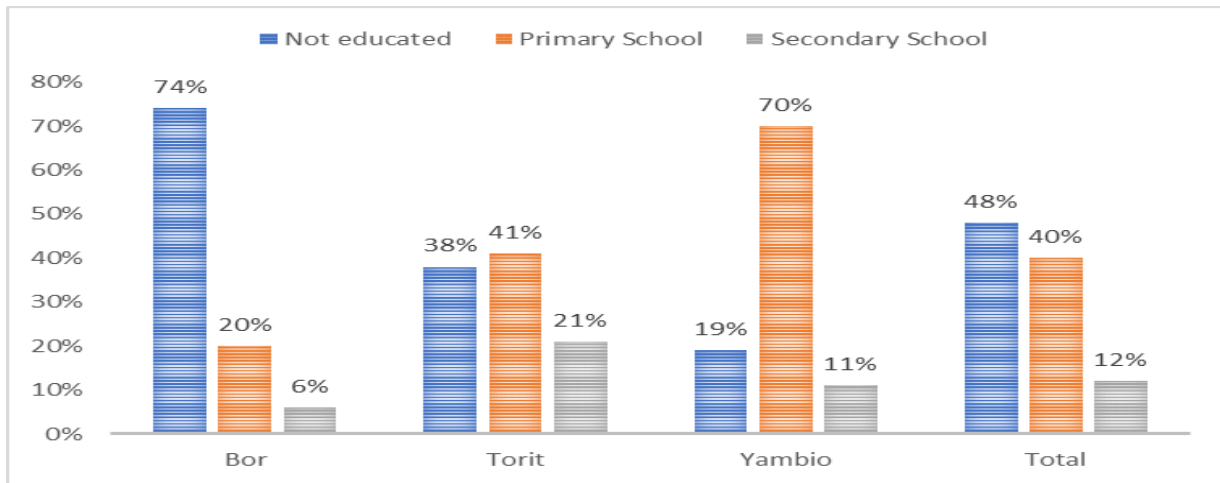
Description		Name of The County			
		Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
Sex of the respondent	Male	32 (53%)	18 (56%)	25 (58%)	75 (55%)
	Female	29 (47%)	14 (44%)	18 (52%)	61 (45%)
Age of the respondent	18-35 years old	26 (43%)	14 (44%)	14 (33%)	54 (40%)
	36-45 years old	22 (36%)	12 (38%)	22 (51%)	56 (41%)
	46-60 years old	11 (18%)	5 (16%)	7 (16%)	23 (17%)
	Above 60 years old	2 (3%)	1 (3%)	-	3 (2%)
Marital Status of the respondent	Married	56 (92%)	29 (91%)	35 (82%)	120 (88%)
	Single	1 (2%)	2 (6%)	7 (16%)	10 (7%)
	Divorced	-	-	1 (2%)	1 (1%)
	Widowed	4 (6%)	1 (3%)	-	5 (4%)
Respondents role in the HH	HH Head	42 (69%)	29 (91%)	32 (74%)	103 (76%)
	HH Member	19 (31%)	3 (9%)	11 (26%)	33 (24%)
Family Size	Male family Size	$3.7 \pm 1.38$	$3.6 \pm 1.42$	$5.1 \pm 2.40$	$4.1 \pm 1.89$
	Female family Size	$3.3 \pm 1.39$	$3.6 \pm 2.07$	$5.6 \pm 2.31$	$4.1 \pm 2.15$
	Total Family Size	$6.7 \pm 2.39$	$7.2 \pm 2.66$	$10.8 \pm 3.48$	$8.1 \pm 3.36$

*Source: June 2019 SSADP II Own Survey Data*

In terms of education level, there is low-level of education in all the three counties. In Bor, Torit and Yambio 73%, 38% and 19% of farmers respectively stated that they are not educated; 20%, 41% and 70% of farmers respectively stated that they possessed primary education level; while 7%, 22% and 12% of farmers respectively educated about secondary school (Figure 1). Among all respondents (farmers) interviewed none of them reported that they possessed tertiary education level (Diploma or degree education level). This low level of education among the agricultural producers negatively impact crop productivity and production. The fact that there is low level of education means that all the capacity building and training activities must be simplified so that all the farmers benefit. Therefore, a lot of emphasis should be placed on practical Market-oriented extension service delivery and training programme.



**Figure 1: Education Status of the Respondent**



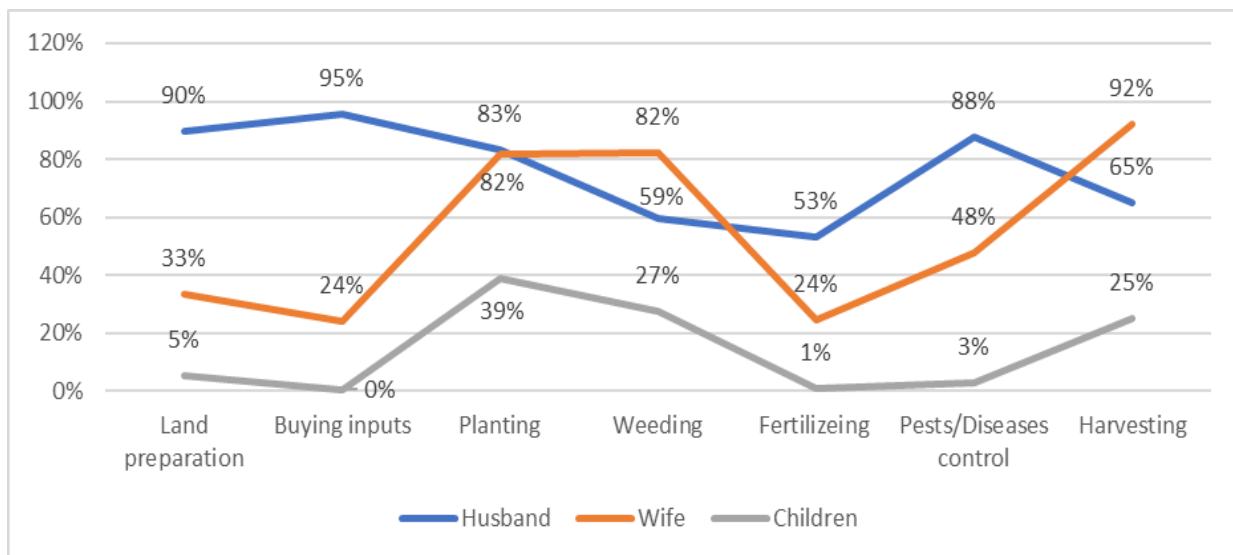
*Source: June 2019 SSADP II Own Survey Data*

## 2. Gender role, ownership to asset and decision-making power in the farming Household

### I. Gender Role in farming, value addition, HH and social

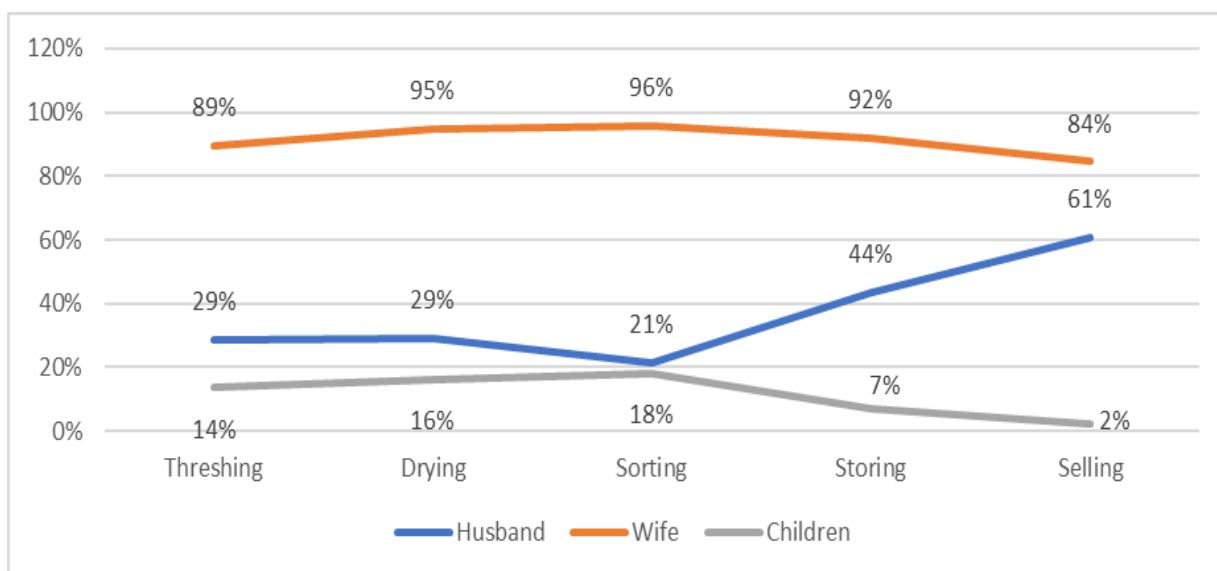
A number of farming activities are predominantly carried out by the husbands; these activities include buying inputs (95%), land preparation (90%), pest and disease control (88%) and planting (83%), while 92% of the wives are engaged in harvesting and 82% in weeding (figure 2). On the other hand, most value addition activities are undertaken by the wives in the family although the husbands also have selling role (61%) and storing role (44%) (figure 3).

**Figure 2: Gender Role in Farming**



*Source: June 2019 SSADP II Own Survey Data*

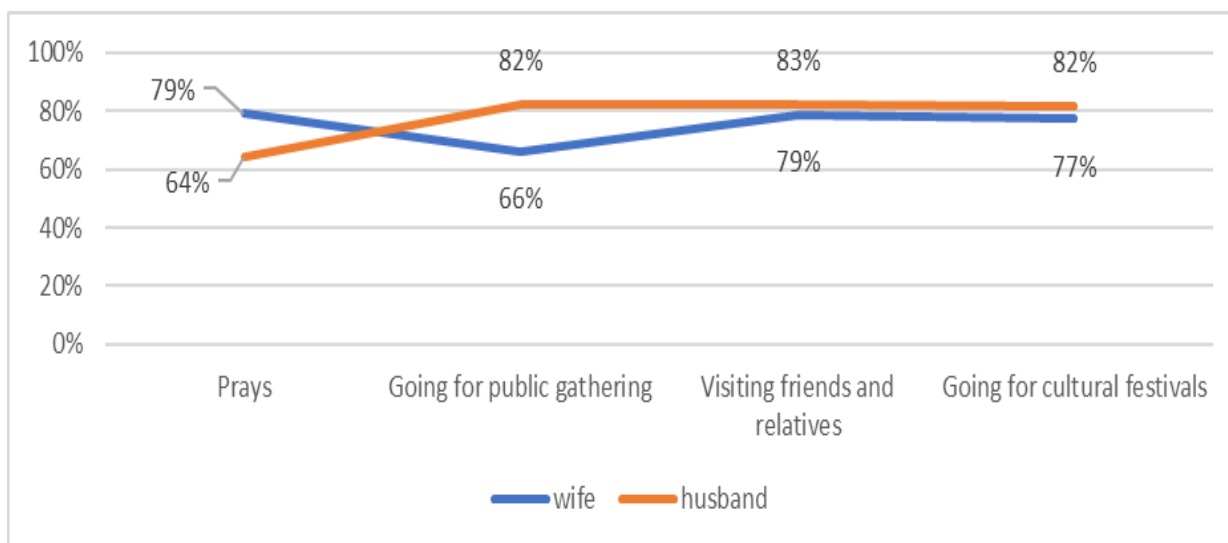
**Figure 3: Gender Role in Value Addition**



*Source: June 2019 SSADP II Own Survey Data*

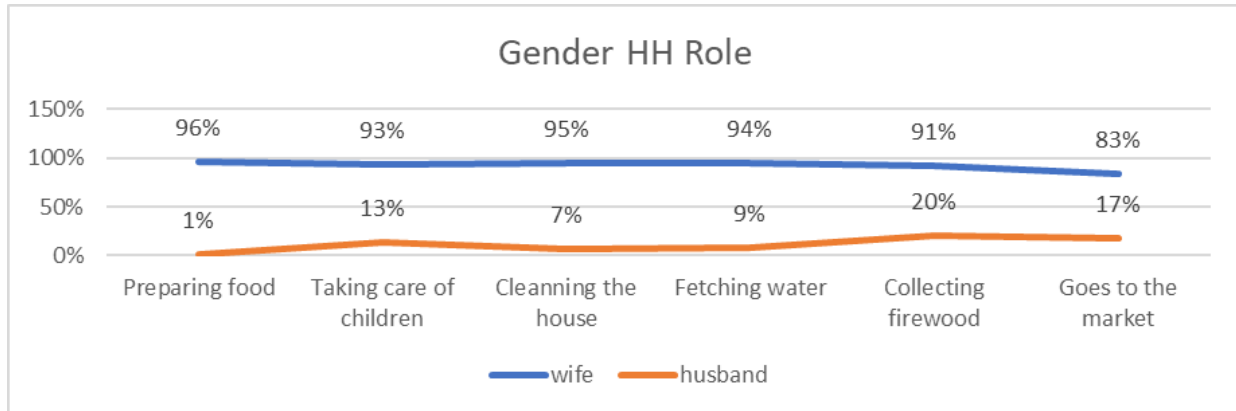
As shown below in figure 4, the husband has more social role. The farmers reported that the husbands are responsible 83%, 82% and 82% to go to public gathering, visiting friends and relatives and going to cultural festivals. However, most household related roles are handled by the wives. 96% of the wives are engaged in food preparation, 95% in house cleaning, 94% in fetching water, 93% in taking care of children, 91% in firewood collection and 83% in going to the market. 20% of the husband are engaged in collecting firewood while 17% of them in visiting market to buy commodities (figure 5).

**Figure 4: Gender Social Role**



Source: June 2019 SSADP II Own Survey Data

Figure 5: Gender HH Role

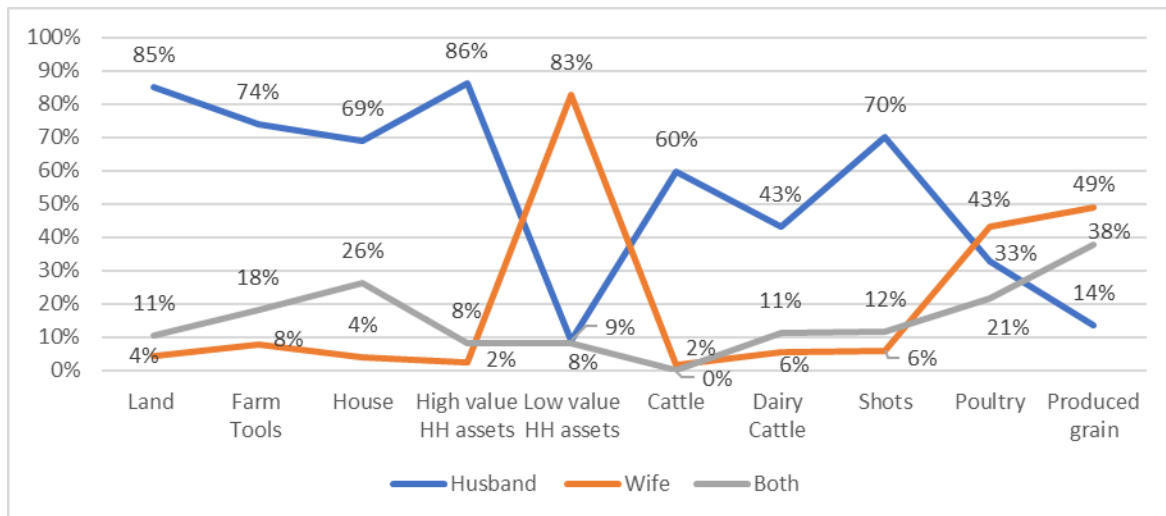


Source: June 2019 SSADP II Own Survey Data

## II. Ownership to asset and decision-making power

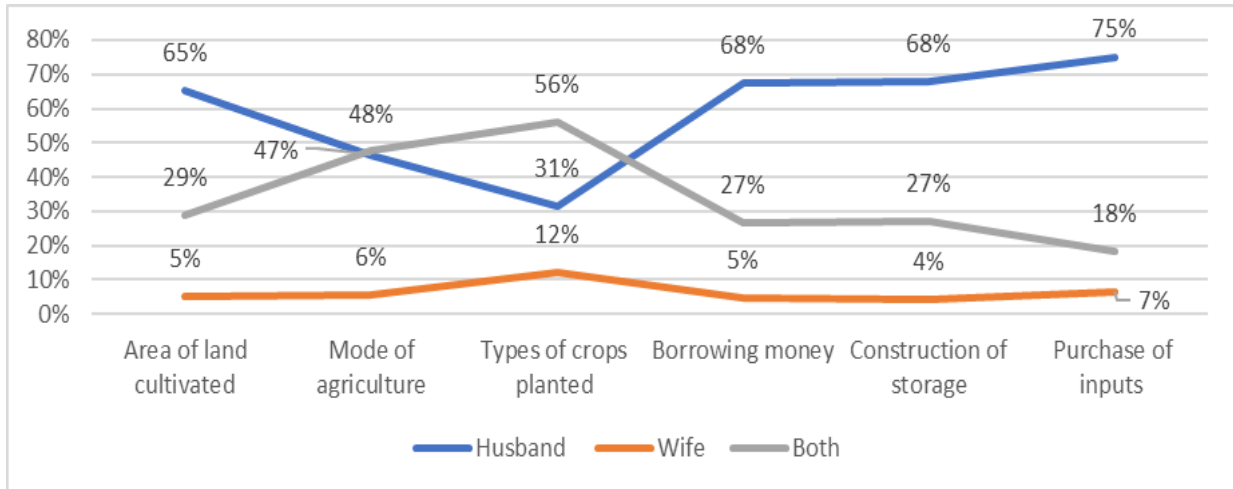
As shown below in figure 6; in three counties the husband has owned most of the assets compared to wife. 83% of the farmers interviewed reported that the wife owned the low value household assets; 49% and 43% of them reported that as she has entitled for produced grain and poultry management, respectively. On the other hand, a husband owned most productive assets such as land, farm tools, shots, cattle, and dairy cattle 85%, 74%, 70%, 60% and 43% of the husbands, respectively. In addition, husbands owned 86% and 69% of high value household assets and house ownership. However, jointly both have asset ownership right 26% on house and 38% on produced grain. This indicate that there is male dominance in the family.

Figure 6: Ownership to Assets



Across the counties both the husband and wife jointly decide 56% on type of crops produced and 48% on mode of agricultural practices. Whereas the husband decides 75% on input purchase, 68% to borrow money for production, 68% to construct storage and 65% on areas of land to be cultivated. This indicates that male take the lion share of the production decision (figure 7).

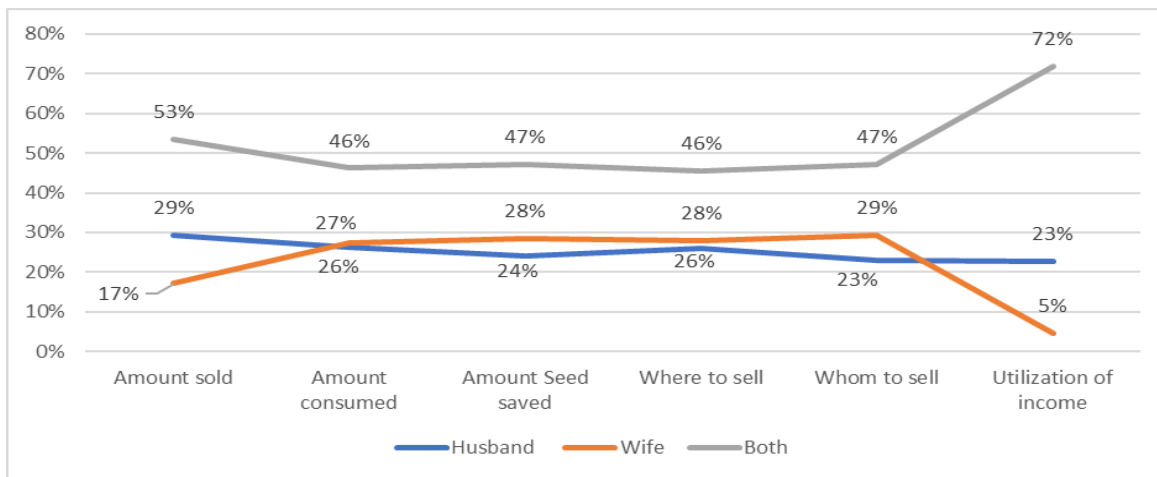
**Figure 7: Production Decision**



*Source: June 2019 SSADP II Own Survey Data*

As shown below in figure 8; both husband and wife make most decision together on marketing and utilization. They make decision 72% and 53% together on the utilization of income and amount to sale, respectively; 47% and 46% to whom to sell and where to sell respectively; and 47% and 46% amount of seed saved for coming season and amount to be consumed in house respectively.

**Figure 8: Marketing and utilization Decision**



*Source: June 2019 SSADP II Own Survey Data*

### 3. Crop Production and Productivity

In Bor county, groundnut is the most popular and important agricultural commodity (cash-earner) produced by most farmers (67%) followed by sorghum and maize crops which are produced by 62% and 53% respectively. On the other hand, 48% and 44% of farmers rear goats and local chicken respectively while 36% produce okra and 21% produce fish (table 5).

1. With respect to groundnut production, capacity-building activities in Bor County should focus on training to enhance groundnut productivity, on-farm value addition activities (threshing, cleaning, sorting, grading, packaging and proper storage).
2. With respect to sorghum production, capacity building activities should focus on training on community-based sorghum seed multiplication, crop production, effective land preparation, adherence to spacing, weed management, pests and disease management through use of integrated pest management, post-harvest management practices (including threshing and winnowing, sorting, grading and storage activities).
3. With respect to maize production, there is an urgent need to support the community in community-based seed multiplication activities, training on routine crop husbandry practices (land preparation, proper spacing, integrated pest management, post-harvest management practices (drying to required moisture level -12%, shelling, sorting, grading and storage (use of the recommended hermetic storage technologies and construction of standard storage facilities that are not accessible by rodents and other pests.

In Torit County, sorghum is the most important agricultural commodity produced 97% followed by 63% maize, 53% groundnut, 31% rearing local chicken and another 31% rearing local goats. Other agricultural commodities produced include (16%) okra, (13%) cassava, (3%) fish and (6%) honey (table 5).

1. Sorghum is a staple food crop in Torit County that makes it an important commodity for household food security and the crop has potential to contribute significantly to household income. A scan of the main market centres in the County showed that sorghum is sold in different forms (pure red sorghum grain, pure white sorghum, admixture of red and white sorghum and sorghum flour). This indicate sorghum has a value addition opportunity.
2. Maize is mainly grown in Torit County as a cash crop. Despite the challenges incurred in accessing improved maize seed, farmer consistently use ordinary grains as seed and select some from previous year harvest. This results to low productivity and production. The need to building the capacity of selected farmer groups/ cooperatives on seed maize production is urgent in order to make positive impact on the farmers. The use of high-quality seed maize will result to better yield provided all other crop production factors; agronomy, fall armyworm pest and disease management, do not depress crop production.
3. Similarly, groundnut is a cash crop in the County of Torit. Whereas access to groundnut seed is a major bottleneck in the County, groundnut grains from previous harvest can be

grown for up to five successive generations without causing significant reduction in yield. In this sub-sector, therefore, there is a need to building the capacity of the farmers in the county on routine crop management (spacing, weeding, pests and diseases control), post-harvest management (effective drying, shelling, sorting, grading and storage). The capacities of the farmers in Torit County should be built on farming as a business, entrepreneurship, marketing and bookkeeping.

As shown in table 5; in Yambio County, maize is the most important agricultural commodity with 100% of the farmers interviewed stating that they grow maize, 93% grow groundnut, 70% produce cassava. Other agricultural commodities being produced include pineapples (19%), Honey (19%), goat (19%), okra (19%), sorghum (16%), poultry (16%) and fish (2%).

1. Commercial production of maize in Yambio County should be enhanced through investing in community-seed production. This will, in the long run, increase maize productivity and hence farmers income. Equally important is the need to provide refresher training to the farmers on maize production, pests and disease management, effective drying, shelling, sorting, grading and storage.
2. Whereas groundnut is grown for commercial purposes in Yambio County, most producers lack skills in basic value addition, although small-scale (artisanal) groundnut paste-makers are increasingly emerging in the county. Support in the groundnut value chain in the county should focus on building the capacities of the community on production and value addition (groundnut paste production and groundnut flour).
3. Cassava training should focus production (techniques of using stem-cutting), pests and disease management and value addition (groundnut-chippings and composite flour production).

**Table 5: Major Subsector per county**

Sub sector	Name of The County			
	Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
Maize	32 (53%)	20 (63%)	43 (100%)	95 (70%)
Sorghum	38 (62%)	31 (97%)	7 (16%)	76 (56%)
Groundnuts	41 (67%)	17 (53%)	40 (93%)	98 (72%)
Cassava	-	4 (13%)	30 (70%)	34 (25%)
Okra	22 (36%)	5 (16%)	8 (19%)	35 (26%)
Poultry	27 (44%)	10 (31%)	7 (16%)	44 (32%)
Honey	-	2 (6%)	8 (19%)	10 (7%)
Pineapple	-	-	8 (19%)	8 (6%)
Fish	13 (21%)	1 (3%)	1 (2%)	15 (11%)
Goat	29 (48%)	10 (31%)	8 (19%)	47 (35%)

*Source: June 2019 SSADP II Own Survey Data*

#### 4. Key on-Farm Activities Done by Farmers

In Bor County, 98% of the farmers interviewed are currently engaged in crop production, 36% of them involved in basic value addition activities at the farm gate level, 56% in marketing and 84% also store their produce at the household level. In Torit county, 100% of the farmers are currently engaged in crop production, 81% of the farmers interviewed carry out basic processing of products (shelling, threshing), while 50% are also active players in the marketing of their commodities at farm-gate level. Another 56% store their produce at the household level. In Yambio County, 100% of the farmers are currently engaged mainly in crop production, 42% of the farmers are engaged in adding value to their agricultural commodities (cleaning, shelling, threshing), 37% of the farmer market their produce at farm-gate level, 35% own storage facilities. Among the small-scale farmers in the project location, the systems of crop production, processing and storage are usually quite basic with little adherence to best practices.

**Table 6: Key On-Farm Activities Practiced by Farmers**

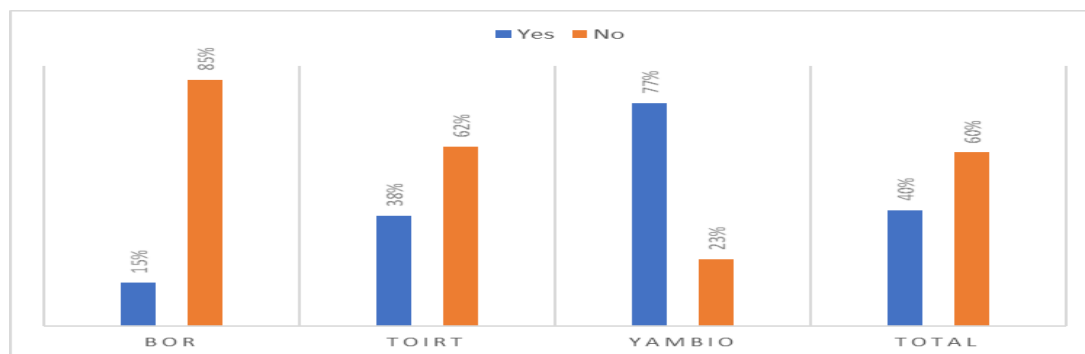
Key On-Farm Activities	Name of The County			
	Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
Production	60 (98%)	32 (100%)	43 (100%)	135 (99%)
Processing	19 (31%)	26 (81%)	5 (12%)	50 (37%)
Value addition	22 (36%)	10 (31%)	18 (42%)	50 (37%)
Marketing	34 (56%)	16 (50%)	16 (37%)	66 (49%)
Accessing Credit	-	11 (34%)	-	11 (8%)
Accessing Inputs	5 (8%)	11 (34%)	6 (14%)	22 (16%)
Storage	51 (84%)	18 (56%)	15 (35%)	84 (62%)

*Source: June 2019 SSADP II Own Survey Data*

#### 5. Farmers Capacity Building Training

There is real opportunity to provide technical support in the development of selected commodities in each county and Cordaid together with local partners started supporting farmers mainly on the four crops (maize, sorghum, groundnuts and cassava). Whereas some farmers gave indication that they have been given limited training before and they need more refresher trainings on crop production and farm-business management. 15% of farmers in Bor, 38% in Torit and 77% in Yambio have attended trainings before (Figure 9).

**Figure 9: Farmers Attended any Capacity Building Training**



*Source: June 2019 SSADP II Own Survey Data*

Among the farmers who have attended training in Bor County, 44% said they were trained on Good Agricultural Practice (GAP) while 33% were trained on farming as a business, another 33% attended training on fishing. In Torit County, among the farmers who attended training, 50% were trained on GAP, 58% on farming as a business and only 8% on seed multiplication. In Yambio County, 91% of the farmers were trained on GAP, 9% were trained on farming as a business and 6% were trained on seed multiplication. While these farmers stated that they have attended certain trainings, most of them were found not to have changed their ways of farming based on what was observed in their farms. Majority still dry produce in the open ground, the store is not effective against control of storage pests, weeding and spacing in the farms are not done based on best practices, etc.

There was a mixed reaction with respect to the effectiveness of the training attended and whether the training added value in term of increasing crop productivity, production and access to sustainable markets. Therefore, we are of the opinion that, there is an urgent need to carry out post-training assessment every end of crop production period to check whether the trainings have resulted to increased yield at farmer-level, reduced-post harvest losses and led to enhanced participation by the farmers.

**Table 7: Type of Training Provided**

Training Topics	Name of The County			
	Bor (N=9)	Torit (N=12)	Yambio (N=33)	Total (N=54)
Trained in GAP	4 (44%)	6 (50%)	30 (91%)	40 (74%)
Trained in Seed Multiplication	-	1 (8%)	2 (6%)	3 (6%)
Trained in Farming Business	3 (33%)	7 (58%)	3 (9%)	13 (24%)
Trained in Fishing	3 (33%)	-	-	3 (6%)
Average number of training days	6±3	5±4	5±4	5±4

*Source: June 2019 SSADP II Own Survey Data*

## 6. Farmers Experience in Agribusiness and Other Income Sources

As shown in table 8 below; 79% of farmers in Bor, 69% in Torit and 41% in Yambio consider themselves engaged in agribusiness (farming as a business). 78% of farmers in Torit and 70% of the farmers in Yambio hire labour; while only 38% of the farmers in Bor hire labour to run their agribusiness activities.

**Table 8: Farmers Engagement in Agribusiness**

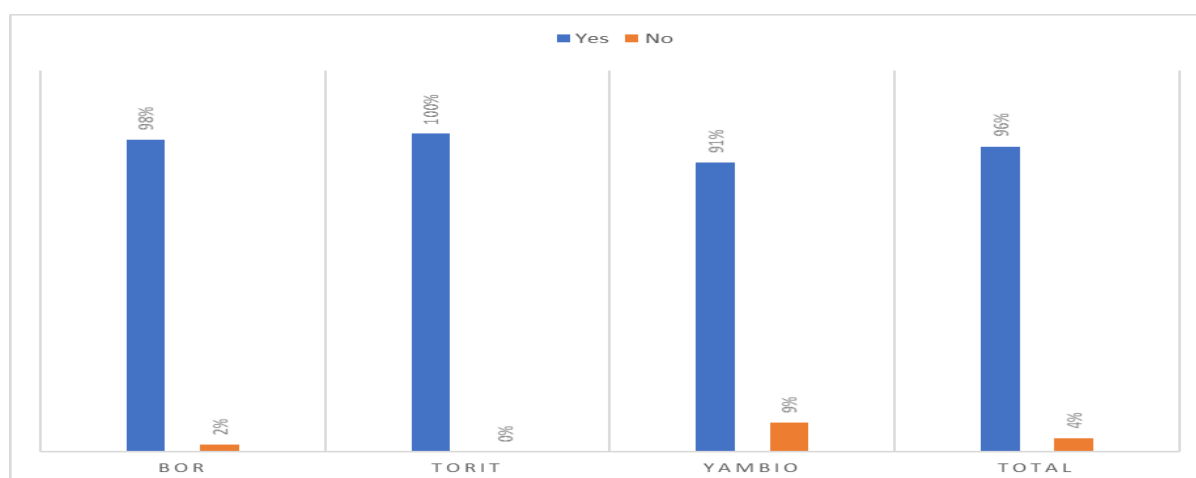
Description		Name of The County			
		Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
Respondents Consider Her/him Self an Agribusiness owner	Yes	48 (79%)	22 (69%)	41 (95%)	111 (82%)
	No	13 (21%)	10 (31%)	2 (5%)	25 (18%)
Respondents Hired Labour to run their agribusiness	Yes	23 (38%)	25 (78%)	30 (70%)	78 (57%)
	No	38 (62%)	7 (22%)	13 (30%)	58 (43%)

*Source: June 2019 SSADP II Own Survey Data*



Among the farmers interviewed 96% of them (98% in Bor, 100% in Torit and 91% in Yambio) reported that as they have other income generating activities apart from farming (figure 10). In Bor county, selling of charcoal, poles and firewood is very popular as an alternative income option – 38% of the farmers also engage in charcoal business. In Torit county, 94% of the farmers are also engaged in selling charcoal and poles and firewood while 47% are engaged in selling grass. In Yambio county, 41% of the farmers are engaged in selling charcoal, poles and firewood while 41% of the farmers also work as casual labourers in the county. The above alternative income options are coping mechanisms that the farmers engage in during off-farm periods and may also be engaged even when they have enough produce for the market (mainly to supplement their income). While we recognise that charcoal production from tress is a coping mechanism, it should be discouraged as it is environmentally destructive. Other alternative income-generating options should be gradually introduced to replace charcoal production (table 9).

**Figure 10: Other Income Source and**



*Source: June 2019 SSADP II Own Survey Data*

**Table 9: Type of IGAs run by Farmers**

IGA Options by the respondents	Name of The County			
	Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
Petty trading	12 (20%)	2 (6%)	8 (21%)	22 (17%)
Selling of Charcoal & pole, firewood	23 (38%)	30 (94%)	16 (41%)	69 (53%)
Selling of Local Alcohol and Brewery	2 (3%)	1 (3%)	8 (21%)	11 (8%)
Causal Labour	3 (5%)	0	16 (41%)	19 (15%)
Selling Grass	7 (12%)	15 (47%)	0	22 (17%)
Different options	28 (47%)	8 (25%)	12 (31%)	48 (37%)

*Source: June 2019 SSADP II Own Survey Data*

## 7. Challenges Faced and support Needed by Farmers

Across the counties, all the farmers (100%) stated that lack of inputs is the main challenges they faced while followed by 92% unpredictable rainfall pattern, 84% lack knowledge on Good Agricultural Practices (GAP), 68 % pests and diseases, 45% low price of agricultural commodities, 43% insecurity and access to finance, 42% lack of market for farm produce, 41% high transport cost and 32% high post-harvest loss. the magnitude of these challenges is almost similar in each county (table 10).

**Table 10: Challenges faced by farmer**

Challenges Faced by The Respondents	Name of The County			
	Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
Lack of Input	61 (100%)	32 (100%)	43 (100%)	136 (100%)
Lack of Knowledge and skill	56 (92%)	27 (84%)	31 (72%)	114 (84%)
Lack of Finance	12 (20%)	18 (56%)	29 (67%)	59 (43%)
Pest and Disease	43 (71%)	20 (63%)	30 (70%)	93 (68%)
Unpredictable rainfall	50 (82%)	32 (100%)	43 (100%)	125 (92%)
Lack of Market	18 (30%)	18 (56%)	21 (49%)	57 (42%)
Shortage of rain	6 (10%)	15 (47%)	10 (23%)	31 (23%)
Theft of produce in the farm	10 (16%)	12 (38%)	15 (35%)	37 (27%)
Lack of storage facility	2 (3%)	11 (34%)	22 (51%)	35 (26%)
Insecurity	20 (31%)	14 (44%)	25 (58%)	59 (43%)
Low price	25 (41%)	11 (34%)	25 (58%)	61 (45%)
High transport cost	10 (16%)	17 (53%)	29 (67%)	56 (41%)
Postharvest loss	11 (18%)	16 (50%)	16 (37%)	43 (32%)

*Source: June 2019 SSADP II Own Survey Data*

In Bor county, 66% of the farmers opined that they need agricultural extension services, 67% of the farmers need farm input subsidies. Other services required in the county include market linkages (36%), access to finance (32%) and training on value addition (28%). Although only 18% of the respondents stated that they need support in terms of group organizing, this is a key activity that would need to be focused on as it directly contributes to performance of farmers groups and individual farmers. In Torit County, 97% of the farmers stated that they need farm input subsidies, 67% said that they require finance for their farming enterprises and 67% need training on value addition. Other important services needed by the farmers include market linkages needed by 56% of the farmers and extension services needed by 41% of the farmers. In Yambio County, 88% of the farmers said that they require financial services. Another important service required by farmers include training on value addition; 81% of the farmers interviewed said that they want to be trained on crop value addition, 63% need farm input subsidies, 51% market linkages and 49% extension services (table 11).

Whereas agricultural NGOs have previously trained farmers on GAP in the three priority counties, there is a need for refresher training especially on GAP, farming as a business and post-harvest innovative technologies. Equally important is the need to start collecting data on market-engagement activities (between the farmer groups and the commercial buyers) in the three counties.

**Table 11: Type of support needed by the farmers**

Type of Support	Name of The County			
	Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
Extension Service	40 (66%)	13 (41%)	21 (49%)	74 (54%)
Farm Input Subsidies	41 (67%)	31 (97%)	27 (63%)	99 (73%)
Market Linkage	22 (36%)	18 (56%)	22 (51%)	62 (46%)
Organizing into Groups	11 (18%)	10 (31%)	10 (23%)	31 (23%)
Access to Finance	38 (32%)	21 (67%)	38 (88%)	97 (71%)
Training on Value addition	17 (28%)	21 (67%)	35 (81%)	73 (54%)

*Source: June 2019 SSADP II Own Survey Data*

## 8. Farmers Membership and its Benefit

49% of the farmers interviewed across the county reported that they are members to farmers group and hence 64% farmers benefited from the capacity building and training organized for the group; 47% farmers to access micro loan; 32% to credit loan for input; 23% to access storage facilities; and while 21% of them reported that the benefit to market their produce (table 12).

**Table 12: Farmers membership status and its benefits**

Description		Name of The County			
		Bor (N=61)	Torit (N=32)	Yambio (N=43)	Total (N=136)
<b>Farmer Groups Membership</b>	Yes	22 (36%)	25 (78%)	19 (44%)	66 (49%)
	No	39 (64%)	7 (22%)	24 (56%)	70 (51%)
		Bor (N=22)	Torit (N=25)	Yambio (N=19)	Total (N=66)
<b>Membership Benefits</b>	Input credit	5 (23%)	5 (20%)	11 (58%)	21 (32%)
	Micro loan	11 (50%)	15 (60%)	5 (26%)	31 (47%)
	Market Outlet	7 (32%)	3 (12%)	4 (21%)	14 (21%)
	Capacity Building and training	14 (64%)	11 (44%)	17 (90%)	42 (64%)
	Storage	9 (41%)	1 (4%)	5 (26%)	15 (23%)

*Source: June 2019 SSADP II Own Survey Data*

## 9. Access to Market and Market Information

As shown below in table 13; with respect to market information 96%, 97% and 94% farmers in Bor, Torit and Yambio respectively has access to market price information; 18%, 56% and 30% farmers in Bor, Torit and Yambio respectively has access to buyers interest information; while 32%, 38% and 79% farmers in Bor, Torit and Yambio respectively has access to market demand information. Across the counties 88% farmers access information from their neighbours, 64% from traders, 21% through farmers association and 11% through NGO and GO extension workers.

**Table 13: Access to Market Information**

Description		Name of The County			
		Bor (N=22)	Torit (N=32)	Yambio (N=34)	Total (N=88)
Type of Market Information	Market Prices	21 (96%)	31 (97%)	32 (94%)	84 (96%)
	Buyers Interest	4 (18%)	18 (56%)	10 (30%)	32 (36%)
	Market Demand	7 (32%)	12 (38%)	27 (79%)	46 (52%)
Market Information Source	Gov't Extension Worker	2 (9%)	6 (19%)	2 (6%)	10 (11%)
	NGO Extension Worker	-	6 (19%)	4 (12%)	10 (11%)
	Farmer Association	1 (5%)	7 (22%)	10 (29%)	18 (21%)
	Traders	13 (59%)	21 (66%)	22 (65%)	56 (64%)
	My neighbors	16 (73%)	29 (91%)	32 (94%)	77 (88%)

Source: June 2019 SSADP II Own Survey Data

In relation to access to market in Bor County 74 %, 64%, 57% and 41% farmers reported that low price, poor road network, low production and insecurity respectively are the main challenges they encountered; while in Torit County, 69 %, 69%, 56%, 53%, 50% and 44% farmers reported that low price, poor road network, limited number of traders, high taxes, low production and insecurity respectively are the main challenges they encountered. In Yambio, the main challenges faced in relation to access to market includes (100%) low price, (98%) poor road network, (85%) low production, (48%) high taxes and (45%) limited market outlet (table 14). Challenges emanating from price, market outlet and production can be addressed by vacillating formation of active groups, trainings on group organizing, farming as a business including how to negotiate for better prices, sharing of market information, etc.

**Table 14: Access to Market Challenges**

Challenges in Relation to Market Access	Name of The County			
	Bor (N=42)	Torit (N=32)	Yambio (N=40)	Total (N=114)
Low price	31 (74%)	22 (69%)	40 (100%)	93 (82%)
Limited Market outlet	12 (29%)	12 (38%)	18 (45%)	42 (37%)
Limited number of traders	8 (19%)	18 (56%)	3 (8%)	29 (25%)
Low production	24 (57%)	16 (50%)	34 (85%)	74 (65%)
Poor road network	27 (64%)	22 (69%)	39 (98%)	88 (77%)
Insecurity	17 (41%)	14 (44%)	12 (30%)	43 (38%)
High tax	7 (17%)	17 (53%)	19 (48%)	43 (38%)

Source: June 2019 SSADP II Own Survey Data

## 2. Processor Analysis

### 1. Demographic Characteristics of the Processors

As shown below (table 15) across the county's male engaged in processing accounts 90% and most of the processors are in the productive age where between 18 to 36 years (45%) and between 36 to 45 years (35%). 80% of the processors in the counties are married, and 30% of the processors have not gone to school, while another 50% possess only up to primary level education and the remaining 20 % are above secondary education level.

**Table 15: Demographic Characteristics of the Processors**

Description		Name of The County			
		Bor (N = 7)	Torit (N=8)	Yambio (N=5)	Total (N=20)
Sex	Male	6 (86%)	8 (100%)	4 (80%)	18 (90%)
	Female	1 (14%)		1 (20%)	2 (20%)
Age	18-36 Years	4 (57%)	2 (25%)	3 (60%)	9 (45%)
	36-45 years	3 (43%)	4 (50%)		7 (35%)
	46-60 Years		1 (12%)	2 (40%)	3 (15%)
	Over 60 years		1 (12%)		1 (5%)
Marital Status	Married	5 (71%)	7 (88%)	4 (80%)	16 (80%)
	Single	2 (29%)	1 (12%)	1 (20%)	4 (20%)
Education Status	Not Educated	3 (43%)	2 (25%)	1 (20%)	6 (30%)
	Primary Education	3 (43%)	5 (63%)	2 (40%)	10 (50%)
	Secondary and above	1 (14%)	1 (12%)	2 (40%)	4 (20%)

Source: June 2019 SSADP II Own Survey Data

## 2. Processing in the Counties

The processors are small employing between 2 and 3 people. The main commodities being processed in the counties include grain (maize and sorghum) and cassava milling into flour (60%), fruit processing into Juice (30%) and ground paste making (10%). End products of processed grains include maize and sorghum flour (40%), cassava flour (10%) and groundnut paste (25%) and different juice (25%). The individual farmers account 90 % of the raw material supply in the counties for the processors. Challenges faced by processors include unclean, poor quality grains and high cost of transport. On average 60% of the processors get a revenue of over 4,000 SSP per day indicate their scale of operation and 15 % of the processors get a revenue of over 500 to 1,000 SSP per day (Table 16).

**Table 16: Type of processing and challenges of the processors**

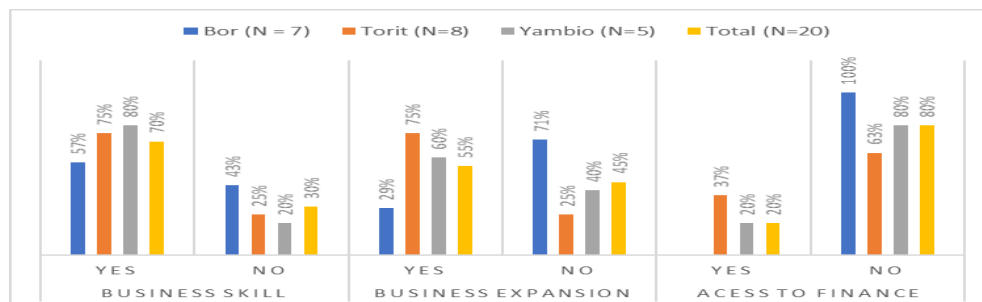
Description		Name of The County			
		Bor (N = 7)	Torit (N=8)	Yambio (N=5)	Total (N=20)
Type of processing	Grain/ Cassava Milling	5 (71%)	5 (63%)	2 (40%)	12 (60%)
	Fruit Processing into Juice	2 (29%)	2 (25%)	2 (40%)	6 (30%)
	Ground Paste making		1 (12%)	1 (20%)	2 (10%)
End product	Maize and Sorghum Flour	3 (43%)	4 (50%)	1 (20%)	8 (40%)
	Groundnut Paste	3 (43%)	1 (12%)	1 (20%)	5 (25%)
	Cassava Flour		1 (12%)	1 (20%)	2 (10%)
	Juice	1 (14%)	2 (25%)	2 (40%)	5 (25%)
Raw Material Supplier	Individual Farmers	5 (71%)	8 (100%)	5 (100%)	18 (90%)
	Farmer Association	1 (14%)			1 (5%)
	Individual farmers & Association	1 (14%)			1 (5%)
Challenges of the processor	Impurity	2 (29%)	5 (63%)	1 (20%)	8 (40%)
	Poor Quality	1 (14%)	2 (25%)	1 (20%)	4 (20%)
	Non-Tariff Barriers	1 (14%)			1 (5%)
	Impurity and poor quality	3 (43%)		2 (40%)	5 (25%)
	High Cost of Transport		1 (12%)	1 (20%)	2 (10%)
Daily Revenue In SSP	500 – 1000		1 (12%)	2 (40%)	3 (15%)
	2001 – 2500	1 (14%)	1 (12%)		2 (10%)
	2501 – 3000	1 (14%)		1 (20%)	2 (10%)
	Over 4000	4 (57%)	6 (75%)	2 (40%)	12 (60%)
	I don't know	1 (14%)			1 (5%)

Source: June 2019 SSADP II Own Survey Data

### 3. Processors Business Skill and Access to Finance

As shown below in Figure 11; 70% of the processors have basic business skills although they would need to be put on a learning curve especially in the areas of business planning, operation management and bookkeeping. However, only 55 % of the processors reported that their processing business is expanding. On the other hand, 80 % of the processors say they cannot access finance.

**Figure 11: Processor Business Skill and Access to Finance**



Source: June 2019 SSADP II Own Survey Data

## 3. Trader Analysis

### A. Demographic Characteristics of Traders

55% of traders in Bor County are male while in Yambio County 60% are male and 60% are also male in Torit County. 82% of traders are household head in Bor County, while 90% are household head in Torit and another 60% are household head in Yambio County. 40% of the traders in Yambio county have attained secondary education, while 60% have primary-level education. In Torit county 70% of traders have secondary education while 10% have primary level education. In Bor county, 73% of trader are not education and 27% have primary-level education. Family size range between 4 to 9 in Bor, 4 to 13 in Torit and 6 to 14 in Yambio (Table 17).

**Table 17: Traders Demographic Characteristics and Experience**

Description	Name of The County				
	Bor (N=11)	Torit (N=10)	Yambio (N=5)	Total (N=26)	
Sex of the respondent	Male	6 (55%)	6 (60%)	3 (60%)	15 (58%)
	Female	5 (45%)	4 (40%)	2 (40%)	11 (52%)
Respondent's role in the HH	Household Head	9 (82%)	9 (90%)	3 (60%)	21 (81%)
	Household Member	2 (18%)	1 (10%)	2 (40%)	5 (19%)
Marital Status of the respondent	Married	9 (82%)	6 (60%)	4 (80%)	19 (73%)
	Single	-	1 (10%)	-	1 (4%)
	Divorced	1 (9%)	3 (30%)	1 (20%)	5 (19%)
	Widowed	1 (9%)	-	-	1 (4%)
Education Status of the respondent	Not educated	8 (73%)	2 (20%)	-	10 (39%)
	Primary School	3 (27%)	1 (10%)	3 (60%)	7 (27%)
	Secondary School	-	7 (70%)	2 (40%)	9 (34%)

Source: June 2019 SSADP II Own Survey Data

## B. Traders experience and quality in the Counties

Across the county's retailers account 96 % and wholesalers 8 % whereas 4 % of the respondents are function both production and trading. Most traders (58 %) has more than 5 years training experience while 27 % of them has served as a between 3 to 5 years. Among the traders interviewed 89 % of the them know how to deal with customers whereas only 15 % of them have enough capital to run their business and 62 % of them has a reliable supplier (Table 18).

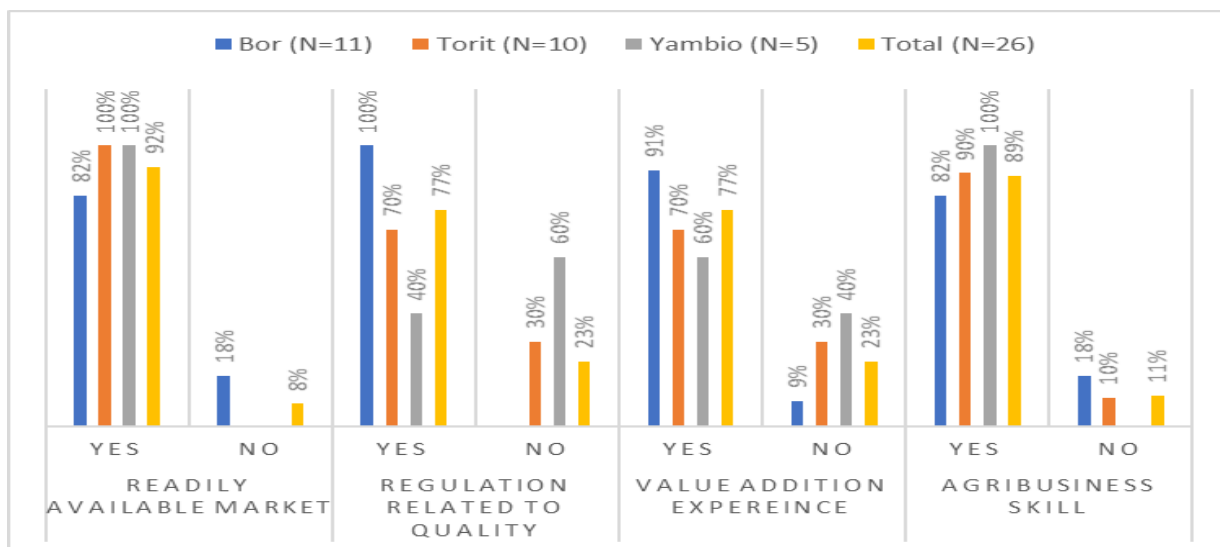
**Table 18. Traders experience and quality**

Description	Name of The County				
	Bor (N=11)	Torit (N=10)	Yambio (N=5)	Total (N=26)	
Trading experience in years	1 to 3 years	2 (18%)	1 (10%)	1 (20%)	4 (15%)
	3 to 5 years	2 (18%)	5 (50%)		7 (27%)
	5 years and above	7 (64%)	4 (40%)	4 (80%)	15 (58%)
Type of trader	Wholesaler	2 (18%)			2 (8%)
	Retailer	11 (100%)	10 (100%)	4 (80%)	25 (96%)
	Produce to sell	0	0	1 (20%)	1 (4%)
Trader Quality	Have enough capital	2 (18%)	1 (10%)	1 (20%)	4 (15%)
	Know how to deal with customers	8 (73%)	10 (100%)	5 (100%)	23 (89%)
	Has reliable supplier	7 (64%)	5 (50%)	4 (80%)	16 (62%)

Source: June 2019 SSADP II Own Survey Data

92 % of the traders have the readily available market and 77 % knows the existence of regulations in relation to quality. On the other hand, 89 % of the traders has an agribusiness skill and 77 % of the them has a value addition experience such as sorting, bulking and grading (figure 12).

**Figure 12: Availability of Market and Quality Regulation and Traders Experience**



Source: June 2019 SSADP II Own Survey Data

## **4. Transporter Business Analysis**

All respondents started transport business for self-employment. In Torit, Yambio and Bor County is dominated by male youths in the age range 18-35 years 71 %, 71 % and 56 % respectively followed by the age range 36-45 years. 14 %, 33 % of transporters have primary level education while another 71 %, 67 % have secondary education in Torit, Yambio and Bor County respectively. Another 14 % in Torit reported that as they have diploma and above level of education.

Transport fee is dependent on the distance covered and weight of the commodities. The main transport problem experienced by transporters in the counties include loss due to poor road infrastructure (tare and ware), theft and high operational costs. Other problems incurred include illegal payment on roads and product damage while in transit. Even though the counties have transport regulations (road license and traffic rules) the enforcement of these rules is weak due to weak legal and regulatory environment. All agreed that there is lack of good telephone network in counties.

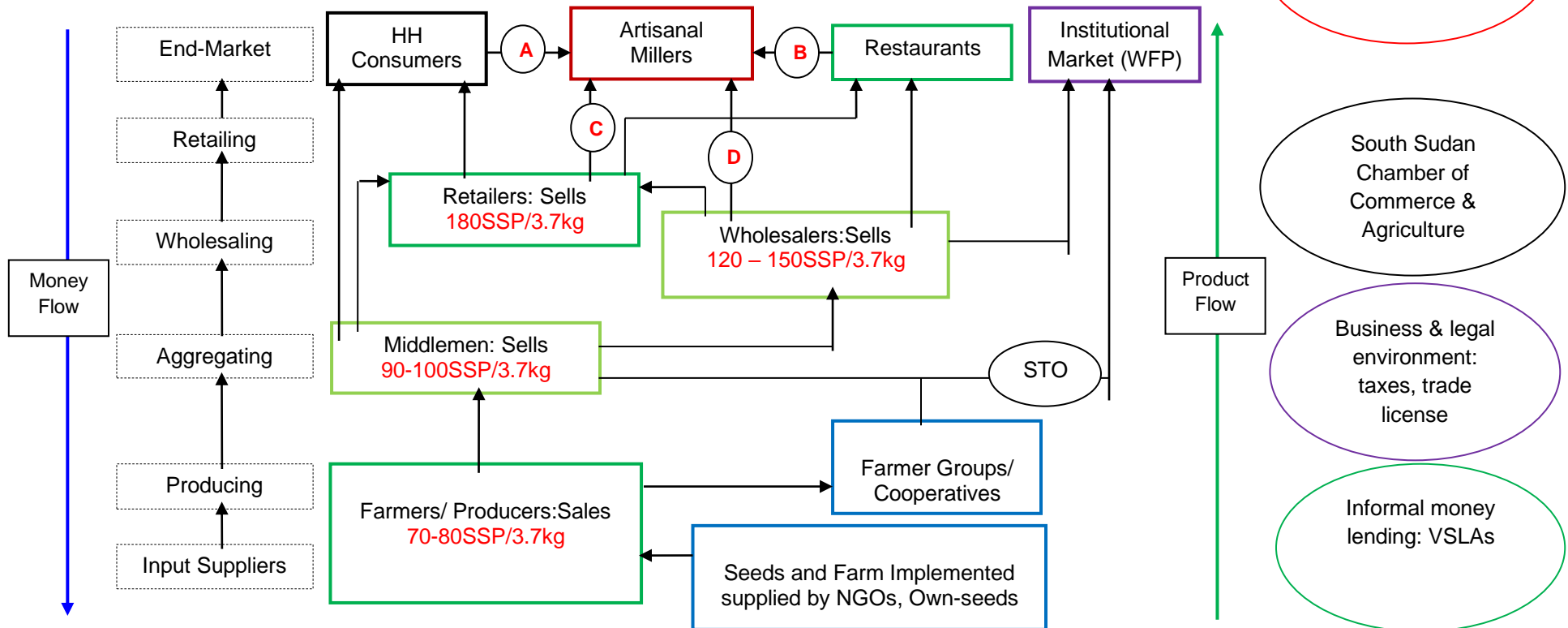
43 % and 77 % of transporters in Torit and Bor respectively reported that they are belong to transport association. In Torit the main challenges faced in the transport businesses are poor and dilapidated roads (100%) and occasional insecurity situations (86%); in Yambio poor and dilapidated roads (100%), high price of spare parts (40%) and high fuel price (50%); and in Bor County poor and dilapidated roads (56%), Lack of spare parts (33%), high fuel price (33%) and illegal road fee (22%).



## 5. Detail Value Chain Analysis

### A. Maize Value Chain Analysis (Torit, Bor and Yambio)

Figure 13: Detail Maize Value Chain Map



Channel A, B, C and D linked to the artisanal millers indicate that the miller offers service; does not take ownership of commodity. At the artisanal miller level, there is a need to support these millers to modernize their value addition facilities. Equally important is the need to build the capacities of SMEs engaged in processing on business management, storage and inventory management, production management, marketing and customer service. Equally crucial is the need to support the millers with soft loan to construct modern milling units. At the farmer level, there is a need to introduce seed multiplication and basic value addition systems e.g. community-based seed production, mobile threshers and winnowers to improve quality, value and hence income of farm produce reaching the market. In Yambio county, STO (local NGO) buy commodities from farmers on behalf of WFP.

**Table 19: Maize Production Trend per County**

Description	Name of The County			
	Bor (N=32)	Torit (N=20)	Yambio (N=43)	Total (N=95)
Planted Area in Feddan in 2017	1.03±.67	1.79±1.52	1.76±1.35	1.48±1.22
Planted Area in Feddan in 2018	1.13±.72	2.44±1.78	2.02±1.39	1.81±1.38
Planted Area in Feddan in 2019	1.21±.83	3.03±2.60	3.06±2.40	2.44±2.22
Yield in Kg/Feddan in 2017	375±262	401±668	810±866	544±663
Yield in Kg/Feddan in 2018	384±340	993±2956	852±783	713±1392
Yield in Kg/Feddan in 2019 (Expectation)	447±337	10550±44597	1722±2041	3373±21893
Production Cost in SSP in 2017	7175±4847	7459±15964	16236±22299	10170±15727
Production Cost in SSP in 2018	7765±5648	9704±16009	19977±23799	13141±18024
Production Cost in SSP in 2019	9618±7516	17050±36213	26300±28172	16601±25499
Quantity Sold in Kg	188±75	182±334	647±780	463±653
Amount Earned from Sale In SSP	8972±4647	6925±5495	28305±27064	20320±23269

Source: June 2019 SSADP II Own Survey Data

### ***1. Maize Production and Consumption Trend Analysis***

- 1) Between 2017 to 2019 area under maize production per farmer increased by 64 % from 1.48±1.22 Feddans to 2.44±2.22 Feddans respectively (by 18 %; 69 %, and 73 % in Bor, Torit and Yambio respectively)
- 2) In all the three project locations, yield of maize per feddan is also increasing steadily, considering 2019 yield estimate, over the three years period
- 3) Analysis of the average cost of production of maize per farmer shows a gradual increase in cost. This can be attributed to the increase in feddans under production that is accompanied by corresponding increase in cost of production.
- 4) 70 % of the maize produced in the three counties is consumed at the household level (53 %; 95 %, and 43 % in Bor, Torit and Yambio respectively)
- 5) Farmers earn 53 % of their production cost from the sale of the maize produce (10 %; -39 %, and 36 % in Bor, Torit and Yambio respectively) although farmers in Torit county seems they lost 39 % of the production cost this is because farmers consumed 95 % of their produce.

### ***2. Farmers Reason to Produce Maize and Access to Input***

99 % of the farmers reported that they produce maize both for consumption and marketing while 13 % of the farmers produce maize only for marketing. To produce most farmers (83 %) access input from their own saving, 42 % of them from their neighbor, 27 % from traders and 20 % through NGO support (table 20).

**Table 20: Reason to Produce Maize and Input Supplier**

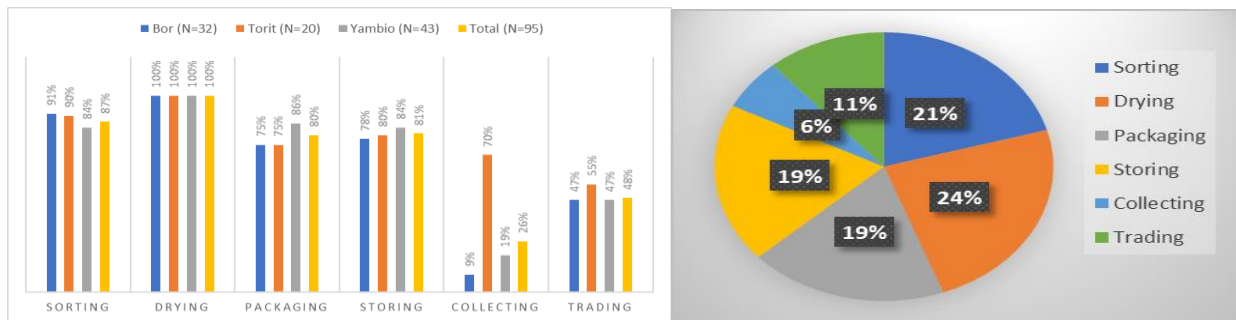
Description	Name of The County				
	Bor (N=32)	Torit (N=20)	Yambio (N=43)	Total (N=95)	
Reason to produce Maize	Both for consumption and marketing	32 (100%)	20 (100%)	42 (98%)	94 (99%)
	Only for marketing	1 (3%)	1 (5%)	10 (23%)	12 (13%)
	Due to experience	6 (19%)	2 (10%)	0	8 (8%)
	Due to availability of start-up capital	2 (6%)	0	3 (7%)	5 (5%)
	Due to other people push	0	0	1 (2%)	1 (1%)
Input Supplier for Maize	Own Saving	27 (84%)	12 (60%)	40 (93%)	79 (83%)
	Neighbour	17 (53%)	8 (40%)	15 (35%)	40 (42%)
	Gov't Support	2 (6%)	0	0	2 (2%)
	NGO Support	2 (6%)	7 (35%)	10 (23%)	19 (20%)
	Traders	8 (25%)	6 (30%)	12 (28%)	26 (27%)
	Association	1 (3%)	0	2 (5%)	3 (3%)

Source: June 2019 SSADP II Own Survey Data

### 3. Farmers Maize Value Addition Practice and Access to Market

Among farmers practice maize value addition function 100 %, 87 %, 81 %, 80 %, 48 % and 26 % farmers practice drying, sorting, storing, packaging, trading and collecting respectively. This indicates that among Value Addition Activities drying, sorting, storing, packaging, trading and collecting practiced 24 %, 21 %, 19 %, 19 %, 11 % and 6 % respectively (figure 14).

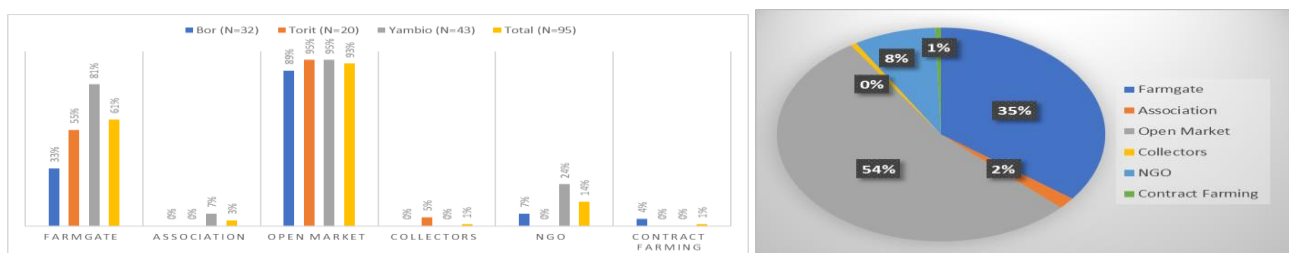
Figure 14: Maize Value Addition Practice by Farmers



Source: June 2019 SSADP II Own Survey Data

93 % farmers across the county’s sale their produce in open market while 61 % at farmgate. Selling through NGO, association and contract farming accounts 14 %, 3 % and 1 % respectively which indicates the marketing is more informal. Across the counties open market (54%) and farmgate (35%) are the two main outlets for farmers to sale maize (figure 15).

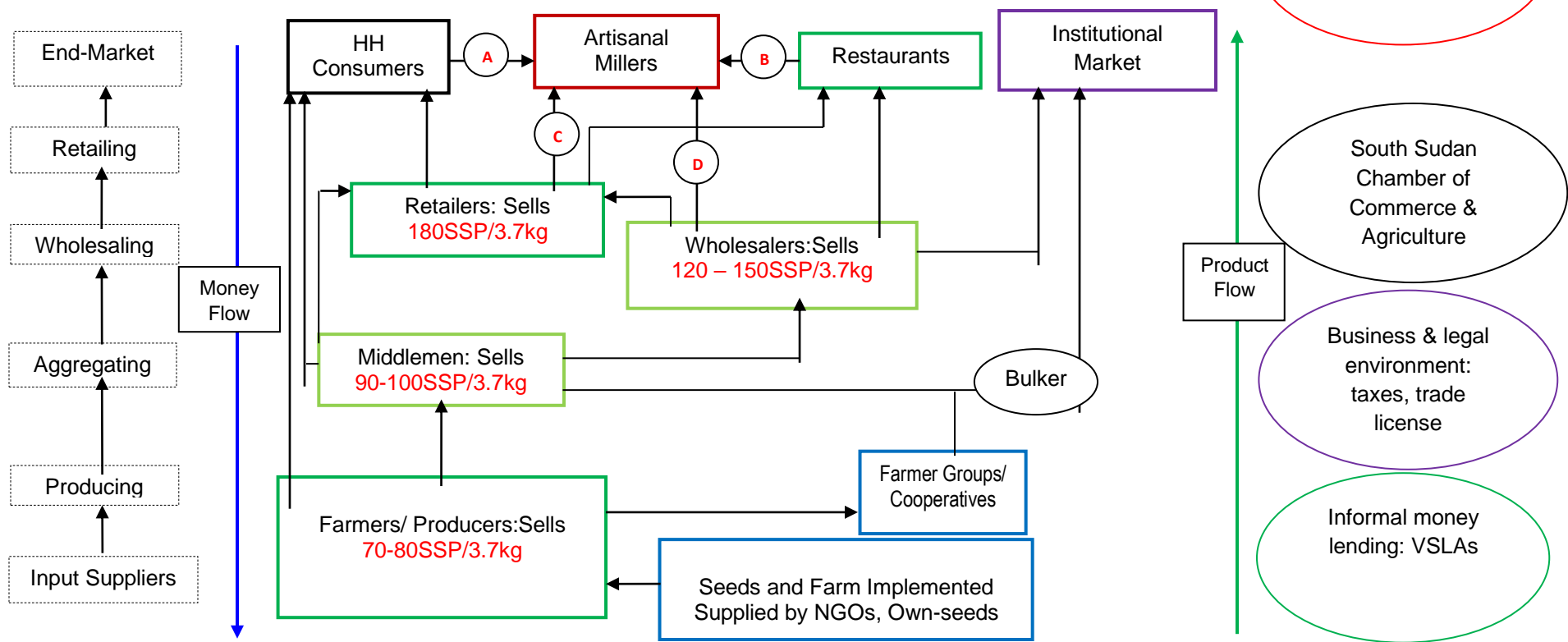
Figure 15: Market Outlet for Maize



Source: June 2019 SSADP II Own Survey Data

## B. Sorghum Value Chain Analysis (Torit, Bor and Yambio)

Figure 16: Detail Sorghum Value Chain Map



At the artisanal miller level, there is a need to support these millers to modernize their value addition facilities. Equally important is the need to build the capacities of SMEs engaged in processing on business management, storage and inventory management, production management, marketing and customer service. Equally crucial is the need to support the millers with soft loan to construct modern milling units. At the farmer level, there is a need to introduce seed multiplication and basic value addition systems e.g. community-based seed production, mobile threshers and winnowers to improve quality, value and income of farmers.

**Table 21: Sorghum Production Trend per County**

Description	Name of The County			
	Bor (N=38)	Torit (N=31)	Yambio (N=7)	Total (N=76)
Planted area in 2017	1.49±.81	2.20±1.65	.83±.51	1.73±1.29
Planted area in 2018	1.59±.78	2.19±1.22	.93±.44	1.75±1.02
Planted area in 2019	1.92±1.03	3.22±1.98	1.00±.50	2.35±1.63
Production in kg in 2017	680±568	279±221	165±114	465±472
Production in kg in 2018	557±411	986±3626	183±68	689±2279
Production in kg in 2019	960±708	7045±36444	266±131	3371±23178
Production cost in SSP in 2017	10840±10308	4021±5479	2625±1796	7327±8802
Production cost in SSP in 2018	13835±16935	8111±9233	9160±5738	11271±13871
Production cost in SSP in 2019	16633±15358	9344±14006	14960±8706	13616±14705
Quantity Sold in Kg	555±395	94±110	176±74	325±355
Amount earned from sale in SSP	35177±34369	7317±8365	13750±7692	21530±27425

Source: June 2019 SSADP II Own Survey Data

### ***1. Sorghum Production and Consumption Trend Analysis***

- 1) Between 2017 to 2019 area under sorghum production per farmer increased by 35 % from 1.73±1.29 Feddans to 2.35±1.63 Feddans respectively (by 28 %; 45 %, and 20 % in Bor, Torit and Yambio respectively).
- 2) In all the three project locations, yield of sorghum per feddan is also increasing steadily, considering 2019 yield estimate, over the three years period.
- 3) Analysis of the average cost of production of sorghum per farmer shows a gradual increase in cost. This can be attributed to the increase in feddans under production that is accompanied by corresponding increase in cost of production.
- 4) 78 % of the sorghum produced in the three counties is consumed at the household level (24 %; 97 %, and 14 % in Bor, Torit and Yambio respectively).
- 5) Farmers earn 100 % of their production cost from the sale of the sorghum produce (155 %; 2 %, and 54 % in Bor, Torit and Yambio respectively). The lowest revenue in Torit is because farmers consumed 97 % of their produce at household level.

### ***2. Farmers Reason to Produce Sorghum and Access to Input***

100 % of the farmers reported that they produce sorghum both for consumption and marketing while 4 % of the farmers produced sorghum only for marketing. To produce most farmers (72 %) access input from their own saving, 53 % from neighbor, 19 % from their traders, and 16 % through NGO support (table 22).

**Table 22: Reason to Produce Sorghum and Input Supplier**

Description		Name of The County			
		Bor (N=38)	Torit (N=31)	Yambio (N=7)	Total (N=76)
<b>Reason to produce Sorghum</b>	For consumption and marketing	38 (100%)	31 (100%)	7 (100%)	76 (100%)
	Only for marketing	0	1 (3%)	2 (29%)	3 (4%)
	Due to experience	6 (16%)	3 (10%)	1 (14%)	10 (13%)
	Due to availability of start-up capital	2 (5%)	0	0	2 (3%)
<b>Input Supplier for Sorghum</b>	Own Saving	30 (79%)	19 (61%)	6 (86%)	55 (72%)
	Neighbour	19 (50%)	18 (58%)	3 (43%)	40 (53%)
	NGO Support	6 (16%)	6 (19%)	0	12 (16%)
	Traders	6 (16%)	7 (23%)	1 (14%)	14 (19%)

Source: June 2019 SSADP II Own Survey Data

### 3. Farmers Sorghum Value Addition Practice and Access to Market

Among farmers practice sorghum value addition function 99 %, 87 %, 78 %, 71 %, 40 % and 38 % farmers practice drying, sorting, storing, packaging, trading and collecting respectively. This indicates that among Value Addition Activities drying, sorting, storing, packaging, trading and collecting practiced 24 %, 21 %, 19 %, 17 %, 10 % and 9 % respectively (figure 17).

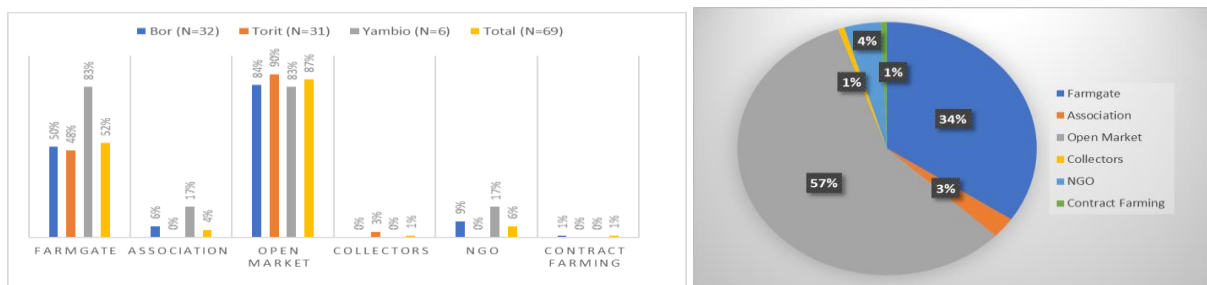
**Figure 17: Sorghum Value Addition Practice by Farmers**



Source: June 2019 SSADP II Own Survey Data

87 % farmers across the county’s sale their produce in open market while 52 % at farmgate. Selling through NGO, association, collectors, and contract farming accounts 6 %, 4 %, 1 % and 1 % respectively which indicates the marketing is more informal. Across the counties open market (57%) and farmgate (34%) are the two main outlets for farmers to sale sorghum (figure 18).

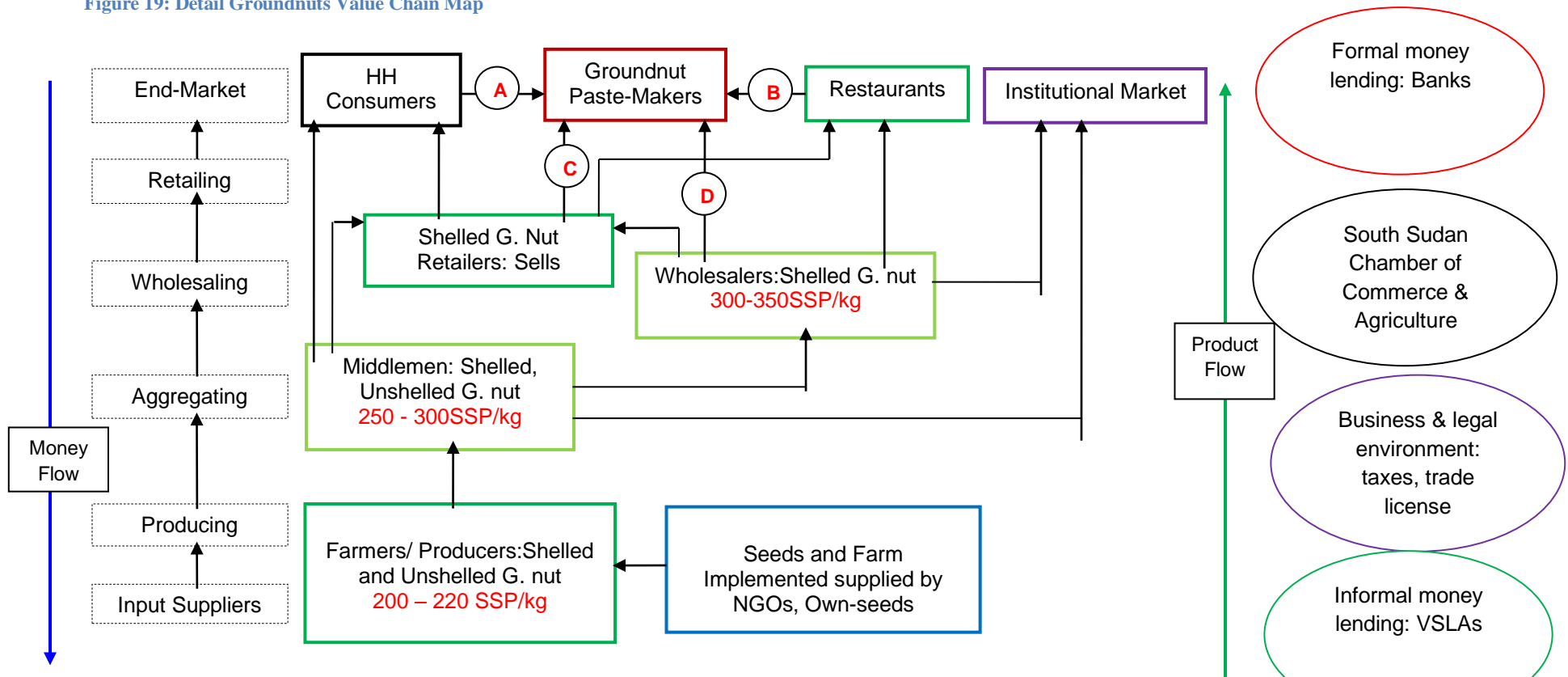
**Figure 18: Market Outlet for Sorghum**



Source: June 2019 SSADP II Own Survey Data

## C. Groundnuts Value Chain Analysis (Torit, Bor and Yambio)

Figure 19: Detail Groundnuts Value Chain Map



Channels A, B, C and D signifies service offered by paste-makers to customers. At the artisanal past-maker level, there is a need to support these millers to modernize groundnut paste-making facilities. Equally important is the need to build the capacities of SMEs engaged in groundnut processing on business management, storage and inventory management, production management and quality standards, marketing and customer service. Equally crucial is the need to support the paste-makers with soft loan to construct modern units. At the farmer level, there is a need to introduce proper post-harvest systems (drying and standard storage units)

**Table 23: Groundnuts Production Trend per County**

Description	Name of The County			
	Bor (N=41)	Torit (N=17)	Yambio (N=40)	Total (N=98)
Planted area in 2017	1.25±.94	0.86±.23	1.47±.97	1.26±.90
Planted area in 2018	1.32±1.12	1.00±.38	1.53±1.05	1.37±1.02
Planted area in 2019	1.81±1.95	1.70±.79	2.07±1.22	1.89±1.52
Production in kg in 2017	497±353	147±95	472±536	434±427
Production in kg in 2018	459±336	233±126	436±495	417±402
Production in kg in 2019	677±546	328±169	886±1002	676±711
Production cost in SSP in 2017	7793±6768	2366±2881	13869±15444	8396±9992
Production cost in SSP in 2018	9782±8087	5727±5061	12756±13992	9991±9995
Production cost in SSP in 2019	15840±16067	6380±7737	25076±31892	15504±19667
Quantity Sold in Kg	267±177	59±64	365±415	276±314
Amount earned from sale in SSP	23520±23773	4370±3162	19737±14757	18706±18881

Source: June 2019 SSADP II Own Survey Data

### ***1. Groundnuts Production and Consumption Trend Analysis***

- 1) Between 2017 to 2019 area under groundnuts production per farmer increased by 49 % from 1.26±0.29 Feddans to 1.89±1.52 Feddans respectively (by 45 %; 97 %, and 40 % in Bor, Torit and Yambio respectively). Significance increases in Torit.
- 2) In all the three project locations, yield of groundnuts per feddan is also increasing steadily, considering 2019 yield estimate, over the three years period
- 3) Analysis of the average cost of production of groundnuts per farmer shows a gradual increase in cost. This can be attributed to the increase in feddans under production that is accompanied by corresponding increase in cost of production.
- 4) 46 % of the groundnuts produced in the three counties is consumed at the household level (51 %; 75 %, and 39 % in Bor, Torit and Yambio respectively)
- 5) Farmers earn 66 % of their production cost from the sale of the groundnuts produce (111 %; - 9 %, and 54 % in Bor, Torit and Yambio respectively). The lowest revenue in Torit is because farmers consumed 75 % of their produce at Household level.

### ***2. Farmers Reason to Produce Groundnuts and Access to Input***

98 % of the farmers reported that they produce groundnuts both for consumption and marketing while 10 % of the farmers produced groundnuts only for marketing. To produce most farmers (84 %) access input from their own saving, 33 % from neighbor, 27 % from their traders, and 13 % through NGO support (table 24).



**Table 24: Reason to Produce Groundnuts and Input Supplier**

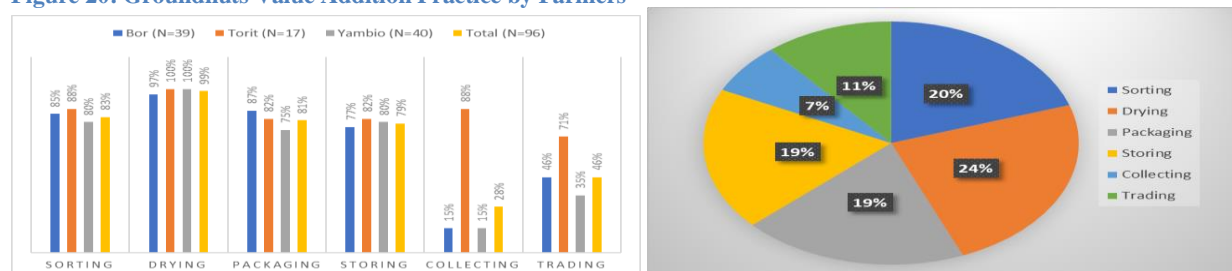
Description		Name of The County			
		Bor (N=41)	Torit (N=17)	Yambio (N=40)	Total (N=98)
Reason to produce Groundnuts	For consumption and marketing	40 (98%)	16 (94%)	40 (100%)	96 (98%)
	Only for marketing	1 (2%)	1 (6%)	8 (20%)	10 (10%)
	Due to experience	6 (15%)	3 (18%)	0	9 (9%)
	Due to availability of start-up capital	2 (5%)	0	3 (8%)	5 (5%)
Input Supplier for Groundnuts	Own Saving	32 (78%)	14 (78%)	37 (93%)	83 (84%)
	Neighbour	14 (34%)	7 (39%)	12 (30%)	33 (33%)
	GO support	4 (10%)	0	2 (5%)	6 (6%)
	NGO Support	3 (7%)	2 (11%)	8 (20%)	13 (13%)
	Traders	14 (34%)	3 (17%)	10 (25%)	27 (27%)
	Association	1 (2%)	0	2 (5%)	3 (3%)

Source: June 2019 SSADP II Own Survey Data

### 3. Farmers Groundnuts Value Addition Practice and Access to Market

Among farmers practice groundnuts value addition function 99 %, 83 %, 81 %, 79 %, 46 % and 28 % farmers practice drying, sorting, packaging, storing, trading and collecting respectively. This indicates that among Value Addition Activities drying, sorting, packaging, storing, trading and collecting practiced 24 %, 20 %, 19 %, 19 %, 11 % and 7 % respectively (figure 20).

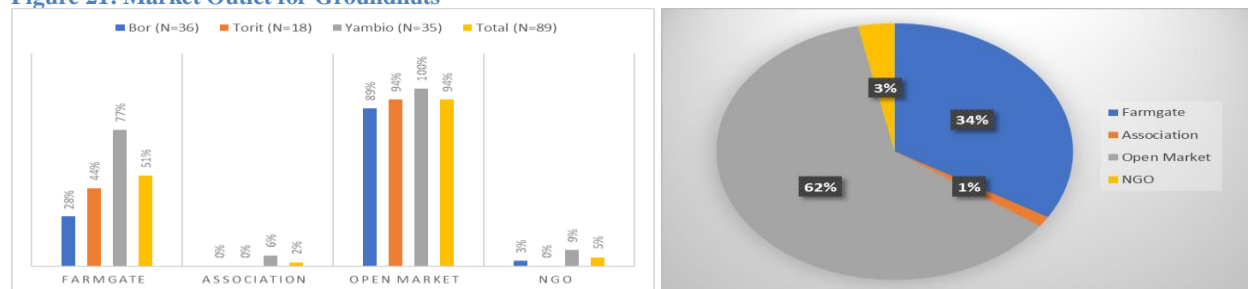
**Figure 20: Groundnuts Value Addition Practice by Farmers**



Source: June 2019 SSADP II Own Survey Data

94 % farmers across the county's sale their produce in open market while 51 % at farmgate. Selling through NGO and association accounts 5 % and 2 % respectively which indicates the marketing is more informal. Across the counties open market (62%) and farmgate (34%) are the two main outlets for farmers to sale groundnuts (figure 21).

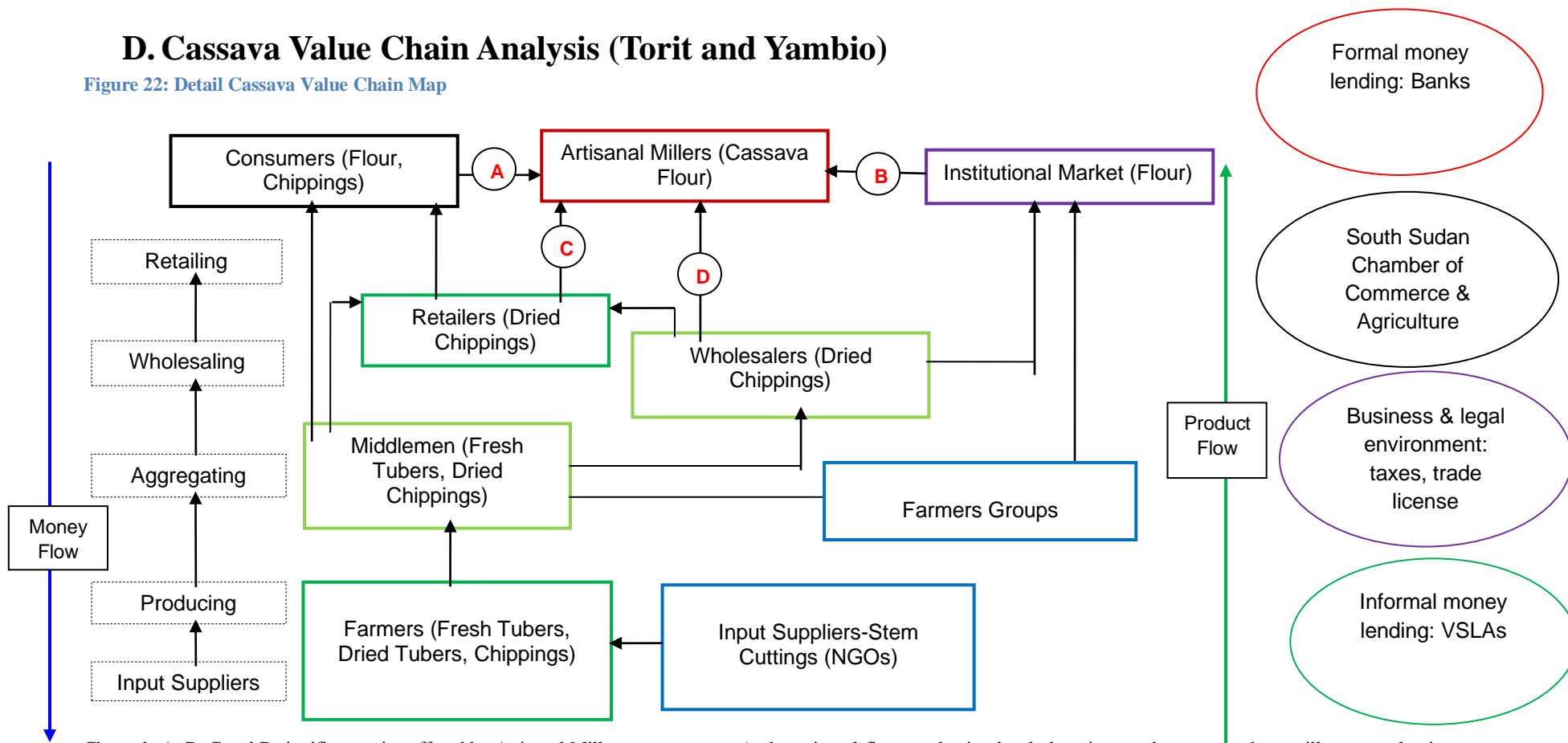
**Figure 21: Market Outlet for Groundnuts**



Source: June 2019 SSADP II Own Survey Data

## D. Cassava Value Chain Analysis (Torit and Yambio)

Figure 22: Detail Cassava Value Chain Map



Channels A, B, C and D signifies service offered by Artisanal Millers to customers. At the artisanal flour production level, there is a need to support these millers to modernize to improve the quality of the flour. Equally important is the need to build the capacities of Cassava producer to improve the quality of the cassava tuber (introduce proper post-harvest handling such as drying and standard storage units) and MSMEs engaged in cassava processing on business management, storage and inventory management, production management and quality standards, marketing and customer service and link them with finance service provider.

**Table 25: Cassava Production Trend per County**

Description	Name of The County			
	Bor (N=0)	Torit (N=4)	Yambio (N=30)	Total (N=34)
Planted area in 2017	-	0.83±0.29	1.37±1.02	1.30±0.97
Planted area in 2018	-	1.00±00	1.64±1.15	1.58±1.11
Planted area in 2019	-	1.17±.29	2.08±1.45	1.99±1.39
Production in kg in 2017	-	40±17	419±775	292±641
Production in kg in 2018	-	60±56	697±1054	599±991
Production in kg in 2019	-	76±40	1767±2188	1485±2089
Production cost in SSP in 2017	-	75±35	600±141	425±292
Production cost in SSP in 2018	-	275±318	2514±1478	2016±1620
Production cost in SSP in 2019	-	150±70	4357±2561	3422±2891
Quantity Sold in Kg	-		416±828	416±828
Amount earned from sale in SSP	-		39916±83448	39916±83448

Source: June 2019 SSADP II Own Survey Data

### 1. Cassava Production and Consumption Trend Analysis

- 1) Cassava produced only Torit and Yambio counties
- 2) Between 2017 to 2019 area under cassava production per farmer increased by 53 % from 1.30±0.97 Feddans to 1.99±1.11 Feddans respectively (by 40 % and 52 % in Torit and Yambio respectively).
- 3) In both counties yield of cassava per feddan is increasing steadily, considering 2019 yield estimate, over the three years period.
- 4) Analysis of the average cost of production of cassava per farmer shows a gradual increase. This can be attributed to the increase in feddans under production that is accompanied by corresponding increase in cost of production.
- 5) In Torit County most of the cassava being produced is consumed at the household-level while in Yambio it is 57 %. This indicates that Cassava marketing is well known in Yambio than Torit.

### 2. Farmers Reason to Produce Cassava and Access to Input

All farmers reported that they produce Cassava both for consumption and marketing while farmers in Yambio produced Cassava 27 % only for marketing and 10 % due to availability of start-up capital. To produce most farmers (88 %) access input from their own saving and 38 % from neighbor. Some farmers in Yambio reported that they access input from traders and through GO and NGO support (table 26).

**Table 26: Reason to Produce Cassava and Input Supplier**

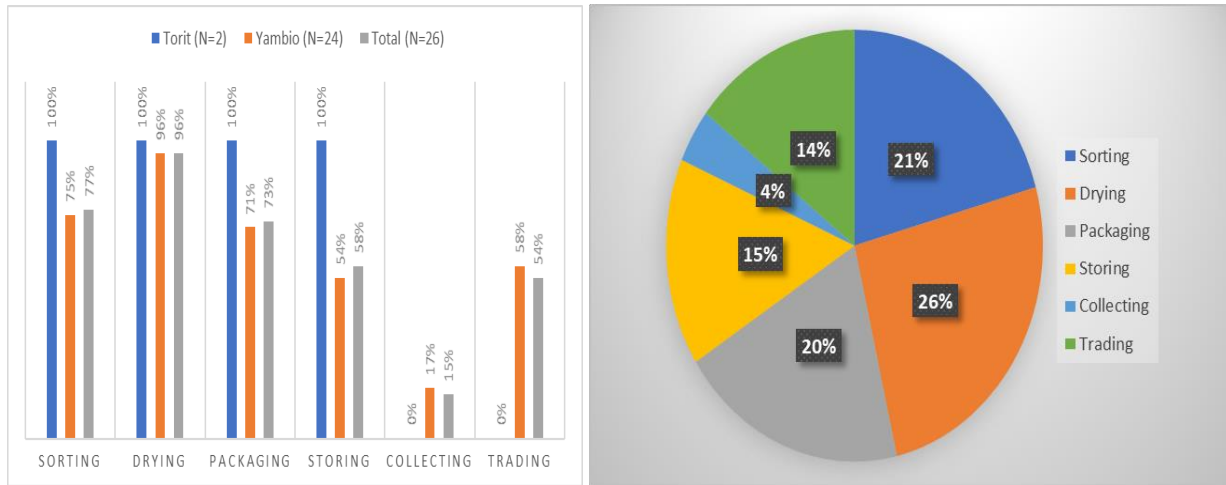
Description	Name of The County				
	Bor (N=41)	Torit (N=17)	Yambio (N=40)	Total (N=98)	
Reason to produce Cassava	For consumption and marketing		4 (100%)	30 (100%)	34 (100%)
	Only for marketing			8 (27%)	8 (24%)
	Due to availability of start-up capital			3 (10%)	3 (9%)
Input Supplier	Own Saving		1 (25%)	29 (97%)	30 (88%)
	Neighbour		3 (75%)	10 (33%)	13 (38%)

Source: June 2019 SSADP II Own Survey Data

### 3. Farmers Cassava Value Addition Practice and Access to Market

Across the counties 96 %, 77 %, 73 %, 58 %, 54 % and 15 % of farmers practice drying, sorting, packaging, storing, trading and collecting Cassava value addition function respectively. This indicates that among Value Addition Activities drying, sorting, packaging, storing, trading and collecting practiced 26 %, 21 %, 20 %, 15 %, 14 % and 4 % respectively (figure 23).

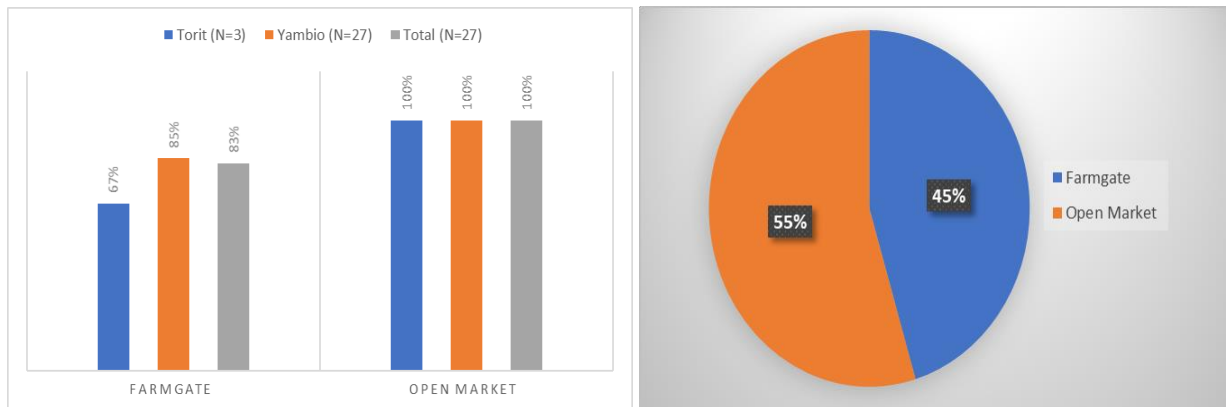
Figure 23: Cassava Value Addition Practice by Farmers



Source: June 2019 SSADP II Own Survey Data

100 % farmers across the county’s sale their produce in open market while 83 % at farmgate. Across the counties open market (55 %) and farmgate (45 %) are the two main outlets for farmers to sale cassava (figure 24).

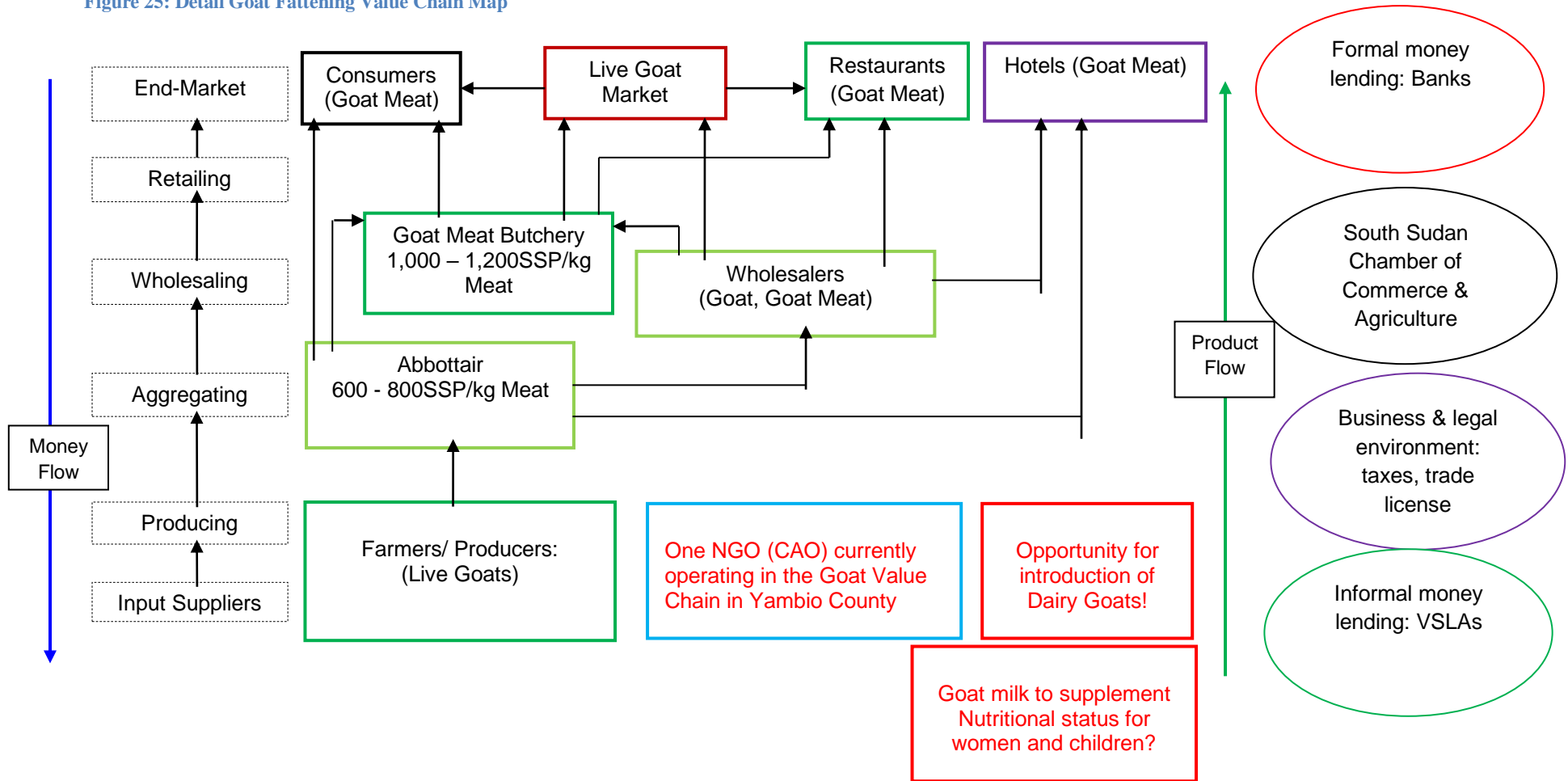
Figure 24: Market Outlet for Cassava



Source: June 2019 SSADP II Own Survey Data

## E. Goat Fattening Value Chain Analysis (Bor, Torit and Yambio)

Figure 25: Detail Goat Fattening Value Chain Map



\*\*\*Boxes marked in red represents the missing links in the value chains

**Table 27: Goat Fattening Trend per County**

Description	Name of The County			
	Bor (N=29)	Torit (N=10)	Yambio (N=8)	Total (N=47)
Number of Goat in 2017	15±13	36±49	6±3	19±27
Number of Goat in 2018	13±10	34±60	15±13	18±30
Number of Goat in 2019	14±20	40±70	16±10	20±38
Production cost in SSP in 2017	15233±31589	3003±3574	3750±1767	11911±27298
Production cost in SSP in 2018	17544±28173	7315±5359	13500±10606	15114±24496
Production cost in SSP in 2019	17396±28577	10880±9227	13666±6350	15730±24487
Goat Sold in Number	3±2	2±1	2±1	3±2
Amount earned from sale in SSP	27815±34264	7587±7961	34142±23348	24358±29125

Source: June 2019 SSADP II Own Survey Data

### ***1. Goat Fattening and Consumption Trend Analysis***

- 1) Even though number of goats fattened per farmer between 2017 to 2019 across the county increased by 12 % the increment is significant in Yambio which is by 166% while in Torit it is by 22%. On contrary the number of goats hold by farmers in Bor decline by 6 % and drought attribute to number reduction in the county.
- 2) Across the county’s farmers hold in average 19 goats between 2017 to 2019 (13 in Bor, 39 in Torit and 12 in Yambio)
- 3) Analysis of the average cost of production of goats per farmer is 14251 SSP/goat.
- 4) Across the counties only 13 % of goats were sold to the market (21 % in Bor, 5 % in Torit and 19 % in Yambio). This indicates that farmers fatten goat mainly for household consumption and/or as prestige.
- 5) Even though the majority farmers did not sale goats to the market those farmers reported sold goats earn 71 % of their production cost across the counties (66 % in Bor, 7 % in Torit and 231 % in Yambio). The highest revenue in Yambio is because the agroecology (very cold) of the county, which is not conducive for goat fattening, inflate the price.

### ***2. Farmers Reason to Fatten Goat and Access to Input***

89% farmers fatten goat both for consumption and marketing while 11 % only for marketing, 11 % due to experience and 4 % due to availability of start-up capital and other people push. For fattening 70 % and 50 % farmers access the required inputs from their own saving and traders respectively. On the other hand, 24 % and 7 % farmers access input from their neighbors and through association respectively (table 28).

**Table 28: Reason to Fatten Goat and Input Supplier**

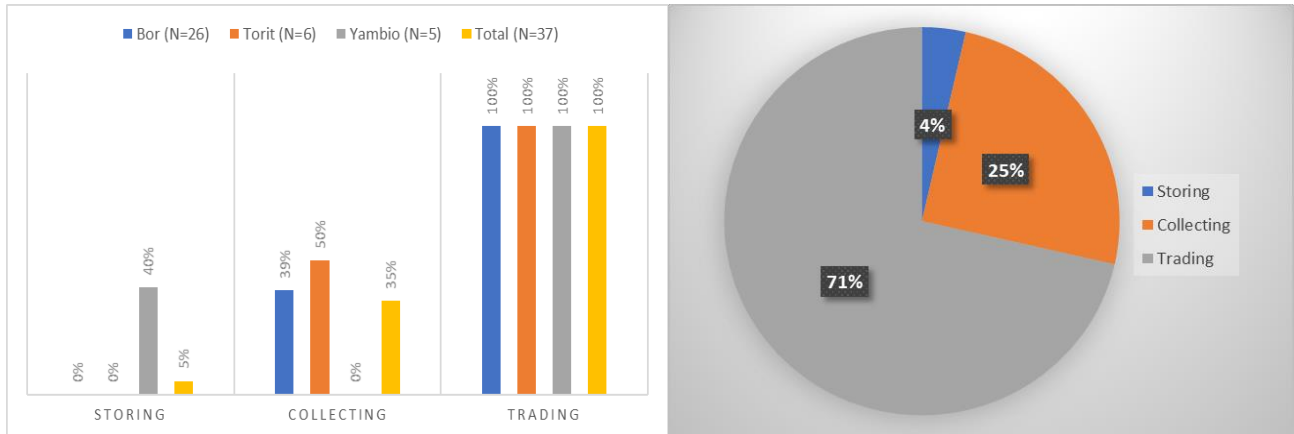
Description	Name of The County				
	Bor (N=29)	Torit (N=10)	Yambio (N=8)	Total (N=47)	
<b>Reason to fatten goat</b>	For consumption and marketing	28 (97%)	8 (80%)	6 (75%)	42 (89%)
	Only for marketing	0	2 (20%)	3 (38%)	5 (11%)
	Due to experience	4 (14%)	0	1 (13%)	5 (11%)
	Due to availability of start-up capital	1 (3%)	1 (10%)	0	2 (4%)
<b>Input Supplier</b>	Own Saving	22 (82%)	5 (46%)	5 (63%)	32 (70%)
	Neighbour	11 (41%)	0	0	11 (24%)
	Traders	12 (44%)	7 (64%)	4 (50%)	23 (50%)
	Association	2 (7%)	0	1 (13%)	3 (7%)

Source: June 2019 SSADP II Own Survey Data

### 3. Farmers Goat Value Addition Practice and Access to Market

Most farmers do not have any special value addition function in goat while all (100 %) farmers across the county practice trading, 35 % collecting and only 5 % engaged in storing. Therefore, the trading function account 71 % while collecting 25 % and storing 4 % of the value addition functions by farmers (figure 26).

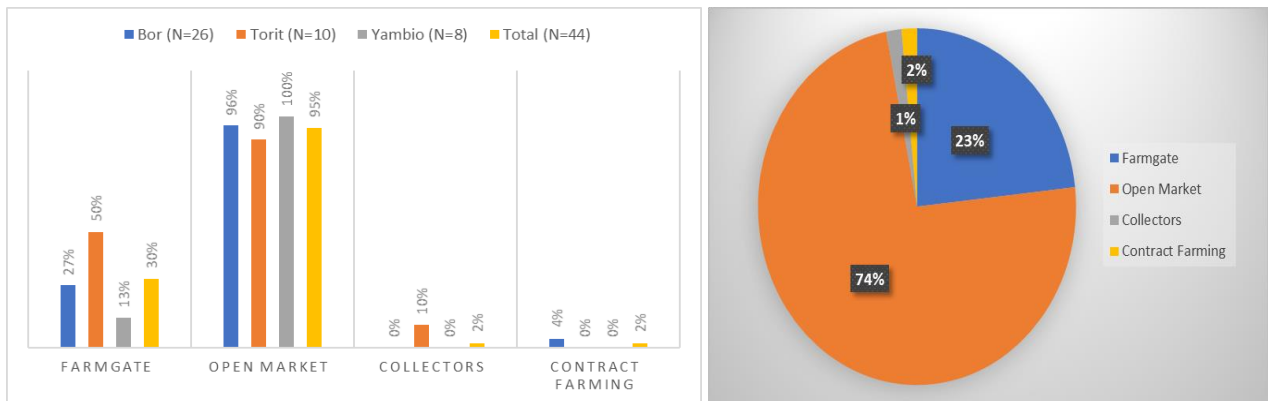
Figure 26: Goat Value Addition Practice by Farmers



Source: June 2019 SSADP II Own Survey Data

95 % farmers across the county's sale their goat in open market while 30 % at the farmgate while 2 % farmers sale through collectors and the other 2 % have signed contract farming with small restaurants and hotels. Therefore, across the counties open market and farmgate account 74 % and 23 % for goat market outlets respectively (figure 27).

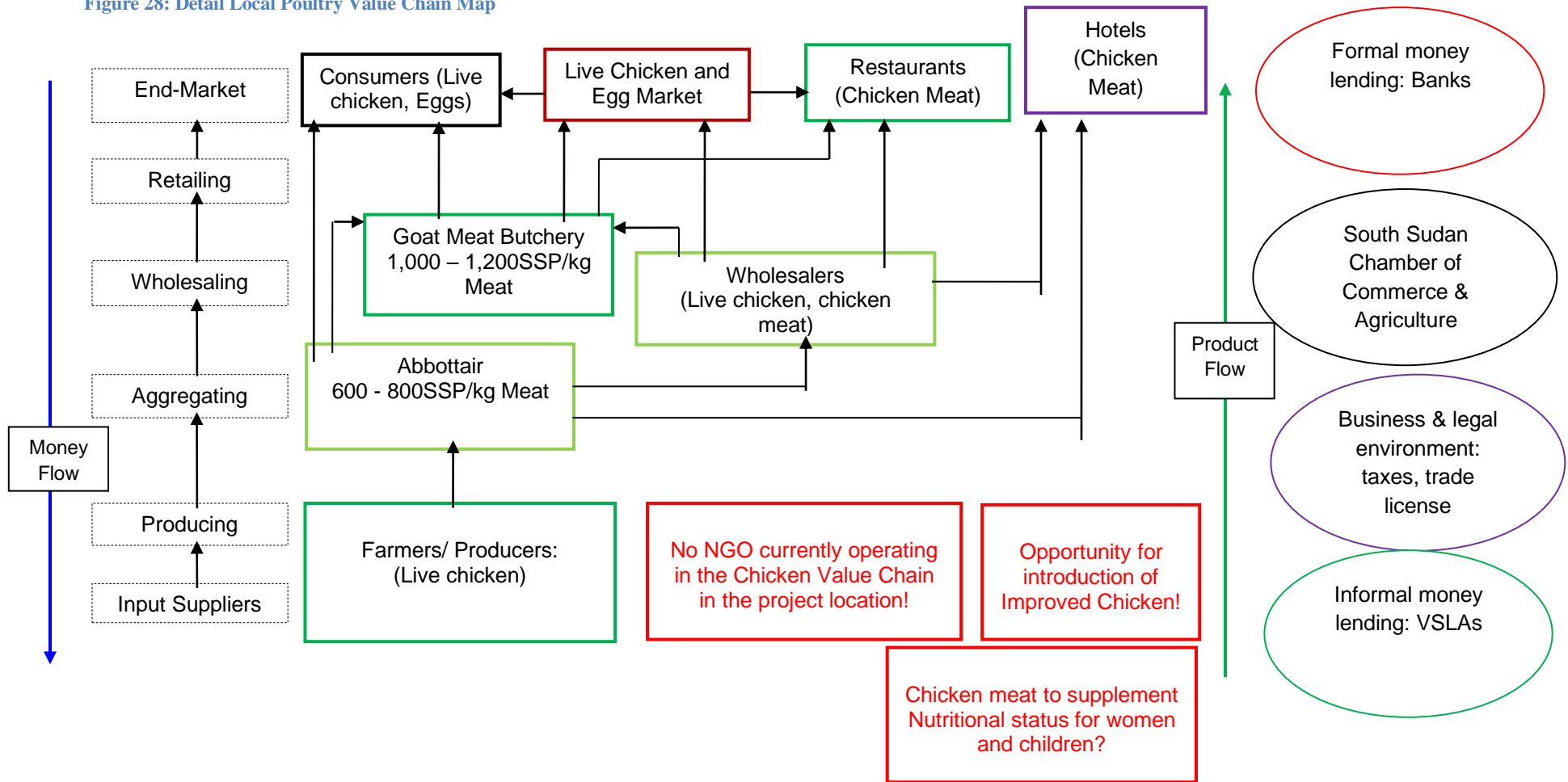
Figure 27: Market Outlet for Goat



Source: June 2019 SSADP II Own Survey Data

## F. Local Poultry Value Chain Analysis (Bor, Torit and Yambio)

Figure 28: Detail Local Poultry Value Chain Map



\*\*\*The record boxes indicated missing links in the value chain that present opportunities for development activities



**Table 29: Local Poultry Production Trend per County**

Description	Name of The County			
	Bor (N=27)	Torit (N=10)	Yambio (N=7)	Total (N=44)
Number of Chicken in 2017	16±17	18±16	29±11	19±16
Number of Chicken in 2018	15±12	9±10	20±11	14±12
Number of Chicken in 2019	12±10	12±12	35±34	14±16
Production cost in SSP in 2017	11205±21761	877±781	6500±3535	7918±17911
Production cost in SSP in 2018	6465±5521	1706±1805	7000±2121	5483±5125
Production cost in SSP in 2019	6972±6060	2202±1893	2750±1060	5741±5634
Chicken Sold in number	5±4	4±2	6±2	5±3
Amount earned from sale in SSP	6888±5465	3200±2122	8600±2222	6234±4796

Source: June 2019 SSADP II Own Survey Data

### **1. Local Poultry Production and Consumption Trend Analysis**

- 1) The local poultry value chain has great potential in terms of nutrition for women and children and income opportunities for the farmers in all the three project locations. However, the sector was neglected by the farmers due to preponderance of diseases that occasionally wipes out the chicken every year (for example fowl typhoid, new castle disease, etc). This is evidenced by the number of local chicken hold per farmer between 2017 to 2019 across the county was decreased by 24 % though the data show increase in Yambio by 19 %.
- 2) Across the county’s farmers hold in average 16 local chicken between 2017 to 2019 (14 in Bor, 13 in Torit and 28 in Yambio)
- 3) Analysis of the average cost of production of local chicken per farmer is 6381 SSP/chicken.
- 4) Across the counties only 28 % of local chicken were sold to the market (32 % in Bor, 27 % in Torit and 20 % in Yambio). This indicates that farmers hold chicken mainly for household consumption.

### **2. Farmers Reason to Local Poultry and Access to Input**

100 % farmers in all counties hold local chicken both for consumption and marketing while 9 % only for marketing, 9 % due to experience and 5 % due to availability of start-up capital. Farmers access the required inputs 62 % from their own saving, 49 % from traders, 44 % from neighbors and 3 % through association (table 30).

**Table 30: Reason to Start Local Poultry and Input Supplier**

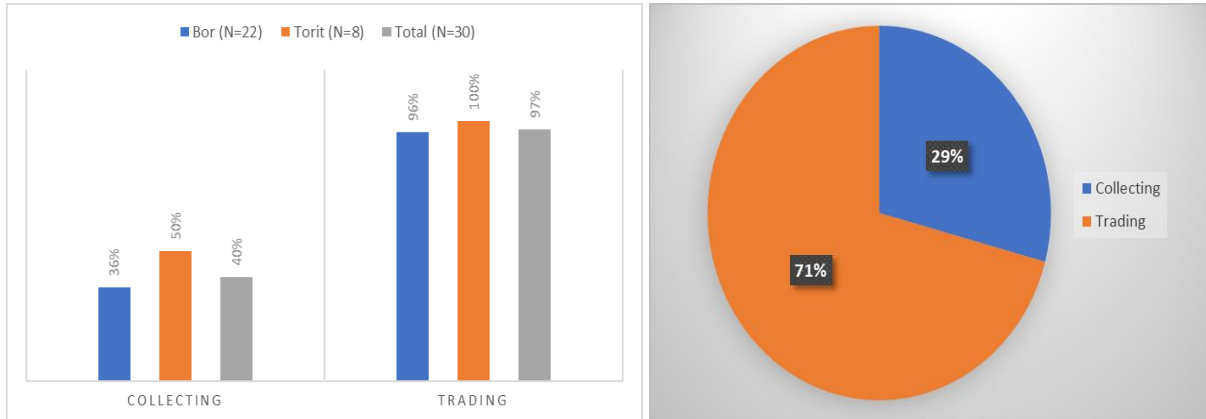
Description		Name of The County			
		Bor (N=27)	Torit (N=10)	Yambio (N=7)	Total (N=44)
<b>Reason to start Local Poultry</b>	For consumption and marketing	27 (100%)	10 (100%)	7 (100%)	44 (100%)
	Only for marketing	0	1 (10%)	3 (43%)	4 (9%)
	Due to experience	4 (15%)	0	0	4 (9%)
	Due to availability of start-up capital	1 (4%)	0	1 (14%)	2 (5%)
<b>Input Supplier</b>	Own Saving	18 (72%)	3 (30%)	3 (75%)	24 (62%)
	Neighbour	13 (52%)	2 (20%)	2 (50%)	17 (44%)
	Traders	12 (48%)	6 (60%)	1 (25%)	19 (49%)
	Association	1 (4%)	0	0	1 (3%)

Source: June 2019 SSADP II Own Survey Data

### 3. Farmers Local Poultry Value Addition Practice and Access to Market

Most farmers do not have any special value addition function in local chicken while 97 % farmers across the county practice trading and 40 % collecting. Therefore, the trading function account 71 % while collecting 29 % of the value addition functions by farmers (figure 29).

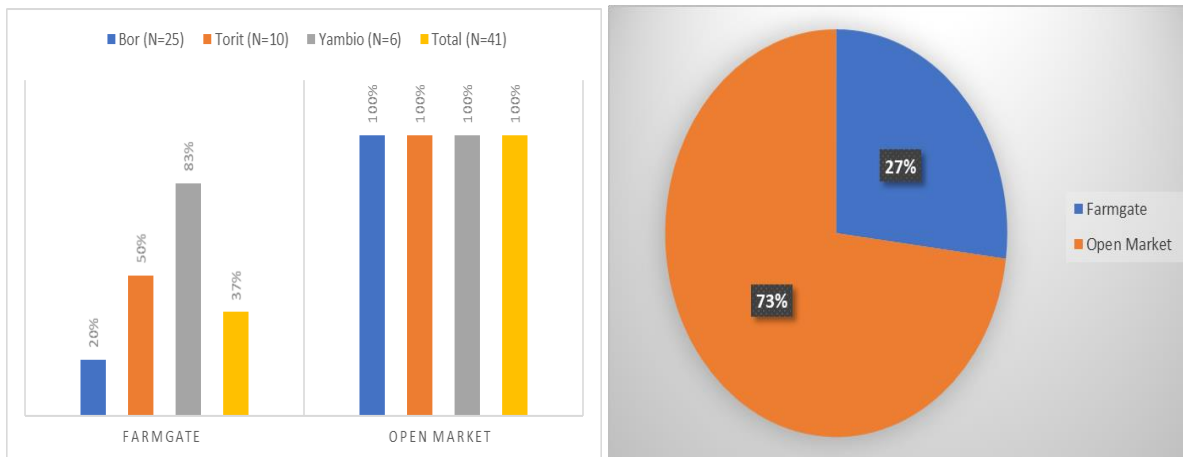
Figure 29: Goat Value Addition Practice by Farmers



Source: June 2019 SSADP II Own Survey Data

100 % farmers across the county's sale their local chicken in open market while 37 % at the farmgate. Therefore, across the counties open market and farmgate account 73 % and 27 % for local chicken market outlets respectively (figure 30).

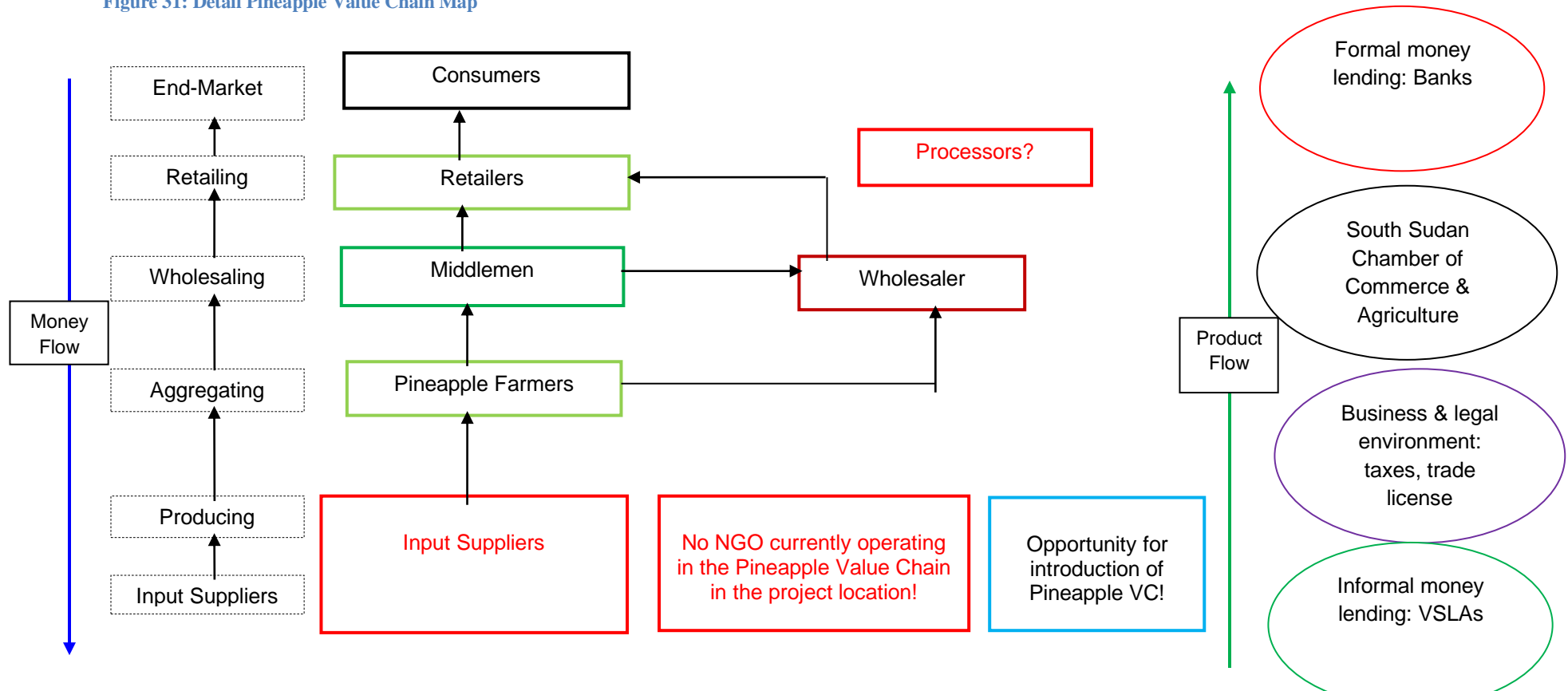
Figure 30: Market Outlet for Goat



Source: June 2019 SSADP II Own Survey Data

# G. Pineapple Value Chain Analysis (Yambio)

Figure 31: Detail Pineapple Value Chain Map



\*\*\*\*The boxes marked in red represents the missing links in the value chain. Among the three project locations, pineapple is produced only in Yambio County

**Table 31: Pineapple Production Trend in Yambio**

Description	Name of The County			
	Bor (N=0)	Torit (N=0)	Yambio (N=8)	Total (N=8)
Planted area in 2017	-	-	.40±.14	.40±.14
Planted area in 2018	-	-	.43±.12	.43±.12
Planted area in 2019	-	-	.43±.12	.43±.12
Number of Pineapple in 2017	-	-	1180±1752	1180±1752
Number of Pineapple in 2018	-	-	846±1559	846±1559
Number of Pineapple in 2019	-	-	808±1239	808±1239
Production cost in SSP in 2017	-	-	2166±288	2166±288
Production cost in SSP in 2018	-	-	3616±1530	3616±1530
Production cost in SSP in 2019	-	-	4650±4173	4650±4173
Pineapple Sold in Number	-	-	79±87	79±87
Amount earned from sale in SSP	-	-	7166±4611	7166±4611

Source: June 2019 SSADP II Own Survey Data

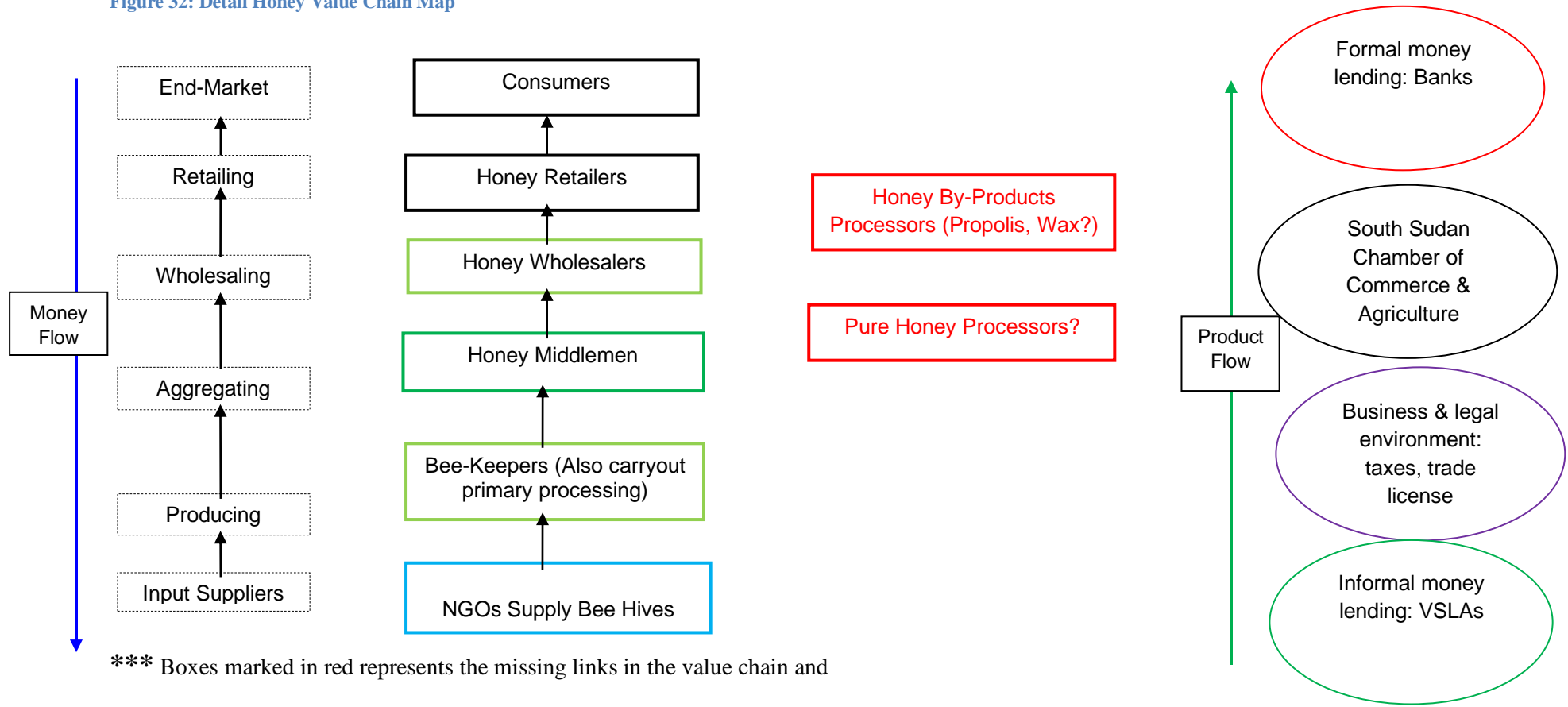
\*\*\* Production level of pineapples in Yambio county is still insignificant

\*\*\* Opportunities to increase production exist in the County given the excellent agro- ecological conditions.

\*\*\* There is agribusiness opportunity and potential by adding value in the pineapples in different product lines such as juice and drying. Therefore, is youth and women or MSME can start micro level agro processing there is possibility to improve production and productivity of pineapple in the county.

# H. Honey Value Chain Analysis (Torit and Yambio)

Figure 32: Detail Honey Value Chain Map



\*\*\* Boxes marked in red represents the missing links in the value chain and

**Table 32: Honey Production Trend in Yambio**

Description	Name of The County			
	Bor (N=0)	Torit (N=2)	Yambio (N=8)	Total (N=10)
Number of Beehives in 2017	-	2±2	66±126	53±112
Number of Beehives in 2018	-	4±3.5	39±64	31±57
Number of Beehives in 2019	-	6±5.3	60±123	45±106
Production in kg in 2017	-		431±832	431±832
Production in kg in 2018	-	2.5±.70	149±280	112±246
Production in kg in 2019	-	6±0	296±663	231±588
Production cost in SSP in 2017	-	10000	1300±989	4200±5071
Production cost in SSP in 2018	-	15000	3633±3385	6475±6320
Production cost in SSP in 2019	-	20000	30300±52999	28583±47590
Quantity Sold in Kg	-	1.5±0.7	25±14	22±13
Amount earned from sale in SSP	-	2000±707	21150±18322	16362±17845

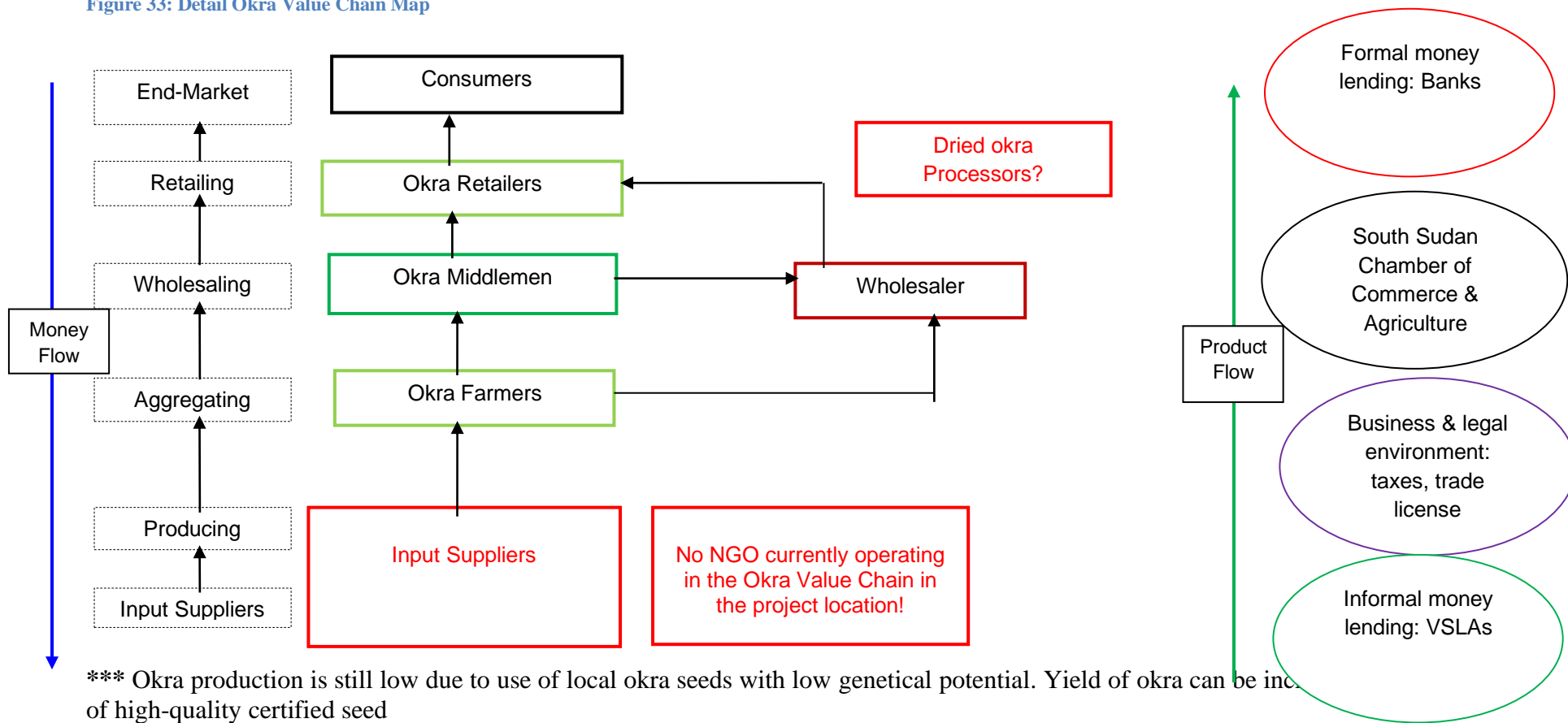
Source: June 2019 SSADP II Own Survey Data

### ***1. Honey Production, Consumption and Marketing Trend Analysis***

- 1) Opportunities for honey production exist in Torit and Yambio counties given the natural forest, an ideal habitat for bees that guarantees continuous supply of pollen for honey production.
- 2) Even though the production system in Torit is not significant and smaller in number the number of beehives hold per farmer between 2017 to 2019 increased by 166 % while in Yambio decreased by 8 %. The latter case can be attributed due to deforestation.
- 3) In Yambio farmers hold in average 55 traditional beehives while in Torit it is only 4 between 2017 to 2019.
- 4) Analysis of the average cost of production per farmer is 12461 SSP/year and 11744 SSP/year in Torit and Yambio respectively.
- 5) Across the county's farmers sold 52 % of produced honey to the market (42 % in Torit and 46 % in Yambio).
- 6) Even though farmers in Torit sold 42 % of their produce their revenue is a loss by 84 % while the Yambio farmers revenue is 80 %. The highest revenue in Yambio is because farmers has many beehives although it is traditional, and the cost of production is lesser than Torit.
- 7) Farmers do not add any value in their honey
- 8) Framers produce honey both for consumption and marketing
- 9) Farmers access the required input from their own source
- 10) Farmers sale honey in open market

# I. Okra Value Chain Analysis (Bor, Torit and Yambio)

Figure 33: Detail Okra Value Chain Map



**Table 33: Okra Production Trend per County**

Description	Name of The County			
	Bor (N=22)	Torit (N=5)	Yambio (N=8)	Total (N=35)
Planted area in 2017	0.36±.26	0.75±.29	0.65±.34	0.46±.31
Planted area in 2018	0.35±.26	0.88±.25	0.82±.59	0.52±.41
Planted area in 2019	0.37±.32	1.00±.61	0.88±.62	0.56±.50
Production in kg in 2017	160±168	33±22	218±225	147±167
Production in kg in 2018	178±138	46±36	150±188	151±143
Production in kg in 2019	254±220	78±76	40±14	196±205
Production cost in SSP in 2017	3202±2492	370±547	2000±1414	2728±2430
Production cost in SSP in 2018	4230±3559	373±544	1400±1058	3241±3344
Production cost in SSP in 2019	5681±4659	746±1088	2000±2103	4397±4424
Quantity Sold in Kg	163±151	15±14	113±171	139±153
Amount earned from sale in SSP	12013±7858	3250±2474	6628±12612	9968±9311

Source: June 2019 SSADP II Own Survey Data

### ***1. Okra Production and Consumption Trend Analysis***

- 1) Between 2017 to 2019 area under okra production per farmer increased by 20 % from 0.46±0.31 Feddans to 0.56±0.50 Feddans respectively (by 1 %, 33 % and 35 % in Bor, Torit and Yambio respectively).
- 2) Across counties the yield of okra per feddan is increasing steadily, considering 2019 yield estimate, over the three years period by 33 % (by 57 %, 136 % and 82 % in Bor, Torit and Yambio respectively).
- 3) Analysis of the average cost of production of okra per farmer shows a gradual increase across the counties by 61 % (by 77 %, 27 % and 70 % in Bor, Torit and Yambio respectively). This can be attributed to the increase in feddans under production that is accompanied by corresponding increase in cost of production.
- 4) Only 15 % of the Okra produced in the three counties is consumed at the household level (17 %; 71 %, and 56 % in Bor, Torit and Yambio respectively). Most of Bor farmers produce Okra mainly of market.
- 5) Farmers earn 188 % of their production cost from the sale of the Okra produce (175 %; 117 %, and 188 % in Bor, Torit and Yambio respectively). These indicate okra is a profitable vegetable among other that can encourage farmers to produce.

### ***2. Farmers Reason to Produce Okra and Access to Input***

All farmers reported that they produce Okra both for consumption and marketing while 9 % farmers produced Okra only for marketing, 11 % due to experience and 9 % due to availability of start-up capital. To produce Okra most farmers (86 %) access input from their own saving and 69 % from neighbor. Some farmers 3 %, 6 % and 11 % reported that they access input through GO and NGO support and from traders (table 34).



**Table 34: Reason to Produce Okra and Input Supplier**

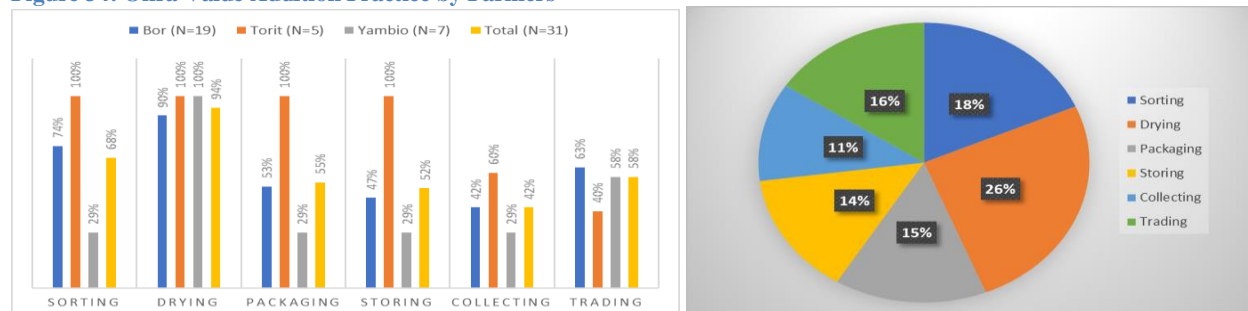
Description		Name of The County			
		Bor (N=22)	Torit (N=5)	Yambio (N=8)	Total (N=35)
Reason to produce Okra	For consumption and marketing	22 (100%)	5 (100%)	8 (100%)	35 (100%)
	Only for marketing	0	0	3 (38%)	3 (9%)
	Experience	4 (18%)	0	0	4 (11%)
	Due to availability of start-up capital	2 (9%)	0	1 (13%)	3 (9%)
Input Supplier	Own Saving	21 (96%)	2 (40%)	7 (88%)	30 (86%)
	Neighbour	16 (73%)	3 (60%)	5 (63%)	24 (69%)
	Gov't Support	1 (5%)	0	0	1 (3%)
	NGO Support	0	0	2 (25%)	2 (6%)
	Traders	2 (9%)	1 (10%)	1 (13%)	4 (11%)

Source: June 2019 SSADP II Own Survey Data

### 3. Farmers Okra Value Addition Practice and Access to Market

Across the counties 94 %, 68 %, 58 %, 55 %, 52 % and 42 % of farmers practice drying, sorting, trading, packaging, storing and collecting Okra value addition function respectively. This indicates that among Value Addition Activities drying, sorting, trading, packaging, storing and collecting practiced 26 %, 18 %, 16 %, 15 %, 14 % and 11 % respectively (figure 34).

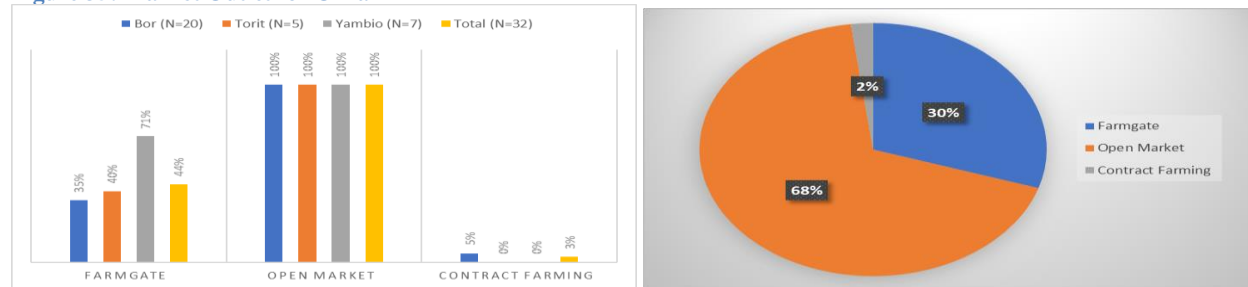
**Figure 34: Okra Value Addition Practice by Farmers**



Source: June 2019 SSADP II Own Survey Data

100 % farmers across the county's sale their produce in open market while 44 % at farmgate. In Bor county farmers sale their produce through contract farming for hotels and restaurants (3 %). Across the counties open market (68 %), farmgate (30 %) and contract farming (2%) are the three main outlets for farmers to sale Okra (figure 35).

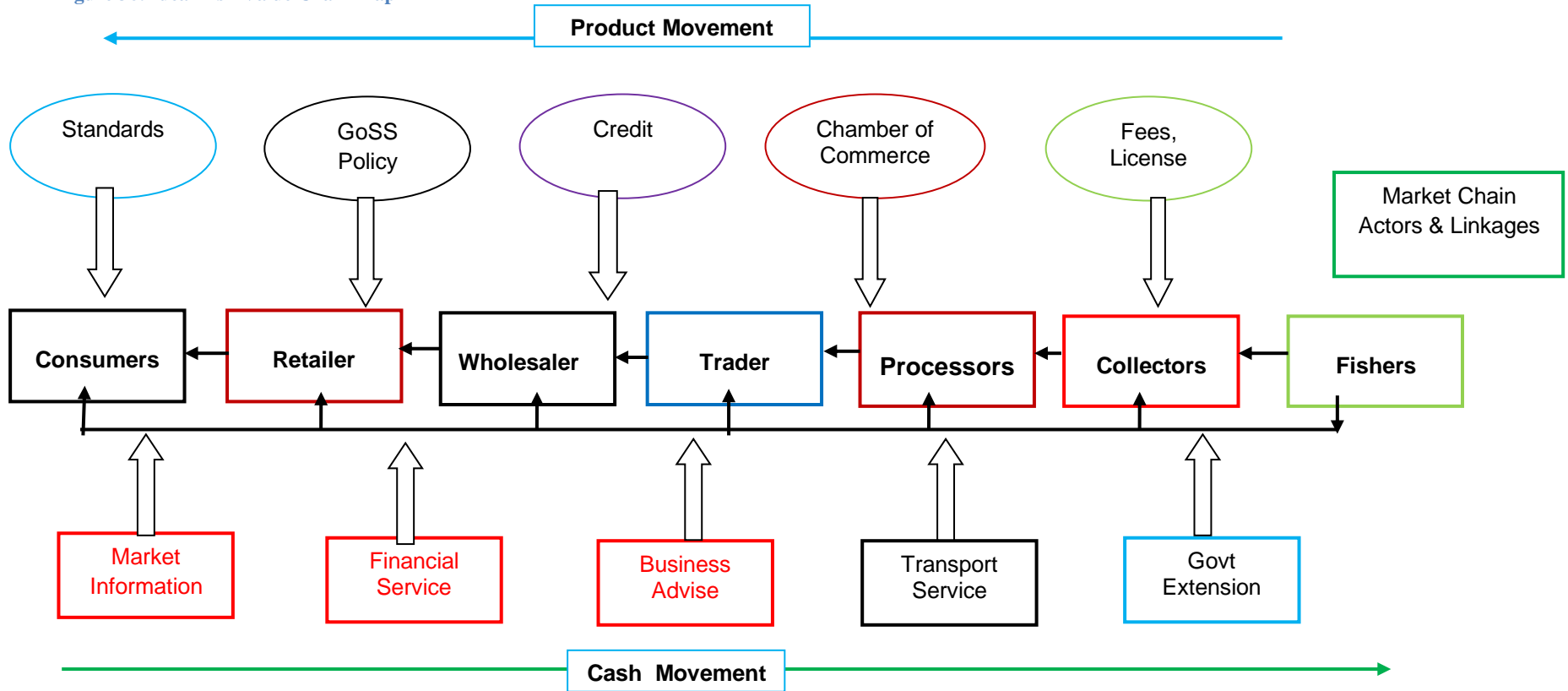
**Figure 35: Market Outlet for Okra**



Source: June 2019 SSADP II Own Survey Data

## J. Fishery Value Chain Analysis (Bor)

Figure 36: Ideal Fish Value Chain Map



**Table 35: Fish Production Trend per County**

Description	Name of The County			
	Bor (N=13)	Torit (N=1)	Yambio (N=1)	Total (N=15)
Production in kg in 2017	1786±5479	-	-	1786±5479
Production in kg in 2018	1602±4932	-	-	1602±4932
Production in kg in 2019	1963±5739	-	-	1963±5739
Production cost in SSP in 2017	16729±10830	-	-	16729±10830
Production cost in SSP in 2018	17000±9073	-	-	17000±9073
Production cost in SSP in 2019	21200±12716	-	-	21200±12716

Source: June 2019 SSADP II Own Survey Data

\*\*\* **Fishing** takes place in Bor County, although limited amount of fish is also obtained from Kineti River in Torit County

\*\* Value addition of fish is done using locally available methods by smoking, deep frying and sun-drying

## Chapter Four

### Conclusion and Recommendation

#### 1. Value Chain Analysis Summaries and Recommendation for Development

SUB-SECTOR	VALUE CHAIN ASSESSMENT	VALUE CHAIN POTENTIAL	EMPLOYMENT POTENTIAL	INTERVENTION PATHWAY FOR NGOs	LIMITATION	RECOMMENDATIONS
<b>MAIZE</b>	Lack of suitable varieties adaptable to the local climate and soils; lack of soil testing to analyse nutrient composition. Whereas Long-4, 5 and 10 varieties are doing relative well in the three counties, these are foreign varieties not bred for the agroecological conditions	Opportunities lies in flour blending & fortification – opportunity to improve nutrition status of women and children, and simple indigenous chicken feed formulation (to improve marketable weight of local chicken)	Strong employment sector at the farmer level as well as at the value addition level	<p><u>At farmer-level:</u> build capacities of farmers on agronomy (provide training and capacity development and processing.</p> <p><u>At farmer cooperative level:</u> Support in procurement of milling unit + spare parts + training unit operators</p> <p><u>At milling level:</u> Up-grade milling facilities, construct proper milling housing units, provide support on inventory management system.</p>	High operation costs (fuel) for milling units and distance to access spare parts	More capacity development is required on production and value addition is required
<b>SORGHUM</b>	Many land races with varying genetic potential; yield could be enhanced through local breeding and improved agronomic practices	Strength lies in the fact that the crop is drought and waterlog tolerant, opportunities lies in flour blending & fortification to improve nutritional status of women and children and simple local chicken feed formulation (to improve marketable weight of local chicken)	Strong self- employment sector at the farmer level as well as at the value addition level. Food security crop	<p><u>At farmer-level:</u> build capacities of farmers on agronomy (provide training and capacity development and processing.</p> <p><u>At farmer cooperative level:</u> Support in procurement of milling unit + spare parts + training unit operators</p> <p><u>At milling level:</u> Up-grade milling facilities, construct proper milling housing</p>	<p>Low productivity due to use of planting materials of low genetic potential.</p> <p>High operation costs for milling units (fuel) and distance to access spare parts.</p>	More capacity development is production and value addition are required

				units, provide support on inventory management systems		
<b>GROUNDNUT</b>	Local varieties (red beauty and white type very popular in the three counties	Opportunities lie in groundnut paste production. These can be used in soup making at the household-level or groundnut margarine in bread	In production at farm level. In local cottage industry/ artisanal millers in paste production	<p><u>At farmer-level:</u> build capacities of farmers on agronomy (provide training and capacity development and processing.</p> <p><u>At farmer cooperative level:</u> Support in procurement of milling unit + spare parts + training unit operators</p> <p><u>At milling level:</u> Up-grade milling facilities, construct proper milling housing units, provide support on inventory management systems, provide training and capacity development at farmer level</p>	High operation costs (fuel) for milling units and distance to access spare parts.  Challenge in accessing package materials for groundnut paste	More capacity development is required on production and value addition is required

<b>CASSAVA</b>	Use of local cassava stem-cuttings that mature in 18-24 months.	Cassava flour production and blending and fortification – to supplement nutritional status for women and children	In production at farm level. In local cottage industry/ artisanal millers in cassava flour production	<p><u>At farmer-level:</u> build capacities of farmers on agronomy (provide training and capacity development and processing.</p> <p><u>At farmer cooperative level:</u> Support in procurement of milling unit + spare parts + training unit operators</p> <p><u>At miller level:</u> Up-grade milling facilities, construct proper milling housing units, provide support on inventory management systems, provide training and capacity development at farmer level</p>	<p>High operation costs (fuel) for milling units and distance to access spare parts.</p> <p>Challenge in accessing packaging materials for blended cassava flour</p> <p>Use of inferior planting materials taking between 18 - 24 months to reach maturity</p>	More capacity development is required on production and value addition is required
<b>LOCAL CHICKEN</b>	A neglected sub-sector by both at the farmers and the NGO level	Opportunities exists given the fact that the birds can scavenge as well as obtain feed supplementation from sorghum and maize grains	Strong employment sector at farmer level and marketing level	Training and capacity development in production of chicken and local feed formulation to improve marketable weight and shorten time to market	Preponderance of chicken diseases;	More capacity development is needed production and marketing, future project should also be strong on disease prevention and control

## 2. Recommendation for Value Chains Upgrading

Analysed data indicates that sorghum, maize, groundnut and cassava are priority value chains with great potential in terms of production, value addition, employment, income and marketing. Others include local poultry and tomato. We recommend the following value chain upgrading strategy in order to formalize the sub-sectors and turn them into profitable economic ventures at the farmer-level.

### *A. Process/Product Upgrading*

The use of better production technology coupled with effective technology transfer mechanism is advocated to increase yield of the the identified value chains. Such technologies include:

- Use of high quality certified seeds to increase agricultural productivity and hence production. High quality certified seeds can only be accessed not through importing seeds from other geographical locations but through stimulating local community-based seed production. Towards this end, we recommend that due diligence be done to select potential farmer-groups/ cooperatives that can be trained on seed production (using foundation seeds). This is the only viable short-term option available to ensure the farmers get high quality seeds. In the long-run, there is a need for the GoSS to work hand in hand with development actors (active in the seed industry e.g. AGRA) and private sectors seed producers (e.g. KSC, Pioneer, Syngenta, Pannar etc) to breed seeds in the country.
- Value chain product upgrading. This can only take place in situation where value chain players are active participants in the sub-sectors. Towards this end, the FEMA approach in farmer capacity building will ensure that the agricultural producers are active not only at the producer space but also at the value addition space, and this means more income for them through active participation in the market.
- We would need to adopt measures that reduce farming risks for example pests (fall army worm) and diseases. These measures include promoting Integrated Pest Management (IPM) where emphasis is placed on cultural control of pests and diseases, and use of chemical is only advocated where other methods are not feasible. With respect to policy on safe-use of agro-pesticides, the GoSS (Agricultural ministry) and development actors need to develop a strategy of how certain agro-chemicals can accessed from reputable companies and used selectively in locations with high pest infestation.
- In the short-term, to achieve economies of scale, seeds need to be procured in bulk and these should be distributed to farmers via farmer organizations. Before procurement decisions are made, it is imperative that seeds samples from suppliers are subjected to germination and other purity tests.

Facilitate access to affordable lines of credit for crop production and farmer-based Micro, Small and Medium Enterprises (MSME).

- This can be achieved by promoting the VESA approach where money is raised internally by the farmers themselves, and those who require credit are advance the money to be repayed at a small interest rate agreed by the VESA members. “Seed capital” should be provided by development actors to the VESAs that show seriousness in internal fund generation and management.

- The MSME would also need to be linked with formal microfinance institution such as RUFU. With respect to the agricultural MSMEs, a mix of grant and loans package would need to be availed to the MSME on case-by-case basis, and close monitoring would need to be made to ensure that advanced money is used for intended purpose and that desired business output, outcome and impacts are achieved.

### ***B. Functional Upgrading***

Establish bulking and primary-level processing at farmer-level to reduce post-harvest and other transaction losses

- Where possible, the farmer cooperatives should be used as centres for bulking of farm produce and centres for primary value addition. Such value addition would include threshing, winnowing, milling and bulk packaging of produce before shipment to the market. There is also a need to pilot and facilitate acquisition of medium-scale milling machines in selected farmer cooperatives. Initial feasibility studies would need to be done to understand the cost outlay, availability of spare-parts and possibility of training selected youths at the payams-level on repair and maintenance of milling units. For those artisanal processors already existing in the payam-level, there is a need to provide them with venture capital (seed capital) to upscale their business on processing and quality assurance, build their capacities on business management, financial management, storage and operation management.

Reduce costs of transporting farm produce by improving road network through working with other development organizations supporting rehabilitation of road infrastructure and constructing road where non exist to open up the market.

### ***C. Upgrading of Coordination and Business Models***

Provide timely and relevant market information through community-based extension agents and other value chain actors in the respective sub-sectors

Generate information to build the capacity of value chain actors (especially the farmers) and monitor sub-sector performance. The use of M.I.S platforms and radio programs to relay information on crucial agricultural production and season, harvesting and post-harvesting should also be emphasized.

Foster trust and long-term relationships among value chain stakeholders through quarterly Multi-Stakeholder Platforms (MSP) where critical issues such as project implementation, crop production and market price are discussed in details, and challenges facing farmers are identified and sorted out, and opportunities are tapped in to by the respective value chain players.

### ***D. Improving Business Enabling Environment***

Support The GoSS in the development of Agricultural Input Policy (AIP), Agricultural Research Institutions, Plant Health and Inspectorate Departments, seed policy, etc.

Standardize units of measurements (use of ISO measurement standards such as “Kg” instead of “Malwa”, buckets, cups and basins) and strengthen GoSS weight and measures departments to champion introduction of standard units of measurements, and to enhance clarify in calculation of taxes, market licenses and fees.



### 3. Proposed Value Chains for SSADP II project

Nr.	Value Chains	Challenges	Opportunities	Proposed Additional Activities
1	Maize	<ol style="list-style-type: none"> <li>1) Lack of access to high quality seed maize:               <ul style="list-style-type: none"> <li>- Farmers using ordinary grains as seeds</li> </ul> </li> <li>2) Farmers lack skills on GAP:               <ul style="list-style-type: none"> <li>- Lack of skills on proper land preparation</li> <li>- Lack of skills on weeding, and pest and disease management</li> </ul> </li> <li>3) Maize pest: Fall armyworm:               <ul style="list-style-type: none"> <li>- Fall armyworm destroy maize crops</li> <li>- Weevil destroy stored produce</li> </ul> </li> <li>4) Farmers lack skills and tools on Post-harvest management               <ul style="list-style-type: none"> <li>- Shelling, sorting, grading, grinding</li> <li>- Lack of proper packaging material</li> </ul> </li> <li>5) Unpredictable rainfall pattern               <ul style="list-style-type: none"> <li>- The rainfall pattern has changed (for example this year’s rain came late when compared with last year)</li> </ul> </li> <li>6) Farmers are unable to access finance to upscale farming activities               <ul style="list-style-type: none"> <li>- Commercial banks do not have loan products for the farmers</li> </ul> </li> <li>7) Difficult to access markets:               <ul style="list-style-type: none"> <li>- Worn-out and dilapidated roads</li> </ul> </li> <li>8) Farmers lack skills in farm business planning, book-keeping, marketing, cost calculations</li> </ol>	<ol style="list-style-type: none"> <li>1) Breeding local seed maize</li> <li>2) Maize is a cash crop in all the three counties:               <ul style="list-style-type: none"> <li>- Upscale production for the markets to tap into the high market</li> </ul> </li> <li>3) Value addition:               <ul style="list-style-type: none"> <li>- Introduction of mobile manually operated maize shellers at farmer group level.</li> <li>- Introduction of medium-scale maize grinders</li> </ul> </li> <li>4) Build/ rehabilitate grain storage warehouses to reduce post-harvest loses and store for market</li> </ol>	<ol style="list-style-type: none"> <li>1) Promote community-based seed maize production at farmer-level, training progressive farmers on seed production               <ul style="list-style-type: none"> <li>- Identify foundation seed producers, negotiate and procure foundation seeds (‘Longe’ 4,5 &amp; 10 seed varieties from Uganda – performs better in project location Torit, Yambio, Bor Counties).</li> <li>- Seed companies to train SSADP-II technical team on seed production; training to be replicated at farmer-level **Proposed Budget Line: B211, B224, B222</li> </ul> </li> <li>2) Support farmers in-terms of:               <ul style="list-style-type: none"> <li>- Financing to procure manually operated maize shellers and grinders. Procure a total of 6 medium-scale manually operated maize-sheller at an estimated cost of: 6*\$6,000 = \$36,000</li> <li>- Farmer groups to construct housing for machines (this should be requirement to acquire maize-sheller and grinding mill) **Proposed Budget Line: B223</li> </ul> </li> <li>3) Explore commercial opportunities and support farmer groups in terms of contracting with buyers               <ul style="list-style-type: none"> <li>- WFP and other large-scale buyers **Staff time</li> </ul> </li> </ol>
2	Sorghum	<ol style="list-style-type: none"> <li>1) Farmers lack high quality and high yielding sorghum seeds               <ul style="list-style-type: none"> <li>- Farmer use of local sorghum landraces which are drought tolerant and waterlogging tolerant, but have low productivity</li> </ul> </li> <li>2) Farmers lack skills on GAP:               <ul style="list-style-type: none"> <li>- Lack of skills on proper land preparation</li> <li>- Lack of skills on weeding, and pest and</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1) Breeding of sorghum seeds suitable for geographical locations in South Sudan</li> <li>2) Opportunity to pilot and introduce mobile manually operated sorghum threshers and winnowers in the project locations</li> <li>3) Opportunities to pilot and introduce manually operated sorghum milling units in the agricultural cooperatives</li> </ol>	<ol style="list-style-type: none"> <li>1) Introduction of mobile threshers, winnowers and milling units at farmer should be accompanied with of identification of a few community members (especially the youths) who can be trained on maintenance and repair of these machines. **Proposed Budget Line: B223 (To explore on available manually operated mobile threshers and winnowers and come up with a report)</li> </ol>

Nr.	Value Chains	Challenges	Opportunities	Proposed Additional Activities
		disease management 3) Farmers lack skills and tools on Post-harvest management of sorghum - threshing, winnowing, sorting, grading, - lack of proper packaging material 4) Farmers are unable to access finance to upscale farming activities - Commercial banks do not have loan products for the farmers 5) Difficult to access markets due to poor roads 6) Destruction of sorghum in the field by <i>Quelea-Quelea</i> birds 7) Farmers lack skills in farm business planning, book-keeping, marketing	within the project location 4) Opportunities to pilot and introduce meshed fabrics over sorghum crops to reduce destruction of the sorghum by the birds 5) Opportunity in sorghum flour production, blending and fortification for improved nutrition among women and children	
3	Groundnut	1) Unavailability of high-yielding groundnut seeds in the project locations 2) Lack of skills in groundnut production reduce productivity 3) Lack of farm business skills (business planning, book-keeping, marketing) 4) Groundnut pest (armyworm, thrips) and diseases (botrytis blight, charcoal rot, leaf spot) 5) Lack of proper storage facilities result to high post-harvest losses	1) Opportunity exist for groundnut seed production at communal level 2) Opportunity for increased groundnut production due to suitable soils 3) Opportunity exist for groundnut-paste making, food-blending and hence improve nutritional status of women and children in the project location 4) Opportunity exist for group farming to increase the volume of groundnut reaching the market	1) Pilot manually operated groundnut milling machine **Staff time 2) Provide milling units to selected cooperatives growing groundnut as a group (group-farming) on cost-sharing basis; SSADP-II to provide milling units and group farmers to provide housing unit **Proposed Budget Line: B223, B222
4	Cassava	1) The main challenge facing cassava is use of inferior planting materials (stems) that mature is 12 months 2) Farmers lack skills in planting materials (stem) preparation and positioning of stem on the ground at planting; this reduces productivity 3) Cassava pests (mites, scales) and diseases (mosaic virus, leaf spot)	1) Opportunity to introduce short-maturing cassava varieties such as ‘Minjera’ and SS04 from (high quality seeds mature in 6 months) Kenya 2) Cassava milling and flour-blending with other flour (maize, sorghum) for improved nutrition among women and children in the project location	1) Pilot and introduce short-maturing high-quality cassava planting materials ‘Minjera’ and SS04 **Proposed Budget Line: B211, B224, B222
5	Local chicken	1) Local chicken regularly gets affected by poultry diseases such as new castle, fowl	1) The crop has the potential to contribute significantly to household income (high	1) Carry out selection of local chicken breeds to be promoted in the project location

Nr.	Value Chains	Challenges	Opportunities	Proposed Additional Activities
		<p>typhoid that wipes out flocks</p> <p>2) Local breeds have low genetic production potential; grow slowly and reach maturity at 8 – 12 months</p> <p>3) Local chickens are neglected by the farmers (left to scavenge without any feed supplementation), hence lower productivity</p>	<p>price margin between farm-gate and main market centres), ready market</p> <p>2) Opportunity to improve nutrition of women and children at household levels</p> <p>3) Local chicken-feed formulation using available grains (sorghum, maize, etc.)</p>	<p>**Staff time</p> <p>2) Promote production of local chicken feed to improve marketable weight of chicken and growth period of chicken **Staff time</p> <p>3) Train farmers on chicken disease identification and treatment **Staff time</p> <p>4) Train farmers on routine chicken husbandry practices including chicken house construction, supplementary feeding regimes **Staff time: Chicken housing to be constructed with locally available materials</p>
6	Honey	<p>1) The market for honey is not well-organized with different farmers selling at different prices</p> <p>2) The farmers face challenges in adhering to quality and hygiene standards</p> <p>3) Challenges in accessing modern beehives; bee farmers use traditional honey hives that are not effective</p>	<p>1) Due to the wild forests the bees feed on, the taste of the honey you get from South Sudan is unique, distinctive and rich. This presents ready market for honey from South Sudan (Yambio)</p> <p>2) Opportunities for honey by-products (wax, propolis)</p>	<p>1) Doing Cost-Benefit-Analysis (CBA) on introducing modern beehives (Langstroth, Top Bar) in the project location **Staff time</p> <p>2) Introduce modern beehives (Langstroth, Topbar) to beehives to farmers in the project location **Pilot construction of beehives using local materials **Engage consultant/ technician to train on local beehives construction</p> <p>3) Establish honey cooperatives and collection centres **Staff time</p> <p>4) Build the capacity of farmers on production best standard for honey **Staff time</p> <p>5) Build the capacities of farmers on honey value addition **Staff time</p>

## Annex 1: Detail sub-sector Analysis Result

<b>Torit</b>																		
Selection Criteria	Maize	Sorghum	Groundnut	Sesame	Sunflower	Onion	Cassava	Okra	Mango	Poultry	Honey	Bananas	Pineapples	Fish	Papaya	Coffee	Goat	Cow
Contribution to HH Food Security	2	2.75	2.75	1.5	0.75	1	2.25	2.5	2	2.5	2	1	1.75	2.5	2	1.75	3	
Contribution to HH income	2.5	2.5	2.75	2.25	1.75	1.5	2.75	2.25	2	2.5	2.25	1	2	2	2.25	1.25	2.5	
Job Creation Opportunity	2	2	2.25	2	1.75	1.5	2.5	2.25	2.25	2.5	2.25	1.25	1.25	2	1.75	1.25	2.5	
Value Addition Potential	2.5	2.75	2.5	1.75	1	1.75	2	2.25	2	2.25	2	1.25	2.25	2.25	2.25	2.25	2.75	
Opportunity for Youth and Women Engagement	2	2	1.5	2	0.75	1	1.75	1.75	2.25	2.75	2.75	2	2.75	2.75	2.25	2.25	2.75	
Ease of Production	2.25	1.75	1.75	2	1.25	1.5	2	1	1.75	1.75	1.5	1.25	1.5	2.5	2	1.5	2	
Does Require Use of Inputs (Ferti, Seeds)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Average weight	16.25	16.75	16.50	14.50	10.25	11.25	16.25	15.00	15.25	17.25	15.75	10.75	14.50	17.00	15.50	13.25	18.50	
Rank	6	4	5	12	17	15	6	11	10	2	8	16	12	3	9	14	1	
<b>Yambio</b>																		
Selection Criteria	Maize	Sorghum	Groundnut	Sesame	Sunflower	Onion	Cassava	Okra	Mango	Poultry	Honey	Bananas	Pineapples	Fish	Papaya	Coffee	Goat	Cow
Contribution to HH Food Security	3	1.25	2.75	1.5	0	0.75	3	2.25	2	2	1.75	1.5	2	1	1.25	0.75	2	
Contribution to HH income	3	0.5	3	0.75	0	1.5	3	1.75	1.5	2.25	2.75	1.75	1.75	1.75	1	2	2.25	
Job Creation Opportunity	2	0.25	2.5	1	0	1.5	2.25	1.25	1.5	2	2.5	1.25	1.75	1.25	0.75	1.25	2	
Value Addition Potential	2.5	0.75	2.5	1	1	0.75	3	0.5	2.75	1	2.75	1.25	2.5	1.25	1.75	1.5	1	
Opportunity for Youth and Women Engagement	2.75	1	2.75	1.5	1	2.25	2.5	1.25	2	2.25	2.5	1.5	2.25	1.75	1.25	1.5	2	
Ease of Production	3	2	2.75	1.25	1	1.75	2.75	2.25	1.75	2.25	2.25	1.5	2.25	1.5	1.5	2	2	
Does not Require Use of Inputs (Fert., Seeds)	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	
Average weight	19.25	7.00	17.00	7.75	3.50	9.00	17.25	10.00	11.50	14.75	15.25	9.50	13.25	9.25	8.25	9.25	12.00	
Rank	1	16	3	15	17	13	2	9	8	5	4	10	6	11	14	11	7	

**Bor**









Selection Criteria	Maize	Sorghum	Groundnut	Sesame	Sunflower	Onion	Cassava	Okra	Mango	Poultry	Honey	Bananas	Pineapples	Fish	Papaya	Coffee	Goat	Cow
Contribution to HH Food Security	2	3	2.25	1	0.25	1	0.5	2.5	0.5	2	0.75			2.5	0.75		2.5	2
Contribution to HH income	1.25	2.5	3	1	0.25	1.75	0.5	3	0.5	2.25	1.25			3	0.75		2.5	2
Job Creation Opportunity	1.25	2.5	2	0.5	0.25	1	0.25	2.75	0.5	2	1			2.5	0.75		2.5	2
Value Addition Potential	2.5	2.75	3	1	0.25	0.5	0.25	1.25	0.5	1.25	0.75			2.25	0.5		1.25	0.75
Opportunity for Youth and Women Engagement	1.75	2.75	1.75	0.75	0.25	1.5	0.25	2.25	0.5	2	0.75			2	0.75		2	1.75
Ease of Production	2.5	2.75	3	1.75	0.25	1.5	0.25	2.75	0.5	2.25	1			1.75	0.5		2	1.25
Does not Require Use of Inputs (Fert., Seeds)	3	3	3	3	3	3	3	3	3	3	3			3	3		3	3
Average weight	14.25	19.25	18.00	9.00	4.50	10.25	5.00	17.50	6.00	14.75	8.50			17.00	7.00		15.75	12.75
Rank	7	1	2	10	15	9	14	3	13	6	11			4	12		5	8

**Cumulative**

Selection Criteria	Maize	Sorghum	Groundnut	Sesame	Sunflower	Onion	Cassava	Okra	Mango	Poultry	Honey	Bananas	Pineapples	Fish	Papaya	Coffee	Goat	Cow
Contribution to HH Food Security	2.33	2.33	2.58	1.33	0.33	0.92	1.92	2.42	1.50	2.17	1.50	0.83	1.25	2.00	1.33	0.83	2.50	0.67
Contribution to HH income	2.25	1.83	2.92	1.33	0.67	1.58	2.08	2.33	1.33	2.33	2.08	0.92	1.25	2.25	1.33	1.08	2.42	0.67
Job Creation Opportunity	1.75	1.58	2.25	1.17	0.67	1.33	1.67	2.08	1.42	2.17	1.92	0.83	1.00	1.92	1.08	0.83	2.33	0.67
Value Addition Potential	2.50	2.08	2.67	1.25	0.75	1.00	1.75	1.33	1.75	1.50	1.83	0.83	1.58	1.92	1.50	1.25	1.67	0.25
Opportunity for Youth and Women Engagement	2.17	1.92	2.00	1.42	0.67	1.58	1.50	1.75	1.58	2.33	2.00	1.17	1.67	2.17	1.42	1.25	2.25	0.58
Ease of Production	2.58	2.17	2.50	1.67	0.83	1.58	1.67	2.00	1.33	2.08	1.58	0.92	1.25	1.92	1.33	1.17	2.00	0.42
Does not Require Use of Inputs (Fert., Seeds)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.00	2.00	3.00	3.00	2.00	3.00	1.00
Average weight	16.58	14.92	17.92	11.17	6.92	11.00	13.58	14.92	11.92	15.58	13.92	7.50	10.00	15.17	11.00	8.42	16.17	4.25
Rank	2	7	1	11	17	12	9	6	10	4	8	16	14	5	12	15	3	18

## Annex 2: Data collection tools

The team developed the following questionnaires and checklists as a data collection tool

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| 1 FARMERS<br>INTERVIEW TOOL.doc   | 2 TRADERS<br>INTERVIEW TOOL.doc   | 3 PROCESSORS<br>INTERVIEW TOOL.doc  | 4 TRANSPORTER<br>INTERVIEW TOOL.doc   | 5 AGRICULTURAL<br>OFFICERS INTERVIEW  | 6 GOVERNMENT<br>DEPT INTERVIEW TOC  |
|  |  |   |   |   |   |
| 7 NGO INTERVIEW<br>TOOL.docx  | Subsector Analysis,<br>Sample Size, and Time                                      |   |   |   |   |

## **Reference**

1. Baseline Study Results
2. South Sudan Food Security documents
3. South Sudan Chamber of Commerce
4. Interview Results