



AGRICULTURAL MARKETING AND TRANSITIONAL INVESTMENTS PROGRAMME (AMTIP)

Financial and Economic Analysis of a Slaughterhouse in Rumbek town - Lakes State and of a Warehouse in Kangi – Western Bahr el Ghazal



FINAL REPORT

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Financial and Economic Analysis of a Slaughterhouse in Rumbek town - Lakes State and of a Warehouse in Kangi – Western Bahr el Ghazal

Final Report

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Frontpage photograph: traders' bicycles in Kangi, Western Bahr el Ghazal

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Abbreviations

AMTIP	Agricultural Marketing and Transitional Investments Programme
CLIMIS	Crop and Livestock Market Information System South Sudan
DG	Director General
EU	European Union
FSDAM	Food Security and Development of Agricultural Markets Programme
GBG	Greater Bahr el Ghazel
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GoSS	Government of South Sudan
HARD	Hope Agency for Relief and Development
LS	Lakes State
SMARF	State Ministry of Animal Resources and Fisheries
NBG	Northern Bahr El Ghazal
PPP	Private Public Partnership
UFSLM	Urban Food Security, Livelihoods and Markets
VSF	Vétérinaires Sans Frontières (Veterinaries without Borders)
WBG	Western Bahr El Ghazal
WS	Warrab State
ZEAT BEAD	Zonal Effort for Agricultural Transformation: Bahr el Ghazal Effort for Agricultural Development

1 Introduction

The Agriculture Marketing and Transformation Investment Programme (AMTIP) is a three year program co-funded by the European Union under the „Zonal Effort for Agricultural Transformation: Bahr el Ghazal Effort for Agricultural Development“ (ZEAT BEAD). AMTIP responds to ZEAT BEAD Result 3: ‘Enhanced local value addition and strengthened Value Chains’. Other organisations such as WFP, UNIDO, UNOPS, FAO and HARD (a local NGO), are executing other parts of the ZEAT BEAD programme, in particular in relation to agricultural production, agricultural processing and feeder road construction. A coordination framework is being established to ensure that the activities of the various partners are complementary and mutually reinforcing.

Within this larger framework, AMTIP plans to renovate and newly establish relatively large agriculture/livestock sector support infrastructures to be managed under a Public Private Partnership between the State Governments, Municipalities and Private Operators (POs) in the four states of the Greater Bahr el Ghazal (GBG) area¹. The core of AMTIP was originally the renovation of two slaughterhouses in Aweil (NBG) and Kuajok (WS), constructed in 2010/2011 by GIZ under the EU funded SPCRP, and the construction of two new slaughterhouses, originally planned for Wau (WBG) and Rumbek but later proposed to be shifted to Yirol (LS).

In August 2015, AMTIP engaged a consultant to make a financial and economic assessment of slaughterhouse operations, carry out a SWOT/P analysis and develop business plans for the four planned slaughterhouses. Based on historic financial data of the operating slaughterhouses and a price breakdown of the livestock-meat value chain, the consultant concluded that investments in slaughterhouses with a daily throughput of at least 20 cows and 40 shoats are justified from a financial and economic perspective. He developed three cost/benefit scenarios, based on the number of slaughtered animals and a slaughtering fee, produced business plans that included a strengthened system for governance and management of the slaughterhouses. The work was completed and submitted on 4 September 2015.

Since September 2015, AMTIP and the EU decided to drop Yirol as a location for a slaughterhouse in favour of renovating an existing slaughter facility in Rumbek town. Vétérinaires Sans Frontières (VSF) Belgique built a small slaughterhouse in Rumbek in 2014, but it was never put to use because of a number of small and large construction errors. Recently, AMTIP was also requested by the EU to build an agriculture warehouse/service centre in Kangi, a small trading centre on the road between Wau and Aweil, in light of the construction of two roads that will connect Kangi to Bar Urud in the west and Kuajok in the east, and the construction of a small processing plant at the trading centre by UNIDO.

These new developments made AMTIP to request the consultant to do a financial feasibility study for the slaughterhouse in Rumbek and the warehouse in Kangi. In addition, the consultant was requested to present the findings of his fieldwork of August 2015 to Municipality and SMARF officials in Wau and Kuajok.

The work was carried out during a field visit to Wau, Kangi, Kuajok and Rumbek from 9-19 February 2016. The consultant encountered good cooperation from AMTIP staff, other ZEAT BEAD partners, who shared their reports and plans with the consultant, traders in Kangi and government officials in Rumbek. However, a few limitations must be taken into account when reading this report:

¹ The area comprises of Northern Bahr el Ghazal State (NBG), Western Bahr el Ghazal State (WBG), Warrap State (WS) and Lakes State (LS)

1. The justification for an investment in Kangi is based on projections of increased produce trade and business as a result of two new roads that are yet to be built or completed. Because very little reliable quantitative information is available on the current agricultural production and trade in the area around Kangi, the projections are shaky, to say the least.
2. As was the case with the previous work in Aweil, Wau and Kuajok, the financial feasibility calculation of the Rumbek slaughterhouse is based on an incomplete dataset. The consultant combined data from Rumbek officials with data collected in August 2015 in Wau, Aweil and Kuajok to arrive at the numbers presented in this report.
3. As mentioned in the previous report, the political and economic uncertainties of South Sudan make any financial and economic projection speculative.

The work was completed and submitted on 9 March 2016. A detailed itinerary is presented in Annex 1, together with the ToR. The business plan for the Rumbek slaughterhouse is provided separately.

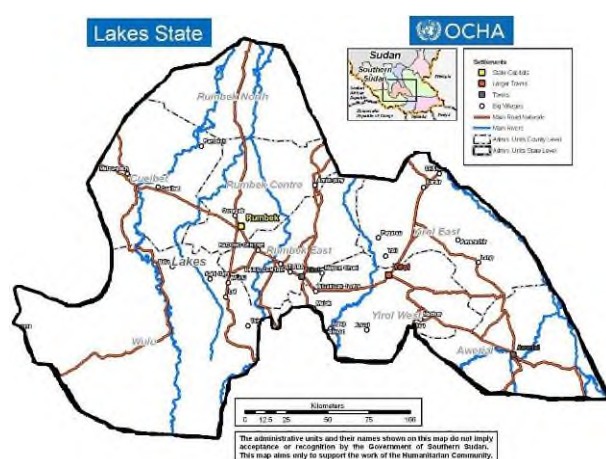
2 A Feasibility Study of the Rumbek Town Slaughtering Hall

2.1 Meat Supply and Demand in Lakes State

2.1.1 The Livestock Production System in Lakes State



Cattle in the GBG area



Map of Lakes State

Lakes States is primarily populated by Dinka. Livestock keeping is deeply embedded in Dinka culture by defining its cultural identity and individual social status, and as a source of food security and income.

More in general, the Lakes State's production system is characterized by a high degree of reliance on pastoral activities for food security and household revenue. Most rural households possess significant numbers of cattle, sheep and goats. According to SMARF officials in Rumbek the number of livestock per household range from 10 cattle and 10-20 shoats² up to over 1000 cattle and shoats.

Livestock keepers practice free ranging, moving their cattle to where the best pastures and water sources are. The eastern counties, Awerial, Yirol West, and Yirol East, are located in the wetter part of Lakes State. They exist of open grassland with ample water throughout most of the year, excellent for livestock rearing. The western part of Lakes State, which includes Rumbek town, is much dryer. During the dry season, from December to April, cattle move from these areas

to the east in search of water and pastures. This causes a shortage of animals in Rumbek town and drives cattle prices up.

In the past, only old animals would be slaughtered and other animals exchanged for sorghum and other foods items when needed. However, SMARF officials mentioned that the livestock sector is slowly commercialising, and that animals are increasingly looked at as a commercial commodity. This may mean that in future more valuable animals in their prime are entering the market.

2.1.2 Cattle and Shoa Meat Supply and Demand

An essential condition for a successful slaughterhouse operation is a guaranteed supply of animals. The consultant analysed the livestock keeping trends and data collected during the base-line survey in August

² Shoa denotes sheep and goats. In the livestock sector in South Sudan and in this report sheep and goat are treated as a single commodity.

2015 and calculated the maximum sustainable offtake in terms of cattle and meat, based on average livestock and meat growth rates for semi-arid conditions in Sub-Saharan Africa.

In August 2015, a survey carried out by Malangki³ put the number of cattle in LS at 1.4 million. During this mission the Ag DG of SMARF, based on vaccination data of VSF, estimated the number of cattle at 1.8-2.0 million, and the number of shoats at around 2.0-2.2 million, in other words considerably higher than the previous numbers. For this report, the latter lower estimates are being used.

Table 1: animal numbers, estimated increase in herd size and meat production for Lakes State

Animal	Number of Animals	Growth rate*	Annual sustainable offtake	Meat production per animal*	Meat production
Cows	1,800,000 ⁴	1.5%	27,000	11 kg/year	19,000,000
Value cattle (SSP)			81,000,000		760,000,000
Shoats	2,000,000	2.5%	50,000	2 kg/year	4,000,000
Value shoats (SSP)			40,000,000		200,000,000

* source: Malangki (2015), Malangki (2) 2015, and <http://www.fao.org/docrep/005/y4176e/y4176e0b.htm>

The consultant applied the FAO standard for semi-arid areas in terms of cattle and shoats growth rate and meat growth rate at 1.5% and 11 kg/annum, and 2.5% and 2 kg per annum respectively. This would result in an annual animal production of over 27,000 cattle and 50,000 shoats, and an annual meat production of 19 million kg beef and 4 million kg shoat. The production constitutes a considerable monetary value to LS. At local market prices of 3,000 SSP/animal and 40 SSP/kg beef, the value of annual cattle production in LS is around SSP 81 million, and the value of beef production would be around SSP 760 million per year. For shoats the value would around SSP 40 million for animals and 200 million for meat respectively.

The consultant estimated the total meat demand in LS, by taken the population and multiply it with the average meat consumption per head as provided by various international statistics. Population numbers were extracted from the population projections 2015-2020, provided by the South Sudan National Bureau of Statistics. The table below provides the aggregate numbers.

Table 2: growth in beef and shoat meat demand in the LS and in Rumbek town

Location	Estimated population in 2020	Annual meat consumption per capita (kg)**	Total meat consumption (kg)
Lakes State beef	1,196,067*	12.0	14,352,804
Lakes State shoat		3.4	4,066,627
Rumbek town beef	60,000	19.3	1,156,000
Rumbek town shoat		2.1	128,034

* source: Government of South Sudan, National Bureau of Statistics; Population Projections 2015-2020

** various sources, adjusted by looking at per capita meat consumption of comparable neighbouring states, for example <http://chartsbin.com/view/12730>

*** based on SMARF slaughtering data for Rumbek for the period October-December 2015

The data show that by the year 2020 Lakes State will consume around 14 million kg of beef per annum, and slightly over 4 million kg of shoat meat. The meat consumption in Rumbek town was calculated by taking the average number of slaughtered animals/year at an average weight of 120⁵ kg/animal, and

³ Malangki produced two reports for AMTIP: a base line survey for NBG, WBG and WS, and a second report for LS only. The first report is referred to as Malangki, and the second report as Malangki (2)

⁴ FAO South Sudan (2015): baseline survey (GCP/SSD/009/EC); page 22 mentions 1.9 million heads

⁵ In the previous report the carcass weight was put at 140 kg for cows, but according to butchers in Rumbek 120 kg is a more realistic average for cows in the market

divided the kgs meat by the town population⁶. The 19.3 kg consumption per person compares very well with the meat consumption found in four other towns in GBG during the field work in August 2015.

Based on an average number of 35 slaughtered shoats per day and a carcass weight of 10 kg, the shoat meat consumption would amount to 2,1 kg/person/year, which is about 30% less as compared with the numbers found for Wau, Aweil and Kuajok in August 2015. The consultant has no explanation for this lower shoat meat consumption. Overall, the numbers are close enough to the average to assume that they are approximately correct. Table 3 gives a summary overview of the supply and demand of beef and shoat meat.

Table 3: comparison of meat supply and demand in Lakes State

Meat source	Annual production	Annual State consumption (2020)	% of production	Annual Town consumption	% of production
Beef	19,000,000	14,352,804	74%	1,156,000	6%
Shoat meat	4,000,000	4,066,627	100%	128,034	3%

The table shows that in the near future the beef consumption in Rumbek town is around 6% of the state production, and of shoat meat 3%. As mentioned earlier, the figures are based on some broad assumptions about herd and meat growth, and meat consumption, based on sub-Saharan averages. In addition, they don't take in and out migration of livestock into consideration, as these figures are not readily available.

2.1.3 Demand and Prices in the Local Markets

During the previous field visit the consultant visited the local markets in Wau, Kuajok and Aweil and talked to butchers and customers to get a view on the specific products and preferences for meat. The two major products in the local market were meat-with-bones, and meat-without-bones, with a moderate price difference between the two. The liver, heart, spleen, and lungs were sold separately for the same price as meat-without-bones. No processed meat was exported to other states. A quick scan of the market in Rumbek and discussions with butchers at the slaughterhouse show a very similar picture.

Table 4: cattle and meat prices in August 2015 in Wau/Aweil/Kuajok, and in Rumbek in February 2016

Item	Average Wau/Aweil/Kuajok		Rumbek town	
	Cattle	Shoats	Cattle	Shoats
Price animal low (SSP/animal)	2000	300	3,000	500
Price animal high (SSP/animal)	3200	430	4,500	1000
Meat and bones (SSP/kg)	23	45	40	50
Meat (SSP/kg)	28	46	45	60

The price of animals and meat seems to have risen since August 2015. Three factors may have caused this: a drop of more than 100% of the value of the SSP against the US\$ since August 2015; the political instability which has made the local population to withdraw to some extent from economic activities; and the dry season which caused a scarcity of animals around Rumbek Centre County and at the Rumbek town cattle auction.

⁶ Rumbek town population data provided varied between 32,100 in 2011(<https://en.wikipedia.org/wiki/Rumbek>) and 120,250 provided by the Deputy Town Clerk. For the entire Rumbek Centre County the population is 153,550 (South Sudan Statistical Yearbook 2011). Based on the available numbers and by comparing the sizes of Wau, Aweil and Rumbek, the consultant estimates the population of Rumbek town at 60,000.

2.2 From Animals to Meat in Rumbek Town

2.2.1 The Meat Value Chain

A steady supply of reasonably priced animals for a slaughterhouse is greatly helped by a functional, transparent and organised value chain, whereby the benefits in the chain are fairly distributed according to the value addition efforts.

The consultant analysed the value chain by separating the chain in its individual components, breaking down the costs in each component and allocating it to the beneficiary of that component. Data were provided during the interviews with officials from SMARF, the Rumbek Town Council and butchers. The figure below shows the major components in the value chain.

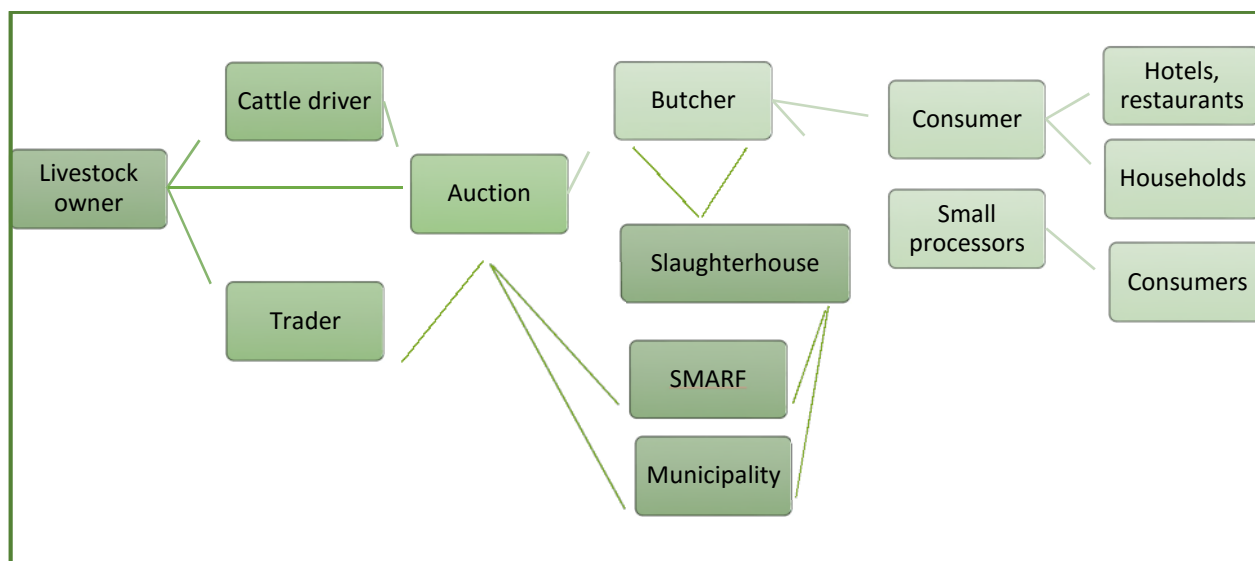


Figure 1: the meat value chain in Rumbek town

Livestock production takes place in the rural areas of Lakes State at household level. Livestock owners sell their cattle to a local trader⁷, or drive their cattle to the town auction. The Rumbek auction is located on the west-side of Rumbek town, about 5 km from the city centre where it was moved in 2007 from the town centre. The town has again caught up with the auction, and the Town Council is planning to move it further to the south west. The auction consists of a chain link fence enclosure and rudimentary shelters for traders and for the auction committee. There is not veterinary inspection, and there are no separate holding pens for approved and rejected animals.

The auction is run by an auction committee, under the overall supervision of Rumbek Town Council. The committee checks that the source of the animal is genuine, and issues a chit on which the owner, village, chief, bailor and price are indicated. The bailor collects 5% of the sales price from both the seller and buyer as auction fee and ensures that the dues are handed over to the auction committee. Of the collected 10% of the sales price, 40% goes to the State Revenue Authority and 60% to the County. The 60% is used to pay the auction committee and the bailor. At this stage in the livestock trade in Rumbek town, no dues are paid to SMARF.

The number of animals that are being auctioned daily ranges from 20-50 cows and from 50-150 shoats. Numbers are usually higher during weekends, at the end of the month when salaries have been paid and

⁷ Because of insecurity, livestock traders have currently withdrawn from the market.

during the wet season, when the cattle are kept nearer to Rumbek town. Sales were down during the last two months according to butchers at the auction, because civil servants were not paid their salaries.



Shoat auction in Rumbek



Cattle auction in Rumbek

The auctioned animals targeted for slaughtering are kept at private kraals in Rumbek for a holding fee of SSP 20 per night per animal. The next morning they are driven to the Rumbek Town Council slaughtering house, around 8 km away, at a cost of SSP 20 per animal. A butcher pays SSP 15 and SSP 10 for cows and shoats respectively in slaughtering fees to the manager of the slaughtering house. The income is being shared by SMARF for meat inspection, and the Town Council. The Town Council pays the public health inspector and the cleaners a Town Council salary that is not related to the number of animals slaughtered. Formally all the funds are surrendered to the State coffers through Form 15. In practice some funds are kept and spent at source for meat inspection and maintenance costs.

Table 5 gives an average breakdown of the value chain components of a cow and shoat that passes through the Rumbek auction and slaughtering house to a butcher and the meat consumer. The calculations are made for an average animal of SSP 3,500, a carcass weight of 120⁸ kg and a meat price of SSP 40/kg. The shoat price is 650, the shoat weight 12 kg and the shoat meat price is set at SSP 60/kg. The scenario is based on data from the auction and the slaughterhouse, taking into consideration the price fluctuations as explained by livestock owners and butchers. There are some notable differences between the data collected in Rumbek as compared to the data from Wau, Aweil and Kuajok:

1. The auctioning fee in Rumbek is set as a % of the sales price, whereas in the other auctions it is a fixed sum per animal. Overall, the auctioning fee in Rumbek is higher than in the other towns;
2. Animal inspection is not done during auctioning, but only post-mortem at the slaughtering facility. Animal health control is therefore more thorough in the other towns;
3. Staff at the auction are employed by the Rumbek Town Council and, apart from their salaries, reportedly get no additional allowances for their work;
4. The slaughterhouse in Rumbek is run by the Town Council. The Public Health Inspectors and cleaners are Town Council staff and reportedly get no additional allowances for their work.

The table shows that the two main beneficiaries of the meat value chain in Rumbek are the livestock keeper and the butcher, receiving around 72% and 14% respectively of the meat value of a cow, and 72% and 11% of the meat value of a shoat. The other 10-15% are fixed payments to other players in the value

⁸ See footnote 5

chain, but primarily the Rumbek Town Council and SMARF. Average earnings for a butcher per cow is in this example SSP 673/animal, or 5.6 SSP/kg and for a shoat SSP 125/animal and SSP 6.7/kg respectively.

Table 5: cost allocations to each step in the value chain of cattle and shoat meat

Value chain steps	Cows			Shoats		
	SSP/cow	SSP/kg	%	SSP/shoat	SSP/kg	%
Livestock production						
Livestock owner per animal	3,500	29.17	72.9	650	43.33	72.2
Driver per animal	20	0.17	0.4	5	0.33	0.6
Trader	0	-	0.0	-	-	0.0
Auctioning						
State Revenue Authority	175	1.46	3.6	32.5	2.17	3.6
Municipality or Local Government	175	1.46	3.6	32.5	2.17	3.6
Standing fee	20	0.17	0.4	5	0.33	0.6
Slaughtering						
Rumbek Town Council	8	0.07	0.2	5	0.33	0.6
SMARF	7	0.06	0.1	5	0.33	0.6
Slaughtering staff of butcher	150	1.25	3.1	50	3.33	5.6
Butchering						
Transporter to shop	20	0.17	0.4	5	0.33	0.6
Salesmen	60	0.50	1.3	10	0.67	1.1
Butcher per animal / kg meat	673	5.61	14.0	125	6.67	11.1
Total	4,800	40	100	900	60	100

The numbers don't differ much from the findings in Wau, Aweil, Kuajok and Yirol in August 2015. Earnings per cow are slightly higher because of the higher meat price, but because cattle are also more expensive the % distribution remains about the same. Earnings for shoats are substantially lower for butchers than in the previous survey, primarily because of the high shoat price. With an average shoat price of SSP 500, the value chain distribution for shoats would work out the same as in the previous report. Because of SSP inflation since August 2015, the actual earnings at constant 2015 prices may have come down a bit.

For Rumbek Town Council the income per cow at the auction is depending on the sales price, whereas for the slaughtering the income for Rumbek Town Council and SMARF is dependent on the throughput of animals. As indicated in the previous report, the value distribution between the livestock keeper and the butcher is sensitive to three parameters: the price of the animal, the weight of the animal and the price of meat. Generally, the price and weight of an animal are correlated: a higher price for a heavier animal. By a fixed meat price and animal weight, the earnings of the livestock keeper rise and of the butcher drop by a higher animal price and vice versa. On the other hand, a higher meat price translates directly into higher earnings for the butcher. In the previous report it was already mentioned that higher animal prices at constant carcass weights would eventually translate in higher meat prices. This scenario has played out during the last 6 months in Rumbek, where the meat price has now reached SSP 40.

Similar to the findings in August 2015, the earnings for livestock keepers and butchers are not very sensitive to the relatively low fixed payments to Rumbek Town Council and SMARF. Therefore, if an increase in fees and levies is needed to guarantee efficient and effective operations of an investments in auctions and slaughterhouses, these can be borne by cattle keepers and butchers without having an immediate impact on consumer prices.

2.2.2 Operations at the Rumbek Slaughterhouse

2.2.2.1 The Slaughtering Facilities

The slaughtering slab at Rumbek was constructed in 2011 and is operated by Rumbek Town Council. Three designated SMARF meat inspectors carry out post-mortem inspections on the slaughtered animals' organs. The Town Council employs one guard and a few cleaners, although the actual cleaning is done by the butchers. Every 1-2 months, SMARF hires a team of cleaners to clean the compound.



The slaughtering hall in Rumbek



Borehole with slaughtering hall in the background

The slaughtering hall is located on Juba road about 6 km out of town in a swampy area. In the rainy season access to facility is difficult, and the facility compound turns wet and muddy. The structure consists of a slaughtering hall of 5 x 11 meters, and two outside concrete slaughtering tables. A functioning borehole is located about 200 meters away. No waste pit was seen, and it is actually not clear what is done with the waste. Because of its small size, the hall is only used to butcher shoats, whereas cows are slaughtered outside the hall on the compound.

In light of the small size and poor status of the old slaughtering house, the Belgian chapter of Veterinaries without Borders (VSF) constructed a new slaughtering facility in 2014, about 1 km further down and off Juba road. It sits on a ½ acre compound that is properly fenced.



The VSF slaughtering hall



Inside the VSF slaughtering hall

The main structure is about 1.5 x larger than the current hall, has three offices, an overnight holding pen, generator, borehole and overhead tank. Inside are two small wash basins, a concrete table, and a transporter rail with hooks. The hall lacks a proper stunning bay and concrete cleaning basins for intestines. The hall is also too small for the average daily number of cows and shoats being slaughtered at the old facility. Overall, construction was poorly done: the floors are cracking, the water supply is broken, the roof needs to be replaced, and the overhead transporter system is weak and dangerous. During the rainy

season, the area around the new slaughterhouse is flooded, making access difficult. Because of these shortcomings, the new hall has never been used.

2.2.2.2 The Slaughtering Process

Private butchers start the shoat slaughtering at around 6:00 am inside the slaughtering hall. Killing is done at the floor by slitting the throat. Butchering is also done inside.

At around 7:30 the cattle arrive at the slaughtering compound, are thrown on their side, tied down and killed by slitting the throat, whereby blood is drained into the compound. Butchering is done on tarpaulins. The organs are put on concrete tables for meat inspection. Small animal waste is thrown around for dogs and birds to pick up. The entire process takes place outside in a rather ad-hoc manner. During the dry season, the environment is dusty, in the wet season it must be extremely muddy. All in all, the situation does not meet any standards for animal friendly, safe and clean meat processing.



Butchering shoats inside the hall



Butchering cows outside



Transporters of meat to the Rumbek market



Meat inspection

The killing and butchering of an animal takes about 1-2 hours. After slaughtering, the Town Council staff clean the slaughtering hall and compound, and prepare it for the next day. By 9:30 am the slaughtering process is largely over and by 12:00 am the facility is clean.

2.2.2.3 Animal throughput, Income and Expenditure

The table below shows the number of animals processed daily at the Rumbek slaughtering hall. The numbers are based on SMARF records of October – December 2015⁹, and discussions with butchers and operators at the slaughtering house. The data also take into consideration the fluctuation in numbers of slaughtered animals due to factors mentioned earlier in this report.

⁹ Data for January – September 2015 were to be sent later, but had not arrived during the drafting of this report

Table 6: average number of livestock slaughtered daily in Wau

Livestock>	Cattle	Shoats
Rumbek	15-50	35-60

Source: SMARF, Lakes State; Deputy Town Clerk

All animals consumed in Rumbek town are slaughtered at the facility. The Town Council charges SSP 15 per cow and SSP 10 per shoat slaughtered. This includes the meat inspection fee. According to the Ag DG of SMARF LS, 40% of the proceeds go to the Ministry of Finance, 10% to the Town Council's Public Health Office and 50% to SMARF. Of the 50% for SMARF, 10% is paid to the meat inspectors. The Deputy Town Clerk confirmed that the Town Council and SMARF share the proceeds of the slaughterhouse 50-50, whereby some of the Town Council's share is used for maintenance and cleaning. Based on the information of SMARF and Rumbek Town Council, the consultant constructed an income and expenditure overview as shown in the Table 7 below.

Table 7: estimated annual income and expenditure of the Rumbek slaughterhouse

Income	Cows	Shoats	
Number of animals per year	11,000	15,700	26,700
Slaughtering fee per animal	15	10	
Gross income (SSP)	165,000	157,000	322,000
Expenditure	SSP		
Staff costs	No of staff	Salary/month	
Public health inspector/manager	1	900	10,800
Town council cleaners	3	300	10,800
Guard	1	300	3,600
Chief meat inspector	1	900	10,800
Meat inspectors	2	700	16,800
SMARF cleaners	1	400	2,400
Other costs	No of months	Cost/month	
Consumables**	12	1000	12,000
Maintenance**	12	2000	24,000
Total operating costs (SSP)			91,200
Gross operating surplus (SSP)			230,800

* Based on a dataset of three months

** Consultant's estimate based on data from August 2015

The table shows that the slaughterhouse makes a moderate surplus of SSP 230,000. However, firstly it should be realised that salary costs of Town Council and SMARF officials are not paid directly from the slaughterhouse's income but through the wage bill of SMARF and the Town Council. The actual cash income from the operation is therefore higher. Secondly, both SMARF and the Town Council confirm that the cash surplus is remitted to the State Revenue Authority, and no actual surplus is generated.

The operating surplus in Rumbek compares very well with the Lokloko slaughterhouse in Wau, which is a very comparable operation in terms of the overheads. Although animal numbers and therefore income is lower in Rumbek, the operating costs are also lower because no operating license is charged, and no fuel costs are incurred.

2.3 Financial and Economic Analysis of the Slaughterhouse in Rumbek

2.3.1 A Cost-Benefit Analysis of the slaughterhouse

The objective of the financial analysis of an investment is to verify that over the lifespan of the investment the monetary benefits are higher than the costs. The most common tool used for this is the Cost-Benefit Analysis (CBA). The common steps in the CBA are:

1. Establish financial cash flows of the project in constant prices for the lifespan of the investment;
2. Discount the cash flows and establish the Net Present Value of the project. However, in this project, the initial investment was not borne by the owners or the operator, and as a result there is no negative cash flow at the start of the enterprise. This makes the calculation of an NPV rather meaningless. This even more so given the uncertain economic circumstances, which make it impossible to come up with an objectively verifiable discount rate.
3. Perform a sensitivity analysis on the main profitability factors of the project.

The current economic situation of South Sudan makes any projections into the future highly speculative, and any conclusions in this report will have to be adjusted when the underlying assumptions change as a result of economic or political factors.

For constructing the CBA for the Rumbek slaughterhouse, the consultant took the lifespan of the investment to be 10 years. In the absence of long-term data for Rumbek, the consultant based the calculations of costs and benefits on the reported incomes and expenditures of the slaughterhouse in Aweil, which is in terms of animal throughput most comparable to Rumbek. The current cost structure for Rumbek is in this respect not relevant, because it does not reflect the cost of running a modern slaughterhouse under a PPP arrangement. Some adjustments to the calculations in the previous report are made, in particular the payments by the private operator directly to meat and public health inspectors.

The consultant based the source of revenue on slaughtering fees only. The two critical parameters are the number of animals slaughtered per day and the slaughtering fee per animal. The CBA assumes a moderate increase in number of animals per year. There may be possibilities to diversify the income into other products, but these are not taken into account.

The consultant used the various cost centres as reported by the private operators in other towns and standardised the expenditure budget lines as a basis for the calculation of outflows. Calculations are based on price levels of 2015, which were used as constant prices from 2017 onwards, whereby a modest increase in salaries and costs is foreseen, related to the increasing number of animals to be processed by the facility. The following provide some details of the underlying calculations for the expenditure budget lines.

- Staff is based on staff number currently employed in Aweil; an allowance for staff insurance (workman compensation) is included;
- Sundries include all administration costs, disinfectants, soaps, gear, clothing and other daily consumables;
- Power/fuel expenditure is based on the use of a generator without biogas. An increase in fuel prices of 10% per year is foreseen;
- Transport includes running costs of a motorbike, and transport refunds to workers;

- Maintenance and repair costs, set at the start 1% per year of the infrastructure's value (estimated to be US\$ 500,000), to increase to 1.5% later in the operational period;
- Communication includes marketing, airtime and internet costs;
- Cost for 2 or 3 PPP stakeholder meetings per year and some funds for staff training are included;

On the basis of the above three scenarios are presented in the tables on the next pages, based on the differences in growth of animal throughput and increase in slaughtering fees. The approach taken in these calculations is slightly different from the last report:

1. Establish the target for a gross operating profit; in this case it is set at SSP 400,000 in 4-5 years
2. Project the growth in animal throughput; in this case three growth scenarios are presented: 3%, 6% and 10%;
3. Adjust the slaughtering fee to arrive at the targeted gross operating profit.

The three scenarios show how the operating profit can be carefully managed by adjusting the slaughtering fee.

The **low growth** scenario starts in 2017 with an average of 35 cows and 55 shoats. The annual growth is set at 3% for animals and 6% for slaughtering fees to arrive at the targeted gross operating profit of SSP 400,000 in 5 years. Staff is kept at a minimum, but the number is higher than currently because of the professionalization of the operation. Operational costs are also higher, primarily because of fuel and staff costs.

Table 8: Rumbek slaughterhouse Cash Flow scenario with low growth in animal throughput, compensated by a high slaughtering fee

Revenue	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Increase p/y
No of cattle per day	35	36	37	38	39	41	42	43	44	46	3%
Slaughtering fee per head	20	21	22	24	25	27	28	30	32	34	6%
Income from Cattle p/y	255,500	278,955	304,563	332,522	363,047	396,375	432,762	472,490	515,864	563,221	
No of shoats per day	55	57	58	60	62	64	66	68	70	72	3%
Slaughtering fee Shoats	12	13	13	14	15	16	17	18	19	20	6%
Income from Shoats p/y	240,900	263,015	287,159	313,521	342,302	373,725	408,033	445,490	486,387	531,037	
Gross revenue	496,400	541,970	591,722	646,042	705,349	770,100	840,795	917,980	1,002,251	1,094,258	

Expenditure	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Increase p/y
Staff (month)											2%
Manager (1)	3,000	3,060	3,121	3,184	3,247	3,312	3,378	3,446	3,515	3,585	2%
Accountant (0.5)	1,100	1,122	1,144	1,167	1,191	1,214	1,239	1,264	1,289	1,315	2%
Technician (1)	1,200	1,224	1,248	1,273	1,299	1,325	1,351	1,378	1,406	1,434	2%
Floor supervisor (1)	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195	2%
Floor workers (6)	2,400	2,448	2,497	2,547	3,117	3,180	3,243	4,301	4,387	4,474	2%
Compound workers (2)	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195	2%
Watchmen (3)	1,500	1,530	1,561	1,592	1,624	1,656	1,689	1,723	1,757	1,793	2%
Casuals (2)	1,000	1,020	1,040	1,061	1,082	1,104	1,126	1,149	1,172	1,195	
Annual salary bill	146,400	149,328	152,315	155,361	164,703	167,997	171,357	186,694	190,427	194,236	
Staff insurance	8,052	8,213	8,377	8,545	9,059	9,240	9,425	10,268	10,474	10,683	5.5%
Total staff costs	154,452	157,541	160,692	163,906	173,762	177,237	180,782	196,962	200,901	204,919	

Consumables											
Sundries	16,000	16,800	17,640	18,522	19,448	20,421	21,442	22,514	23,639	24,821	5%
Power/fuel	29,200	30,660	32,193	33,803	35,493	37,267	39,131	41,087	43,142	45,299	5%
Transport	20,000	21,000	22,050	23,153	24,310	25,526	26,802	28,142	29,549	31,027	5%
Maintenance	35,000	38,500	42,350	46,585	51,244	56,368	62,005	68,205	75,026	82,528	10%
Communication	3,600	3,780	3,969	4,167	4,376	4,595	4,824	5,066	5,319	5,585	5%
Total annual consumables	103,800	110,740	118,202	126,230	134,870	144,176	154,203	165,014	176,675	189,260	
Meetings and trainings	10,000	10,500	11,025	11,576	12,155	12,763	13,401	14,071	14,775	15,513	5%
Total Expenses	268,252	278,781	289,919	301,712	320,787	334,176	348,386	376,046	392,350	409,692	
Gross operating profit	228,148	263,188	301,803	344,331	384,562	435,925	492,410	541,934	609,901	684,566	

The CBA for a **low growth** scenario shows that the operation is profitable at a slaughtering fee starting in 2017 with SSP 20 per cow and SSP 12 per shoat, but with annual growth of in slaughtering fee of 6% per year. The current slaughtering fees in Rumbek (SSP 15 for cows and SSP 10 for shoats) would not be sufficient to cater for the increased costs of a professional operation; and a slow growth of number of animals requires a rather quick growth in slaughtering fees.

If out of the gross operating profit the private operator is paid an attractive commercial fee (after deducting all his costs), in the range of SSP 6,000 – 10,000 per month, the income of SMARF and the Town Council would be sufficient to cover their inspection costs, and, if some funds were put aside, for upgrades and replacement costs.

The **average growth** scenario starts in 2017 with 35 cows and 55 shoats, but projects an annual increase of 6% for animals and of 4% for slaughtering fees. For this scenario the staff and consumables increases overtime with the growth of the operation.

Table 9: Rumbek slaughterhouse Cash Flow scenario with medium growth in animal throughput and slaughtering fees

Revenue	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Increase p/y
No of cattle per day	35	37	39	42	44	47	50	53	56	59	6%
Slaughtering fee per head	20	21	22	22	23	24	25	26	27	28	4%
Income from Cattle p/y	255,500	281,663	310,506	342,301	377,353	415,994	458,592	505,551	557,320	614,389	
No of shoats per day	55	58	62	66	69	74	78	83	88	93	6%

Slaughtering fee Shoats	12	12	13	13	14	15	15	16	16	17	4%
Income from Shoats p/y	240,900	265,568	292,762	322,741	355,790	392,223	432,386	476,663	525,473	579,281	
Gross revenue	496,400	547,231	603,268	665,042	733,143	808,217	890,978	982,214	1,082,793	1,193,671	
Expenditure											
Staff (month)											
Manager (1)	3,000	3,120	3,245	3,375	3,510	3,650	3,796	3,948	4,106	4,270	4%
Accountant (0.5)	1,100	1,144	1,190	1,237	1,287	1,338	1,392	1,448	1,505	1,566	4%
Technician (1)	1,200	1,248	1,298	1,350	1,404	1,460	1,518	1,579	1,642	1,708	4%
Floor supervisor (1)	1,000	1,040	1,082	1,125	1,170	1,217	1,265	1,316	1,369	1,423	4%
Floor workers (6)	2,400	2,496	3,245	3,375	3,510	3,650	3,796	4,737	4,927	5,124	4%
Compound workers (2)	1,000	1,040	1,082	1,125	1,170	1,217	1,265	1,316	1,369	1,423	4%
Watchmen (3)	1,500	1,560	1,622	1,687	1,755	1,825	1,898	1,974	2,053	2,135	4%
Casuals (4)	1,000	1,040	1,082	1,687	1,755	1,825	1,898	2,625	2,730	2,840	4%
Annual salary bill	146,400	152,256	166,134	179,528	186,709	194,178	201,945	227,314	236,407	245,863	
Staff insurance	8,052	8,374	9,137	9,874	10,269	10,680	11,107	12,502	13,002	13,522	5.50%
Total staff costs	154,452	160,630	175,271	189,402	196,978	204,858	213,052	239,816	249,409	259,385	5%
Consumables											
Sundries	16,000	16,960	17,978	19,056	20,200	21,412	22,696	24,058	25,502	27,032	6%
Power/fuel	32,850	36,135	39,749	43,723	48,096	52,905	58,196	64,015	70,417	77,459	10%
Transport	15,000	16,500	18,150	19,965	21,962	24,158	26,573	29,231	32,154	35,369	10%
Maintenance and replacements	35,000	38,500	42,350	46,585	51,244	56,368	62,005	68,205	75,026	82,528	10%
Communication	3,600	3,816	4,045	4,288	4,545	4,818	5,107	5,413	5,738	6,082	6%
Total annual consumables	102,450	111,911	122,271	133,617	146,045	159,660	174,577	190,922	208,836	228,470	
Meetings and trainings	10,000	11,000	12,100	13,310	14,641	16,105	17,716	19,487	21,436	23,579	10%
Total Expenses	266,902	283,541	309,642	336,330	357,665	380,623	405,344	450,226	479,681	511,435	
Gross operating profit	229,498	263,690	293,626	328,713	375,478	427,594	485,634	531,988	603,112	682,236	

The CBA for an **average growth** scenario shows that the operation is moderately profitable with a starting slaughtering fee of SSP 20 per cow and 12 per shoat. The projected growth in animals and fees of 6% and 4% respectively, would create a similar gross operating profit over time as in the low growth scenario but with a lower slaughtering fee because of higher animal throughput.

The **high animal** scenario starts in 2017 with 35 cows and 55 shoats, but with a growth of 10% in animals and 3% fees. For this scenario over time an assistant manager is added, the floor workers are increased to 6, compound workers to 3, and casuals to 4. All consumable expenditures grow commensurate with the increased animal throughput.

Table 10: Rumbek slaughterhouse Cash Flow scenario with high growth in animal throughput and slaughtering fees

Revenue	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Increase p/y
No of cattle per day	35	39	42	47	51	56	62	68	75	83	10%
Slaughtering fee per head	20	21	21	22	23	23	24	25	25	26	3%
Income from Cattle p/y	255,500	289,482	327,983	371,604	421,028	477,024	540,468	612,351	693,793	786,068	
No of shoats per day	55	61	67	73	81	89	97	107	118	130	10%
Slaughtering fee Shoats	12	12	13	13	14	14	14	15	15	16	3%
Income from Shoats p/y	240,900	272,940	309,241	350,370	396,969	449,766	509,585	577,359	654,148	741,150	
Gross revenue	496,400	562,421	637,223	721,974	817,996	926,790	1,050,053	1,189,710	1,347,942	1,527,218	
Expenditure											
Staff (month)											
Manager (1)	3,000	3,150	3,308	3,473	3,647	3,829	4,020	4,221	4,432	4,654	5%
Assistant Manager (1)	-	-	-	-	2,200	2,310	2,426	2,547	2,674	2,808	5%
Accountant (1)	1,100	1,100	1,650	1,650	1,650	2,310	2,426	2,547	2,674	2,808	5%
Technician (2)	1,200	1,260	1,323	1,389	2,917	3,063	3,216	3,377	3,546	3,723	5%
Floor supervisor (1)	1,000	1,050	1,103	1,158	1,216	1,276	1,340	1,407	1,477	1,551	5%
Floor workers (6)	2,400	2,520	3,150	3,308	3,473	3,647	4,595	4,824	5,066	5,319	5%
Compound workers (3)	1,000	1,050	1,103	1,736	1,823	1,914	2,010	2,111	2,216	2,327	5%
Watchmen (4)	1,000	1,050	1,103	1,736	1,823	1,914	2,513	3,430	3,601	3,781	5%
Casuals (4)	2,000	2,100	2,625	2,625	3,150	3,675	4,200	4,200	4,725	5,250	5%
Annual salary bill	152,400	159,360	184,356	204,900	262,784	287,263	320,941	343,966	364,944	386,656	
Staff insurance	8,382	8,765	10,140	11,270	14,453	15,799	17,652	18,918	20,072	21,266	5.50%
Total staff costs	160,782	168,125	194,496	216,170	277,237	303,062	338,592	362,884	385,016	407,922	

Consumables											
Sundries	16,000	18,400	21,160	24,334	27,984	32,182	37,009	42,560	48,944	56,286	15%
Power/fuel	32,850	39,420	47,304	56,765	68,118	81,741	98,090	117,707	141,249	169,499	20%
Transport	15,000	18,000	21,600	25,920	31,104	37,325	44,790	53,748	64,497	77,397	20%
Maintenance	35,000	42,000	50,400	60,480	72,576	87,091	104,509	125,411	150,494	180,592	20%
Communication	3,600	4,320	5,184	6,221	7,465	8,958	10,750	12,899	15,479	18,575	20%
Total annual consumables	102,450	122,140	145,648	173,720	207,247	247,297	295,147	352,326	420,664	502,349	
Meetings and trainings	15,000	16,500	18,150	19,965	21,962	24,158	26,573	29,231	32,154	35,369	10%
Total Expenses	278,232	306,765	358,294	409,854	506,445	574,517	660,313	744,441	837,833	945,640	
Gross operating profit	218,168	255,656	278,930	312,119	311,551	352,273	389,740	445,269	510,108	581,577	

The CBA for a **high animal growth** scenario, shows that the operation is moderately profitable at a starting slaughtering fee of SSP 20 per cow and 12 per shoat, which can increase at a slow pace without eating in the gross operating profit. This scenario would also cater for a fair reward to the private operator and the quick built-up of a financial buffer for major replacements and expansion.

The three CBA scenarios above show that profits of the slaughterhouse are primarily dependent on the number of animals and the slaughtering fee, whereby lower animal throughput can be compensated with higher slaughtering fees and vice versa. As concluded earlier in this report, slaughtering fees have a very minor impact on meat prices, and are therefore an appropriate and sensitive tool for the board of directors of the slaughtering house to work towards a desired financial outcome. The calculations show that the any of the animal growth scenarios are sustainable under good financial management. In order to start the operation on a proper financial footing, a higher slaughtering fee from the start, for example SSP 25 for cows and 20 for shoats, is desirable.

It is clear that in the above scenarios, staff establishment and cost structure have very little resemblance with the current operations in Rumbek. The transition towards a more professional slaughtering operation may be harder than in the other three towns targeted by AMTIP. They are already operating more or less according to commercial principles and have gained experience in handling a private operator. In Rumbek, there is no experience with a private operator, and no experience with this level of income and expenditure. This situation is likely to require more training and support for SMARF the Rumbek Town Council and the private operator than in Wau, Aweil and Kuajok.

The overall conclusion is that a modern slaughterhouse in Rumbek can be run profitably, and, if well managed, will be able to pay for maintenance and repairs to ensure operations up to, and in principle beyond 2026. It will also produce a reasonable income for a private operator and the government. This conclusion is in line with the findings of August 2015, whereby the Rumbek slaughterhouse fits quite well in the medium size category described in the previous report.

2.3.2 Economic Considerations for Modernizing the Slaughterhouse in Rumbek¹⁰

By definition, an economic analysis looks at the wider economic impacts of the project on the society as a whole. Unfortunately, often societal benefits are intangible, in other words cannot be easily expressed in monetary terms. The consultant has taken the government income from the project as an economic benefit, but has not made an attempt to put a value to the public health and environmental benefits of a slaughterhouse. In large projects this includes an analysis of the impact on economic growth, public funds, distribution of income and foreign exchange but because of the limited scope of the slaughterhouses beyond the town borders, the analysis can restrict itself to the impact on the town community, and the livestock sector. Three basic principles apply:

1. Transfers within the boundaries of the entity (in this case the towns), for instance the payment of government fees and taxes, are not considered a cost, since they remain within these boundaries;
2. External inflows and internal benefits because of the project, are considered additional revenue;
3. Price distortions because of subsidies or market regulation are removed.

Even without going into elaborate calculations it is clear that applying the above principles to the slaughterhouse in Rumbek would lead to positive economic returns. Why? When the government transfers are removed from expenditure lines, the overall expenditure goes down and therefore the economic NPV goes up. Secondly, the investment in the slaughterhouse is an external inflow that should be counted as revenue from an economic point of view for the town or state, with, in addition, has a substantial multiplier effect. Lastly, as there are no subsidies or price regulations to be included as an expenditure, the remaining expenditure lines are not going up.



Unhygienic and dangerous slaughtering in Rumbek

What remains is to put a value to other societal benefits, and external inflows, and this is a very hard thing to do. The consultant considered enhanced public health because of improved hygienic conditions during slaughtering, improved meat inspection, and improved waste disposal as the main intangible economic benefit stream of the project. To put a value to this, one could be looking at the reduction in number of labour days lost because of slaughtering related accidents; or the reduction in the cost of treatments for meat poisoning related diseases.

Such saved expenditures are an economic benefit stream for the project. With no data available, calculations along those lines are extremely speculative, and have no place in this report.

A final question in the economic analysis could be if there are more economically profitable alternatives for the planned investment in this slaughterhouse. The answer to this question would require a much wider analysis of the economy of Lakes State, which would normally take place as part of the project identification process. Since the project is ongoing and the area of investment has been decided, the question is superfluous.

¹⁰ Since the economic analysis does not differ much from the work done in the previous consultancy, this chapter borrows heavily from the previous report.

2.4 SWOT/P of the slaughterhouse in Rumbek

In the previous report, a comprehensive SWOT/P analysis was presented of the livestock sector in GBG, including Lakes State. In this paragraph, the consultant will briefly analyse some specific SWOTs for Rumbek.

The **strength** of the Rumbek slaughtering operations are:

1. A surplus production of animals and meat in relation to consumption;
2. A short and transparent value chain in which the players get a reasonable reward for efforts;
3. A steady demand for meat products in Rumbek, although with low local growth prospects;
4. A functional livestock auction, although poorly located and with managerial shortcomings;
5. A functional State Ministry of Animal Resources and Fisheries, with a professional meat inspection system;
6. An existing slaughterhouse, with all the basic slaughtering operations in place, that has the basics for being professionalised;
7. A newly constructed slaughtering house, albeit too small for the current animal throughput, and with many technical shortcomings;
8. A Town Council that is actively involved in livestock auctioning and slaughtering;
9. Skilled butchers, operating in a competitive and transparent market.

The **weaknesses** are:

1. A poorly located auction in relation to the slaughtering house, that in future will be moved further away from the slaughtering operations;
2. A slaughtering house in a swampy, difficult accessible area; access road none existing;
3. Weak pre - mortem meat inspection; no inspection during auctioning and before slaughtering;
4. An outdated slaughtering facility, unfit for providing a safe and clean slaughtering environment for butchers and consumers;
5. Low butchering standards and training, and dangerous slaughtering practices.

The **Opportunities/Potentials** are:

1. A slow but steady growth in the local meat market;
2. External markets, for instance in Sudan and Saudi Arabia for quality animals; and Juba for diversified meat products with added value;
3. Upgrading/breeding of better quality and resistant animals;
4. Experience with modern commercial slaughtering practices in Aweil and Kuajok, and to a lesser extent in Wau; that can be brought to Rumbek;

The **Threats** are:

1. Erosion of purchasing power due to economic instability, leading to a reduced demand for meat.

2.5 Conclusions and Way Forward on the Slaughterhouse in Rumbek

The livestock sector in Lakes State operates in an organised market with a surplus production, but is hampered by cultural practices, the lack of animal support services and external markets.

Modern slaughtering is only a minor step in the value chain, which will not have a major impact on the sector as a whole. A more comprehensive intervention in animal health services and infrastructure, in particular water provision in the western counties, would help to grow animal production, but this would only boost local development if external markets are developed and aggressively accessed. The relative remoteness of the LS and the poor animal health support system are in that sense a serious setback.

Improving slaughtering facilities is important at the local level. It helps to regulate the market, improves livestock tracking and security, and contributes to public health and sanitation. Road-side slaughtering does not happen in Rumbek, but the current slaughtering house is too small, poorly equipped, dangerous and therefore unfit for providing meat to the Rumbek population.

The old slaughterhouse and the one constructed by VSF are located in an area that is easily flooded in the rainy season. The Rumbek Town Council has offered to build an access road through the area, and this would be a prerequisite before any building or renovation activities can take place. For smooth operations in the future the access road needs to be maintained. The slaughterhouses are also far away from the auction. In case the auction is further moved to the south-west, the distance between the two closely related livestock value chain operations adds unnecessary costs to the chain. The consultant strongly advises to first develop a masterplan for the auction and the slaughterhouse, with a view of bringing the two together in a suitable location, before embarking on the slaughterhouse renovation project.

The current idea is to upgrade the VSF slaughterhouse into a modern facility that can cater for all the Rumbek slaughtering needs in the next 10 years. The renovations are being planned by more knowledgeable construction experts than the consultant, but there is no doubt that to bring it up to size and quality requires substantial investments. In view of the suggestion by the consultant to develop a masterplan for the auction and slaughterhouse together, and given the fact that the current location is difficult to access, the possibility of constructing an entirely new slaughterhouse at a more appropriate place should not be dismissed outright.

The slaughterhouse is managed by the town council and SMARF in a very low cost manner, with low slaughtering fees and very little investments being made in the last few years. The good news is that slaughtering in Rumbek is already centralised and the operators have gained experience with a medium size slaughtering operation. The step towards further professionalising and commercialising slaughtering in Rumbek should therefore not be too hard.

The analytical work carried out in 2015 shows that commercial slaughterhouses in towns can be financially viable, if professionally managed. For that a PPP is probably the best managed arrangement, so long the government provides a stable business environment, proper supervision and a fair reward to the private operator. Rumbek has no experience with PPP, and has not considered this as an option for the nearby future. This issue needs to be clarified and agreed between the partners before the construction work starts.

In practice, the long-term success or failure of the enterprise depends on the quality of governance and management of the facility. Currently, the differences between the three functional slaughterhouses in Wau, Aweil and Kuajok are striking and some good lessons can be learned and applied in future:

- The PPPs must be incorporated, and strategic decisions about investments, slaughtering fees and revenue sharing must be taken by a Board with representation of the partners and co-opted experts.
- The basic payment to the private operator should be based on a fixed fee per animal, to be set by the Board. The private operator pays his staff and consumables from the fee. Investments are paid from the net surplus, i.e. after the PO is being paid, to be decided by the Board.
- The consultant proposes to create an investment fund under the management of the Board, from which major investments are being paid.
- The quality of the services depend directly on the quality of the staff. Better quality staff across the board but certainly in the finance department, and regular staff training will help to further professionalise the operations, which is highly necessary when volumes will increase in future.
- Generally financial management and record keeping is a major challenge, as was shown in the three functional slaughterhouses in Wau, Aweil and Kuajok, and poses a risk to the entire enterprise. The establishment of a Board that sits regularly, demands for annual budgets and monthly expenditure reports and supervises the PO is paramount. The Board need to be established properly, and trained to perform its functions professionally.

3 A Feasibility Study of the Kangi Warehouse and Service Centre

3.1 The Agricultural Production System around Kangi



Figure 2: a homestead in the dry season close to Kangi

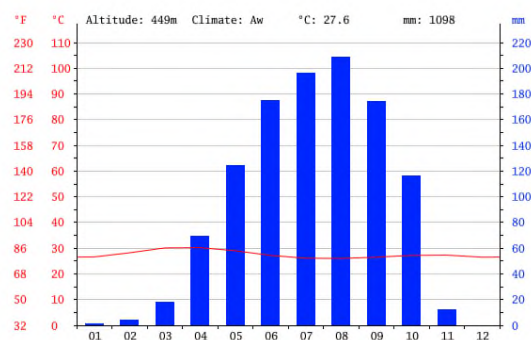
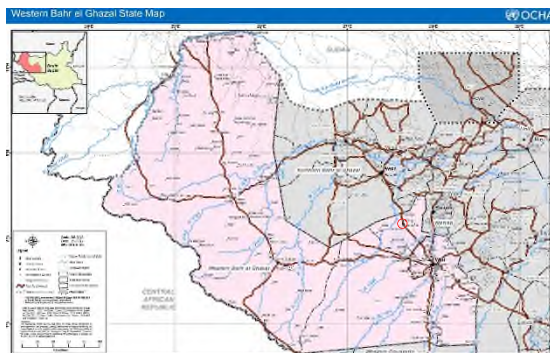


Figure 3: climate data for Wau, 65 km south of Kangi

Kangi trading centre is located 65 km north of Wau. It is centrally located in Jur River County, which had in 2014 an estimated population of 201,947¹¹. Kangi Payam has an estimated population of 6,800 persons, with an average HH size of 6.1 persons¹².

The population is a mix of Luo and Dinka. Their main occupation is agro-pastoralism, whereby the Luo are more agricultural oriented and the Dinka are primarily pastoralist. According to the FAO (2015)¹³, for 58% of the population the main source of livelihoods is crop production, and for 14% livestock husbandry. The average farm size in WBG¹⁴ is 10 feddan¹⁵, of which on average 4 feddan is being cropped.

The agricultural production system is entirely rain-fed, depending on a unimodal rainfall pattern. The rainy season starts in April/May and ends in October/November. Prolonged dry spells do occur frequently and can decimate output.

Generally, crop production is semi-subsistence, low input/output. Cropping is done with traditional tools, and hardly any modern inputs in terms of seeds, fertilizers and crop protection chemicals, are being used. Some farmers use oxen and donkey ploughs.

Two crops dominate the farming system, sorghum and groundnuts, which are grown by over 70% of the households; whereas simsim is grown by around 50%. Cassava is slowly entering the farming system, often intercropped with sorghum and simsim. As a perennial crop, however, it is the only food source

for animals in the dry season, and is often destroyed by livestock.

¹¹ Annual Needs and Livelihoods Analysis 2014 2015

¹² Hope Agency for Relief and Development (2015); Participatory Disaster Risk Analysis for Udici, Kangi and Thikou Bomas

¹³ FAO South Sudan (2015): baseline survey for the project "sustainable agricultural development through strengthening extension, input supply and service" under ZEAT/BEAD programme (GCP/SSD/009/EC)

¹⁴ A detailed analysis of the farming system in Jur River County is not available, therefore most of the data apply to WBG

¹⁵ 1 feddan = 4,200 metres² = 0.42 hectares = 1.038 acres

3.2 Yields and prices

By all standards, cereal production is low in Jur River County. Sorghum yield ranges between 800-1,300 kg/ha, and on average a household grows slightly below one ha. Production fluctuates significantly from year to year, as is shown in the table below.

Table 11: cereal production data for Jur River County for 2011 and 2014

Year	Cereal area (ha)	Yield (kg/acre)	Cereal production (tons)	Cereal surplus
2011 ¹⁶	10,650	720	7,668	-7,855
2014 ¹⁷	32,094	1,300	24,726	2,631

The high fluctuation in acreage between the two years, raises some doubts about the reliability of the data. However, yield fluctuations of over 50% from one year to another are not uncommon. Groundnut yields are equally low at around 800 kg/ha unshelled.

Overall, Jur River County has the annual risk of being food deficit, as the production figures for 2011 show. Food scarcity hits its peak in June/July, just before the new crop enters the market. Coupled with a poor infrastructure and subsequent high transportation costs that hampers food imports from outside the region, commodity prices fluctuate considerably throughout the year. A monthly price cycle is also observed in towns caused by the wage payments of salaried workers: the days after pay-day, the demand for luxury food items, such as simsim and meat goes up, allowing traders to raise their prices¹⁸.

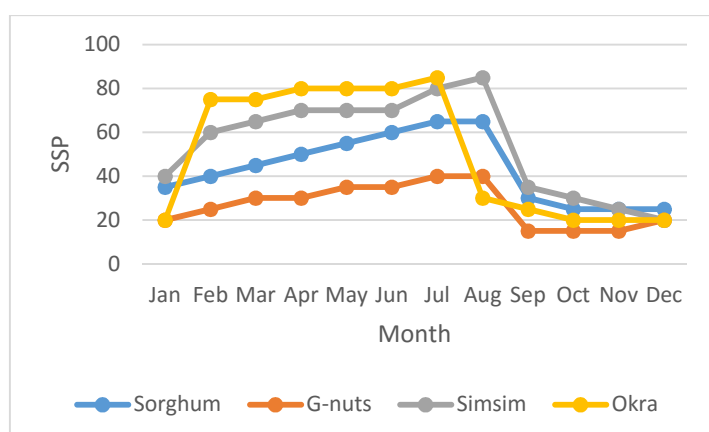


Figure 4: 2015 price fluctuations in Kangi market for 4 main crops, per malwa¹⁹

The consultant constructed the price fluctuations at Kangi market for the four most commonly traded commodities on the basis of traders' information. Figure 4 shows that for all products the prices are at their lowest in October and November, and more than double for ground nuts, triple for sorghum and quadruple for simsim and okra by July and August.

These high price fluctuations provide opportunities for traders to make substantial profits by simply buying during the glut period and selling during the lean period. How well a trader can play the market depends on his cash reserve. Traders with ample financial means buy big quantities of produce in October and November at the farm gate at low prices and store it in the towns. They enter the town markets again when the prices reach a peak in June/July. Only occasionally, large traders will sell their produce at the local trading centres. Small traders with less financial muscle, work with smaller quantities, and will turn their money around faster in order not run out of cash. These are the traders that work the market around Kangi.

¹⁶ FAO (2012): FAO WFP crop and food security assessment South Sudan 2011

¹⁷ Annual Needs and Livelihoods Analysis 2014 2015

¹⁸ CLIMIS (2015): South Sudan Traders Survey Technical Working Paper

¹⁹ The malwa is a standard volume measure for produce in the local markets. One malwa of sorghum weighs 3.5 kg; 1 tin = 5 malwa, 1 small sack = 11 malwa; 1 medium size sack = 18 malwa = 60 kg; 1 big sack = 7 tins = 120 kg

3.3 Vendors and produce volumes in Kangi market



Local trader in his store in Kangi



Bicycle trader buying from farmer at market day



Bicycle traders on the road to Kuajok



Local market vendor

Kangi is the headquarters of the Kangi Payam. As a small trading centre, it is strategically located on the road from Wau to Aweil. The strategic location is shown by the Wau-Aweil Market Correlation Coefficient of 0.88²⁰, indicating that Wau and Aweil, and presumably the trading centres in between, operate in a close to single market system.

Kangi counts about 10 small tea shops and restaurants, a few grocery stores and at least one grinding mill. Sunday is market day, and the busiest day of the week. On market day around 50-75 traders set up small stalls with a variety of goods and produce.

Throughout the year, the Kangi market is primarily supplied with farm produce by farmers. Farmers store their produce on-farm and sell small quantities in Kangi according to their cash requirements. From January onwards the commodity prices increase, and reach their peak in July. A typical example is the farmer interviewed by the consultant in Kangi market: she confirmed that she harvested in October 2015 9 sacks of sorghum of 80 kg each. Of these she kept 4 for food, 4 for cash and 1 for planting, whereby she was selling once a month about 20 kgs of sorghum to buy salt, sugar, tea, and other household items as needed.

In Kangi, farmers sell to three outlets:

- Local produce traders; who buy and store between 5-15 sacks of produce and ferry them to Wau or Aweil when they need money. Around 8-12 traders are active at this scale at the Kangi trading centre. They mentioned that they trade between 25-50 sacks of produce annually.
- Bicycle traders; they buy up to 11 malwa (about 40 kgs) during market days, from farmers and carry them on their bicycles in sacks to Kuajok for a profit of SSP 5 per malwa. Some bicycle traders buy directly at the farm gate at a slightly lower price and sell their produce to local produce traders and other bicycle traders. On 14 February 2016, the consultant counted 32 bicycle traders in the Kangi market.

²⁰ Annual Needs and Livelihoods Analysis 2014 2015

One bicycle trader mentioned that around 50 traders work like this in a radius of 40 km around Kangi.

- Small local vendors, who repackage or process small quantities of produce from farmers and sell it in the market. Typical products are small packages of groundnuts, groundnut- and simsim paste, hibiscus flowers, tobacco, eggs, simsim, honey, sorghum and okra flour. On 14 February 2016, the consultant counted around 60 small vendors. Their turnover is however too small to have any measurable impact on the produce volumes that are traded through the market.

The consultant interviewed three produce traders and two bicycle traders. All traders mentioned their financial resources as their main constraint to expand their business. The two bicycle traders had enough funds to buy up to 15 malwa (SSP 600) of sorghum at the current price level. For local produce traders the amount of cash available for their trade varied between SSP 5,000 to 25,000.

Case: James Apinye

James Apinye has a shop and produce store in Kangi. He invests part of his shop income in produce financing. In October, he provides loans to farmers through an intermediary. Farmers pay back with produce at the commodity price of the day from January onwards.

In October 2015 he loaned SSP 24,000 to farmers, from which he expects to get 7 sacks of sorghum, 8 sacks of groundnuts and 1 sack of simsim. Yearly he buys approximately 30 sacks of produce, which he sends to Wau traders. The cost of transport to Wau is SSP 50 for a sack of sorghum and SSP 20 for a sack of groundnuts.



Based on the 5 interviews conducted on 14 February, the consultant estimates that the trade of the four main farm products that are sold out of Kangi is as per Table 12 below.

Table 12: estimation of annual produce trade through Kangi market

Produce	No of traders	Sacks/year/trader	Weight per sack	Tonnes/year
Sorghum				
Small produce traders	12	20	120	28.8
Bicycle traders	30	52	40	62.4
Groundnuts				
Small produce traders	12	30	60	21.6
Simsim				
Small produce traders	12	3	120	7.2
Okra				
Small produce traders	5	2	100	1.0
Total tonnage per year				121.0

The table shows that the trade through Kangi could be in the range of 120 tonnes, or 1,200 sacks of 100 kg per year. The consultant makes the following observations by these figures:

- The figures need to be interpreted with care, as they are based on a small interview sample of five traders on a single market day. Trading volumes may differ considerably in October – December when prices are lower.
- The large produce traders who buy big quantities during the glut period are not included here. Local traders mentioned that they do not trade through Kangi market, neither store their produce there. This is confirmed by CLIMIS²¹ (2015) which also found that the “market supplies of locally produced foods were mostly coming from farmers...”. As this statement refers to the main markets in Wau, Aweil, Kuojok and Rumbek, this will certainly apply to Kangi.

3.4 Storage capacity, storage cost and trade profits in Kangi



On-farm storage (Picture: UNIDO)



Produce store in Kangi

Generally, farm produce is stored on the farm in locally constructed raised stores, and is brought to the Kangi market in small quantities.

The consultant counted four produce stores²² in Kangi. All the stores were constructed from adobe blocks and iron sheets and had a capacity of 30-50 bags each. Total storage capacity in Kangi is therefore estimated at 150-200 bags.

During his market visit the consultant counted in total 45 stored bags in the four visited produce stores. Some stores are shared by a few traders, who label their bags with their name. All traders but one mentioned that they buy and sell in quantities of 5-15 bags. Traders pay SSP 150 per month to the store owner, irrespective of the number of bags stored.

The main storage problem cited is rats: one trader estimated that about 10% of the produce gets spoiled. Traders specifically mentioned that theft is not an issue in Kangi but is a problem in some other trading centres. When asked how a properly built store would enhance their trade, the main

advantage mentioned was the possible reduction in produce damage by vermin. All traders were willing to pay about the same amount as they are paying currently for a storage facility.

The main financial benefit of storing produce in WBG is the increase in stock value over time because of increased produce prices. In paragraph 3.1.1, the price fluctuations of the four most common traded agricultural products were given, whereby the most tradeable produce, sorghum, increases in value from SSP 25/malwa in October to SSP 65/malwa in July. From October to January the price increase is rather slow (from SSP 25-35) but thereafter raises more quickly. The effect of this on the profit margin for a sack of sorghum of 100 kg is shown in Table 13.

²¹ Crop and Livestock Market Information System South Sudan; South Sudan Traders Survey Technical Working Paper 2015

²² It is possible that there are 1-2 stores more that were not shown to the consultant

Table 13: profit from storing a sack of sorghum for different periods

Cost structure	Price at 15/10	Storage period		
		15/10 – 15/01	15/10 – 15/07	15/01-15/07
Price per malwa (SSP)	25	35	65	65
Price per kilogramme (SSP)	7	10	19	19
Number storage days		92	274	182
Gross profit per sack at end of storage (SSP)		286	1,142	857
Gross profit per sack/month (SSP)		93	125	141
Storage cost/month/sack (SSP)		15*	15*	15*
Storage losses (1%/month) (SSP)		0.9	1.3	1.4
Net profit per sack/month (SSP)		77	109	125
Net profit per sack at end of storage (SSP)		234	984	750
Profit per sack per storage day (SSP)		2.5	3.6	4.1

*Assumes that on average 10 bags are stored at a storage rent of SSP 150/month

The table shows that for a storage period of three months from October to January, the gross profit per sack of sorghum/month in Kangi is SSP 93; storage from October to July creates a profit per sack/month of 125 and for the period January to July SSP 141.

Storage losses are incurred by vermin, spillage and theft, and is estimated by the interviewed traders at 1% per month. In addition a trader incurs local storage costs of SSP 150/month. If these are deducted from the profit per sack, the net profit per sack proves to be highest for the longest storage period, whereas the profit per day is the highest for the storage period January – July. When the number of sacks stored increases while the store rent remains the same, the profit per sack increases as well. Table 13 also shows that storage rent of SSP 150 month at an average stock of 10 sacks, a local trader would earn SSP 770, 1,090 and 1,250 per month respectively for different storage periods and number of storage days.

A local trader would in addition incur transport costs of SSP 50 per sack for transportation to Wau. This cost is off-set by the price difference of SSP 5 per malwa between Kangi and Wau. This shows that for local traders the main income is earned by storing and waiting for the price to increase, and only to a lesser extent by the price difference between Wau and Kangi.

For a large trader who buys early in the season, profits can be considerable. The price breakdown above shows that purchasing for example 40 tonnes of sorghum and storing it for 9 month would generate a net income of almost SSP 400,000, which is at the exchange rate of February 2016 slightly over US\$ 13,000. These traders are currently not storing in Kangi, but may be attracted in future because of its connection to four major towns, and the availability of a good warehouse, but only if their produce can be stored professionally and can clearly and safely separated from other small and large traders.

The consultant notes that the small local stores currently operational in Kangi are used by different groups of traders. If a modern warehouse is being constructed it may be advisable to provide for separately lockable small storing spaces, rather than one big store. This would follow the current storage practice in Kangi, and would allow for more flexibility to respond to larger traders who do not want to mix their produce with local traders.

During the consultants visit to Kangi, two sites were proposed for the store, one close to the payam headquarters and one close to the junction / trading centre. The consultant strongly advises to choose the

site close to the trading centre. The site at the payam headquarters is too far from the market and the agricultural service centre/warehouse may not be used at all if constructed there.



Kangi trading centre on a weekday seen from Wau-Aweil road (top), from Kuajok road (middle) and from the planned Bar Urud road (above)



Kangi trading centre on a market day (14 February 2016) (above)



Kangi: Proposed preferred location for the agricultural warehouse and service centre

3.5 Growth Projections of Cereal Produce Trade and Storage Capacity in Kangi

Two developments around Kangi may have an impact on the volume of produce trade through the market:

- The completion of the Kangi – Kuajok road by WFP and the Kangi - Bar Urud road by UNOPS. The latter may be connected to Raga later. These new roads put Kangi in the crosshairs of the four major towns in the region: Wau, Aweil, Kuajok and Raga. Undoubtedly this will increase traffic and trade in Kangi, and may cause Kangi to grow quickly into a major trading centre. Being rather central to the four major markets, some large traders may choose to store produce in Kangi and ferry it from there to the most profitable market.
- The roll out of a farmers' support programme under ZEAT BEAD named: "Sustainable Agricultural Development through Strengthening Extension, Inputs Supply and Services". This is in addition to ongoing farmer support activities under SORUDEV. The project is likely to support farm oxenisation, distribution of improved seeds and tools, and farmer training. Experience show that the impact of these activities on on-farm production might be slow, but should over time have some effect on the trade volumes in Kangi.

The total produce trade for Kangi is determined by the following factors:

- Area under production in ha in the catchment area for Kangi: for Jur River County the area under cereal production in 2014 is estimated at around 30,000 ha. By assuming a steady increase in area under production due to population growth and mechanisation, one can make a projection of future area under production.
- Yield: the average yield is on average 1,100 kg/ha. Based on assumptions about yield increase because of improved inputs and extension, one can make projections of future production.
- The additional produce that will be marketed by small farmers. One may assume that the growth in marketing follows the growth in production.
- Market share of Kangi of the total produce trade in Jur River County: based on the 2014 production figures and the produce volumes that are currently marketed in Kangi, the consultant estimates that about 0.5% - 1% of the production in Jur River County is moved through the Kangi market by small produce traders and bicycle traders. If better storage facilities are available larger traders may choose to use Kangi as a distribution centre.

By setting growth figures for each of these parameters one can estimate how much cereal volume will be traded through Kangi in the next 10 years. The corresponding storage volume can be calculated by setting values for the following parameters:

- Number of storage days for any volume of produce: the number of storage days determines how many times a year a space in the warehouse is being 'refreshed'. For example, an average of 50 storage days for any given volume would mean that the same storage space can be used 7.3 x per year for new produce.
- Storage volume: the storage volume is calculated by multiplying the specific volume of a product by its weight in tonnes; for grains this varies between 1.8 m³/tonne for grain in sacks.
- Stacking height: the number of meters that the produce will be stacked.

The outcome of the first set of calculations about trade volume and the second calculations about space requirement per unit of volume results in a projected growth of storage capacity over a period of time. The following table uses a growth of area and production levels of 5% and 3% respectively and an increase of market share at Kangi from 1% to 1.5% in 6 years, because of its enhanced connectivity.

Under these conditions, the trade volume at Kangi will increase about three-fold in 10 years. With a storage time of 50 days, a specific volume of 1.8 for cereals and stacking height of 3 meters, the storage capacity requirements would increase to about 180m² over a ten year period as shown in the table.

Table 14: calculation model for projected storage requirement for cereals at Kangi trading centre between 2016 and 2026

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Growth
Cereals												
Cereal area (ha)	30,000	31,500	33,075	34,729	36,465	38,288	40,203	42,213	44,324	46,540	48,867	5%
Yield (kg/ha)	1,100	1,122	1,144	1,167	1,191	1,214	1,239	1,264	1,289	1,315	1,341	2%
Production (mt)	33,000	35,343	37,852	40,540	43,418	46,501	49,802	53,338	57,125	61,181	65,525	
Market share	0.5%	1.0%	1.0%	1.0%	1.0%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	
Trade volume (mt)	165	353	379	405	434	698	747	800	857	918	983	
Storage days	50	50	50	50	50	75	75	75	75	75	75	
Storage (tonne/month)	23	48	52	56	59	143	154	164	176	189	202	
Storage volume (m ³)	40	87	93	100	107	258	276	295	316	339	363	
Stacking height (m)	2	3	3	3	3	3	3	3	3	3	3	
Storage space for cereals (m²)	20	29	31	33	35	86	92	98	105	113	121	
Other produce (m²)	10	15	16	17	18	43	46	49	53	57	61	
Total storage need (m²)	31	44	47	50	54	129	138	148	158	170	182	

The model uses a compounded growth rate for area under production and yield, and is for the rest entirely linear: a doubling (or halving) of any of the other parameters (market share, storage days and stacking height) will double or halve the required storage space.

In this particular example the consultant has set the 2016 data as per his findings in Kangi in February 2016, whereby area and yield were based on the Annual Needs and Livelihoods Analysis 2014 2015 data, storage days and storage tonnage based on local trader data, and stacking height on own observations. Out of these the current market share for Kangi was calculated. For the subsequent years, it was assumed that the market share will increase because of improved connectivity, storage days will increase because of increased produce financing as a result of the general increase in trading at Kangi, and the stacking height increased by a meter because of the improved storage facility. The calculation shows that under the cited assumptions the storage requirements for *cereals* at Kangi is likely to increase and may reach 120 m² by 2026. The current local storage of other tradeable produce, such as groundnuts, simsim and okra are about 50% of the cereal storage. If for these products the same parameters are applied, the overall required storage capacity would increase in ten years to about 180 m².

3.6 A SWOT Analysis of a Warehouse in Kangi

Based on the analysis presented in the previous paragraphs, a summary SWOT for a warehouse in Kangi is presented below.

Strengths:

- Local traders are active at Kangi, and use local storage space, for which they are willing to pay a storage fee;
- Substantial profits are potentially being made by cheaply buying produce during harvest, and selling it 3-8 months; which pay for storage costs;
- Local storage facilities in Kangi are of poor quality;
- Cereal and groundnut production is ongoing in the catchment area of Kangi market, of which part is being marketed by farmers to cover their cash needs;
- Damage to properly stored produce from moisture and mould is minimal because of an annual pronounced dry season;

Weaknesses:

- Cheap local store available and sufficient to cover current storage needs; therefore no local demand for a large warehouse in Kangi;
- Large traders buy early in the season and prefer to store and sell in towns;

Opportunities

- Strategical location with the potential of developing into a major trading hub in the near future by the completion of two new roads to Raga and Kuajok;
- Planned farmer support programmes may increase production area, yields and marketed produce volumes;
- The planned processing unit may further increase the attractiveness of Kangi as an agricultural centre;
- Planned farmer support programmes may increase the demand for other agricultural inputs and services, that can be incorporated in a warehouse design;

Threats:

- Traditional warehouse design does not cater for various small storage needs in the region;
- Low production and recurrent food deficits in the area may limit the volume of marketed produce;
- Instability may further reduce production and marketing volumes.

3.8 Cost / Benefit analysis of produce storage at Kangi

The profitability of the Kangi warehouse is calculated by taken the financial benefit of storage and subtract the storage costs.

The cost structure of a warehouse is substantially different from the local storage currently practiced in Kangi. Table 15 provides an overview of operating cost of a small modern warehouse.

Table 15: operating costs of a small warehouse

	Cost per month	Number of months	Total
Staff			
Manager	1,500	12	18,000
Floor workers	600	24	14,400
Cleaners	300	24	7,200
Guards	500	24	12,000
Sundries	1,000	12	12,000
Transport	1,000	12	12,000
Meetings and trainings	5,000	2	10,000
Maintenance and repairs (1% of establishment cost)			36,000
Total operating costs			121,600

The table shows that the annual operating costs of a small rural warehouse will be approximately SSP 121,000 at 2016 price levels. The income of such a warehouse is primarily derived from the storage fee. Table 16 shows the income by three different storage fees per tonne, against different storage quantities. The storage fee of SSP 150 is based on the current storage fee at Kangi for a simple adobe block store.

Table 16: income and breakeven point for a small warehouse by different storage quantities and storage fees

Storage fee SSP/ton/month	Quantity stored (tonnes/month)							
	25	30	40	50	70	100	140	190
150	45,000	54,000	72,000	90,000	126,000	180,000	252,000	342,000
200	60,000	72,000	96,000	120,000	168,000	240,000	336,000	456,000
250	75,000	90,000	120,000	150,000	210,000	300,000	420,000	570,000

Table 16 indicates that at a fee of SSP 150 per tonne/month, the warehouse should store permanently 70 tonnes of produce to breakeven. By higher storage fees the breakeven point drops to 50 or 40 tonnes/month. When compared to the trade projections model for Kangi (Table 14), such a situation would be achieved by a doubling of the market share of Kangi trading in Jur River County, combined with an annual increase in acreage by 5%, a yield increase of 3% that translates in an increase of farm gate trading by 3%. This scenario could happen if some large traders would start using Kangi as a distribution point.

As can be seen from Table 13, an increase in the storage fee to SSP 200/tonne/month would cause a decrease in trader profit of SSP 5 per sack if he/she stores an average of 10 sacks a month. A local trader might be willing to accept a higher fee only if this comes with a reduction in his local storage losses. This calls for a well-managed, vermin-free warehouse.

3.9 Conclusions and Recommendations on the Warehouse in Kangi

The current production levels around Kangi, the current produce volumes that are traded through the Kangi market, and the current storage facilities and market volumes do not create an immediate demand for more storage capacity in Kangi. Although the existing stores are very basic and do have vermin problems, they do serve the purpose of keeping produce of small traders for relatively short periods safe from major damage and theft. In addition, larger volumes of produce bought directly from farmers by large

commercial traders from Wau, Aweil and Kuajok, have until now not been stored in Kangi, but are ferried immediately to the towns. This finding was confirmed by the GIZ USFLM project, where a VCA stakeholder workshop concluded that storage capacity was a not a constraint to local traders²³.

The operational cost of a small warehouse are estimated at around SSP 122,000. The current storage fee in Kangi is SSP 150 per local store/month. A local trader stores on average 10 bags per month, and is therefore willing to pay around SSP15-20 /sack/month. With a permanent storage of 50-70 tonnes (500-700 sacks of 100 kg), the warehouse would breakeven. The consultant estimates that around 50-75 bags, 10% of the breakeven quantity, are currently stored at any time in Kangi, requiring a space of 30 – 45m² in storage space at a stacking height of 3 meter.

This situation may change rather quickly once the roads from Kangi to Bar Urud and Kuajok are completed, and if production levels in the Kangi market catchment area increase. Because of the combined development efforts around Kangi, it is likely that the Kangi market will grow substantially. How fast and to what extent this may happen is very difficult to predict. The consultant has provided a model based on some critical parameters that helps to predict future storage requirements under different growth pathways. The model shows that the permanent storage requirement in Kangi in the next 5 years may reach around 100m², in particular when larger traders are starting to use Kangi as a storage and distribution centre. In 10 years it could reach 200m². This would amount to a store of around 10x20 m. By collecting additional area and production data the coming seasons, the model could be further refined and tested.

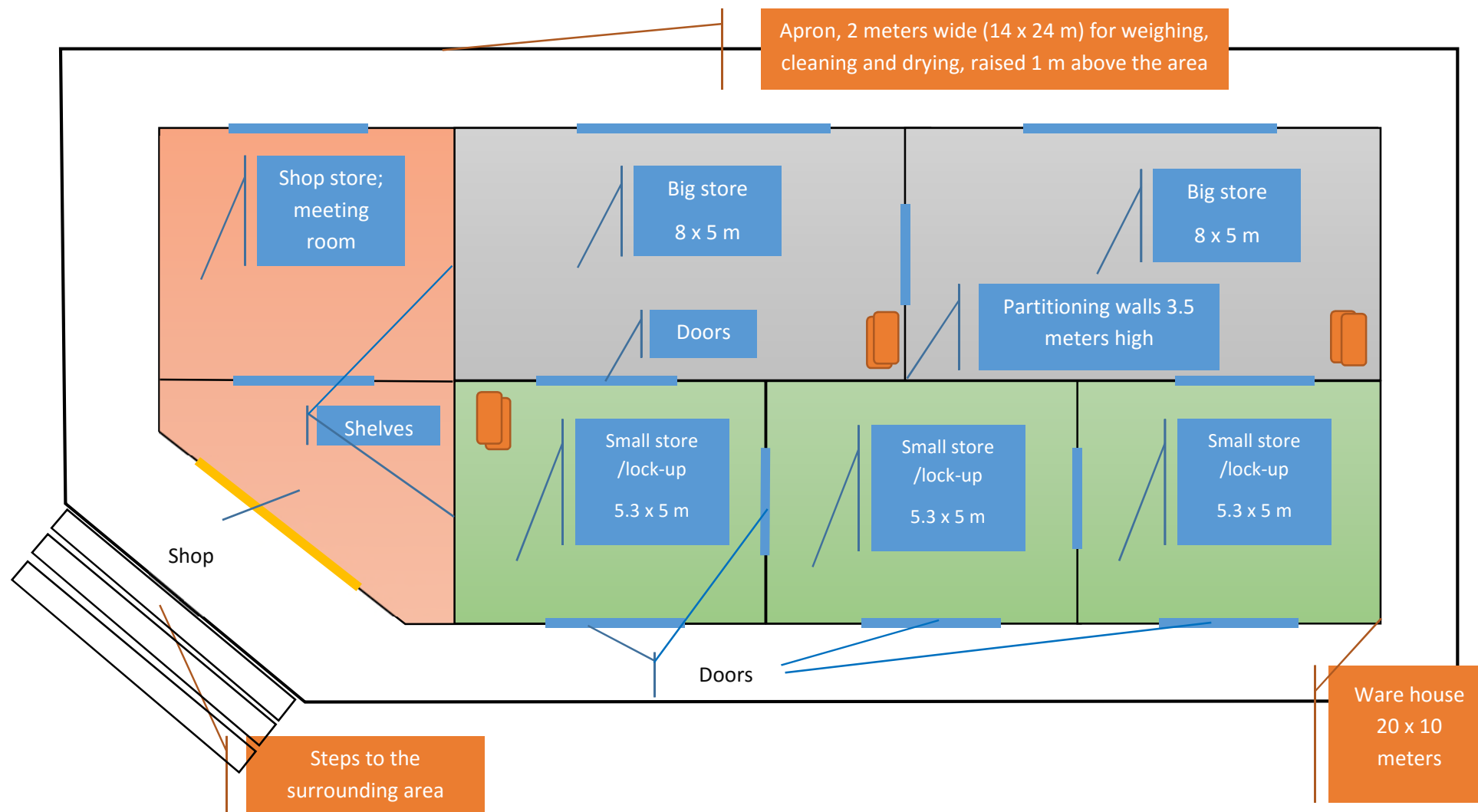
Storage in Kangi is done by small traders, some of whom currently share local stores. For a commercial warehouse to be successful, it seems logical to stay rather close to the current storage model: a few small storage spaces for one or more small traders. To ensure that the warehouse is also attractive for large traders, it should have separated storage spaces for 30-60 tonnes, 20 – 40 m². By connecting the storage spaces with doors, the total space rented by a trader can be adjusted according to his/her needs. Providing this type of flexibility, which obviously comes at an increased building cost²⁴, will make it more likely that at least parts of the warehouse are being used.

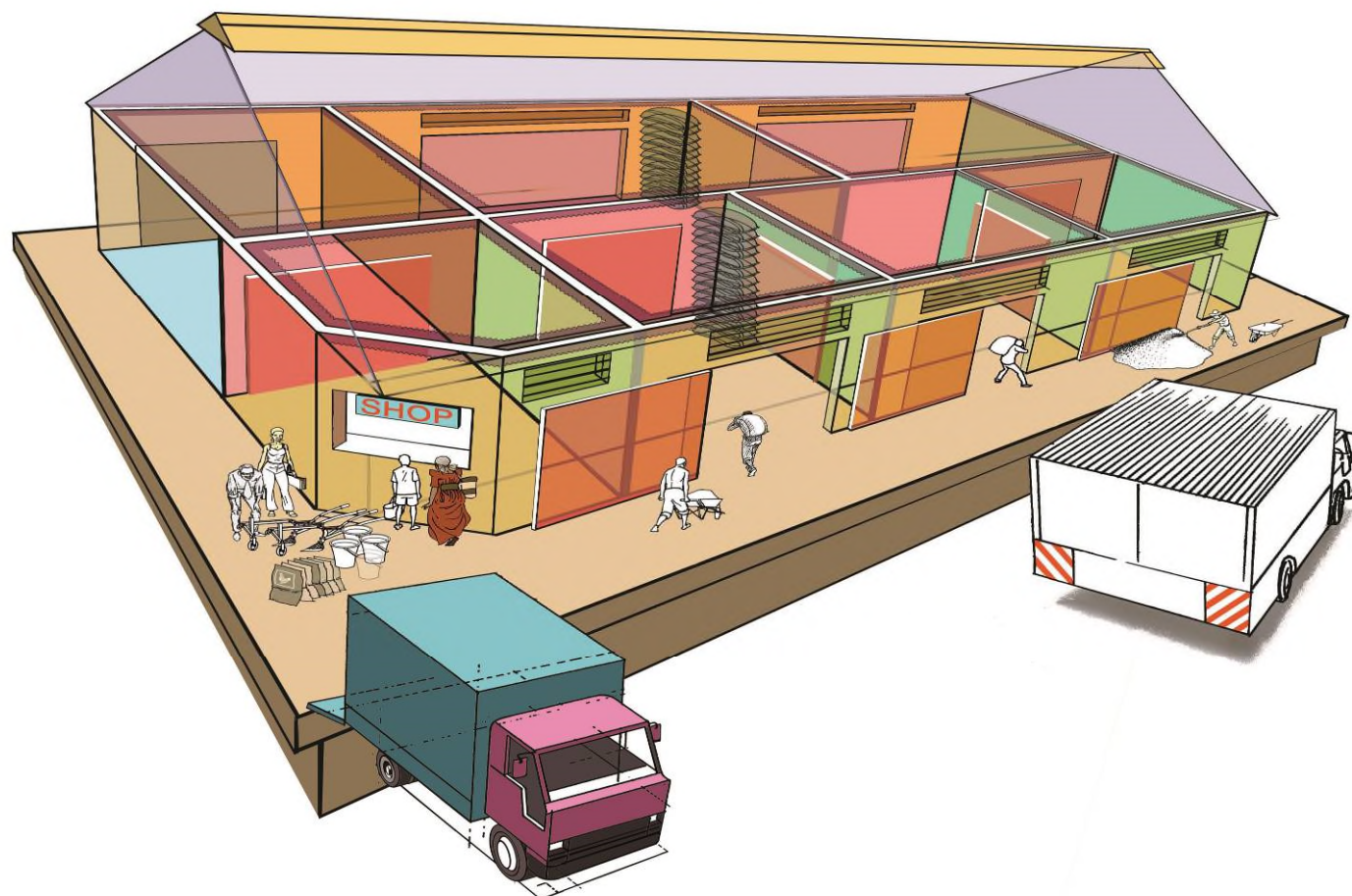
The use, income and profitability of structure can be substantially improved by combining it with other agricultural oriented services, turning it into an agricultural service centre for Kangi Payam or Jur River County. Typical additional functions of the structure could be a bulking/cleaning/weighing centre, whereby the current produce buying under trees at the trading centre is shifted to the facility; an agro-vet shop; an agricultural advice and training centre; and other lock-up shops. This, again, calls for a flexible design whereby separate spaces can be turned into different functions as per the local demand. The additional advantage of this approach is that one of the permanent users, for example a shop-owner or trader, can be contracted to manage the entire facility. This would require a Public-Private-Partnership arrangement between the payam or county administration and a private operator, whose management fee could (in part) be offset by the rent of his uses of the facility.

A preliminary ground plan and an artistic impression of the warehouse as proposed is shown on the next two pages. A business for the facility plan is presented as a separate document.

²³ Urban Food Security, Livelihoods and Markets (UFSLM), 2015: Value Chain Analysis Activities report

²⁴ One contractor informally estimated the building cost to be between US\$ 75,000 – 85,000.





4 Response by officials in Wau and Kuajok of the presentation of the C/B analysis of slaughterhouses

The consultant presented his C/B findings of August 2015 about C/B analysis of slaughterhouses in Kuajok and Wau to Municipal, County and SMARF officials of the two towns on 15 and 16 February respectively. The presentation is attached in Annex 3.

The officials asked explanatory questions about the calculations, and agreed with the consultant's findings. Neither of the meetings suggested changes to the findings and recommendations.

ANNEX 1: TERMS OF REFERENCE

Agricultural Marketing and Transitional Investments Programme (AMTIP)

GIZ Project number: 13.2198.3-003.00

Consultancy

Economic assessment of 1 improved slaughter facility and 1 agricultural warehouse and development of business plans

Terms of Reference (ToR)

1. Introduction

The EU funded Agricultural Marketing and Transformation Investment Programme (AMTIP) is a component of the wider programme of Market Chain Development titled “Support to Food Security and the Development of Agricultural Markets in South Sudan (FSDAM)” funded by the German Ministry for Economic Cooperation and Development (BMZ). AMTIP will also complement the DFID funded component for “Urban Food Security, Livelihoods and Market Project (UFLSM)” covering the three states of the Greater Bahr El Ghazal area.

Objectives

AMTIP will contribute to the overall objective of FSDAM (“Access to and availability of food for rural and semi-urban households are sustainably improved”); three Specific Objectives (SO) have been formulated for AMTIP.

SO 1: Enlarging capacities to process, store and market local agricultural products puts a strong focus on the need to invest into the physical infrastructure for the transformation/marketing in urban, peri-urban and rural areas

SO 2: State governments are contracting private operators to run the processing, storage and marketing facilities. State governments, counties or town councils will be the formal owners of the investments but should not operate them considering their limited capacities and the inadequate rules and modes of operation of the public sector. The legal contracts and procedures for this new type of Public-Private Partnership (PPP) have to be developed and approved; civil servants have to be trained for their role as supervisors.

SO 3: The selected private operators are enabled to run the facilities technically and economically at affordable prices. The private sector is investing not much into the productive sector considering the risks for the capital investments too high and the time for its recuperation too long. Operators have to be identified and trained to ensure that they have the capacity to run the facilities in a long-term perspective.

Estimated results

1. 2 slaughterhouses (Wau, Rumbek) constructed and operating
2. 2 slaughterhouses (Aweil, Kuajok) rehabilitated and operating
3. 1 agricultural warehouse constructed and operating
4. State ministries, county and town administrations accept and manage the outsourcing of public owned facilities to private operators

5. Private operators and their staff are trained and able to run the facilities according to the required technical and economic standards

Timeframe

The action has been planned for an implementation period of 36 months. Three main phases can be distinguished: (a) the administrative and technical preparation of the investments which will require at least ten months; (b) the period of physical construction and equipment of the facilities estimated at twelve months, and (c) the monitoring and coaching of operations from their start up to the end of the programme for sixteen months.

The contract for AMTIP has been signed on 19th December 2014 and the implementation period started on the 1st of February 2015.

2. Background to the consultancy:

The inception phase, consisting of the first six month of the project came to an end. Discussions with the EU and other stakeholders led to some changes and 2 new activities were included in the AMTIP workplan. These are the upgrading and modernisation of a slaughterhouse in Rumbek, Lakes State and the construction of an agricultural warehouse in Kangi, Western Bahr el Ghazal. GIZ and EU agreed to carry out feasibility studies before constructing any of the 2 infrastructures. These activities are foreseen in the workplan under Results 2 and 3.

Businessplans for the operations of the agricultural warehouse and the slaughterhouse as part of the feasibility study need to be developed. Furthermore, during an earlier consultancy, business plans for the slaughterhouses in Kuajo, Wau and Aweil were developed. These business plans need to be presented to the various stakeholders and finetuned.

Result 2: Agricultural warehouse in Kangi constructed and operational

The proposed location for the agricultural warehouse is Kangi trading centre, along the main Wau – Aweil road. Kangi is also connected to Kuajok through a new road under construction, undertaken by WFP with funding from EU. UNOPS, under the ZEAD BEAT is constructing a feeder road from Kangi to Bar Urud, another busy farming area. It is foreseen that the agricultural warehouse will develop into a one-stop agricultural trading centre. AMTIP will commission an economic feasibility study in relation to the agricultural warehouse before signing a MoU.

Result 3: Slaughterhouse in Rumbek is upgraded and completed

GIZ proposed / EU agreed to upgrade and complete the construction of the already existing slaughterhouse in Rumbek instead of constructing a new slaughterhouse in Rumbek. Construction work of this slaughterhouse was undertaken by VfS Belgium with funding from the EU. However the work was not finished and the slaughterhouse never used. Issues such as access to the facility and provision of security need to be assured / put in place before rehabilitation can start. In addition a feasibility study will be carried out prior to signing a MoU.

Prior to the planned consultancy, a basic baseline data collection took place. Relevant data from that baseline may be used for the feasibility study. However, additional baseline data will be collected by the consultant.

3. Timetable

GIZ employs Reint Bakema within the period from 09.02.2016 to 19.02.2016 for a maximum of 9 working days in South Sudan and 2 travel days. In addition, GIZ employs Reint Bakema within the period from 20.02.2016 to 10.03.2016 for a maximum of 8 working days at his country of residence, for report writing.

4. Description of tasks

The Consultant shall undertake the following tasks:

- Assess the economic feasibility of renovating and upgrading 1 slaughterhouses in Rumbek
- Assess the economic feasibility of constructing 1 agricultural warehouse in Kangi
- Determine the positive economic benefits of the intervention to the 2 private operators of the slaughterhouse in Rumbek as well as the agricultural warehouse
- Assess if the proposed 2 development projects fit in with the existing business environment and the developmental needs and plans of the 2 beneficiary locations
- SWOP analysis (strengths, weaknesses, opportunities and potentials) of existing types of state ownership and private management for slaughter facilities and agricultural warehouses / one-stop agricultural trading centre
- Develop business plans for slaughterhouse in Rumbek and one-stop agricultural trading centre in Kangi based on the principle of full cost recovery
- Present the earlier developed business plans for the slaughterhouses in Wau, Aweil and Kuajok
- Document stakeholder views and comments

Deliverables

The consultant will submit his findings and recommendations in an aide memoir at a debriefing meeting with stakeholders, and a draft final report within 10 days after the end of the field mission. The project will provide comments within 3 days after receiving the draft report. The consultant will submit within the following 7 days the final report in electronic form to the FSDAM Programme Manager and AMTIP Component Manager.

Supervision

The consultant will work under the overall supervision of the FSDAM Programme Manager. Supervision and coordination on a daily basis will be done by the Component Manager. The Consultant will be assisted by staff of AMTIP and the State Ministry for Animal Resources and Fisheries in Western Bahr El Ghazal and Lakes States.

Duty Station for field work:

Wau in Western Bahr el Ghazal, South Sudan with travels to Kangi, Kuajok for Western Bahr el Ghazal and Rumbek for Lakes State, South Sudan.



European Union







AGRICULTURAL MARKETING AND TRANSITIONAL INVESTMENTS PROGRAMME (AMTIP)

ANNEX 2: ITINERARY

Date Feb / March	Activity	Location
09 Tue	<ul style="list-style-type: none"> Travel from Kampala to Juba Briefing by RMO Meeting with Programme Manager 	Juba
10 Wed	<ul style="list-style-type: none"> Arrival to Wau Meeting with AMTIP team Meeting SMARF WBG Meeting Executive Director Jur River County 	Wau
11 Thu	<ul style="list-style-type: none"> Meeting UNIDO Visit Wau market Meeting FAO Meeting UNOPS Meeting HARD 	Wau
12 Fri	<ul style="list-style-type: none"> Travel to Kangi Meeting with traders Meeting with payam Paramount Chief 	Kangi
13 Sat	<ul style="list-style-type: none"> Prepare presentation for Wau and Kuajok officials Meeting with UFSLM VC advisor 	Wau
14 Sun	<ul style="list-style-type: none"> Travel to Kangi Meeting with local traders Meeting with bicycle traders Travel to Kuajok 	Kangi Kuajok
15 Mon	<ul style="list-style-type: none"> Discuss C/B analysis and business plan with SMARF and municipality officials Kuajok Travel back to Wau 	Kuajok Wau
16 Tue	<ul style="list-style-type: none"> Discuss C/B analysis and business plan with SMARF and municipality officials Wau Debriefing to AMTIP team in Wau 	Wau
17 Wed	<ul style="list-style-type: none"> Fly to Rumbek Meeting with SMARF officials 	Rumbek
18 Thu	<ul style="list-style-type: none"> Visit to slaughterhouse Meeting with Town Clerk Meeting with Deputy Town Clerk Meeting with Ag DG SMARF 	Rumbek
19 Fri	<ul style="list-style-type: none"> Fly back to Juba and Uganda 	Juba
23 Tue -25 Thu	<ul style="list-style-type: none"> Report writing 	Kampala
29 Mon -2 Wed	<ul style="list-style-type: none"> Report writing 	Kampala
7 Mon -8 Tue	<ul style="list-style-type: none"> Report writing 	Kampala

ANNEX 3: PRESENTATION TO WAU AND KUAJOK OFFICIALS







FEASIBILITY ANALYSIS OF SLAUGHTERHOUSES IN GBG

Reint J Bakema

AGRICULTURAL MARKETING AND TRANSITIONAL INVESTMENTS
PROGRAMME (AMTIP)

Cost benefit analysis of slaughterhouses in GBG

1







PRESENTATION OUTLINE

- What is AMTIP
- What is a Feasibility Analysis
- What are the findings for slaughterhouses in Wau
- Strengths and weakness in the current operations
- Business Plan
- Next steps

Cost benefit analysis of slaughterhouses in GBG

2







AMTIP

- EUROPEAN UNION: Zonal Effort for Agricultural Transformation: Bahr el Ghazal Effort for Agricultural Development¹ (ZEAT BEAD)
- Objective 3: Enhanced local value addition and strengthened Value Chains
 - 4 slaughterhouses (Wau, Aweil, Kuajok and Rumbek)
 - 1 warehouse (Kangl)

Cost benefit analysis of slaughterhouses in GBG

3







FEASIBILITY OF SLAUGHTERHOUSES

- Supply and demand of meat/animals
- The efficiency of the value chain
- Financial feasibility (Cost/benefit analysis)
- Economic feasibility (economic analysis)

Cost benefit analysis of slaughterhouses in GBG

4



SUPPLY AND DEMAND OF CATTLE/MEAT





Main conclusion: there is a sustainable supply of cattle in GBG

State	Number of Cattle	Growth rate*	Sustainable beef offtake (kg/year)	Annual meat consumption per capita (kg)	Total meat consumption (kg/year)
WRBG	1,224,000	1.5%	13,464,000	12	6,313,824
NRBG	1,760,000	1.5%	19,360,000	12	13,597,764
Warrap	3,110,000	1.5%	34,650,000	12	18,388,632
Lakes	1,444,577	1.5%	15,890,347	12	14,352,804
Total	7,578,577		83,364,347		46,339,200
Value in million SSP			2,075		

Town	Population	Cows/year	kg/person/year	Annual meat consumption (kg)
Wau	151,000	24,090	22.3	3,372,600
Aweil	100,000	12,775	17.9	1,788,500
Kuajok	50,000	7,300	20.4	1,022,000
Rumbek				
Total	347,500	51,465		7,205,100

Cost benefit analysis of slaughterhouses in GBG

5



SUPPLY AND DEMAND OF SHOATS/MEAT

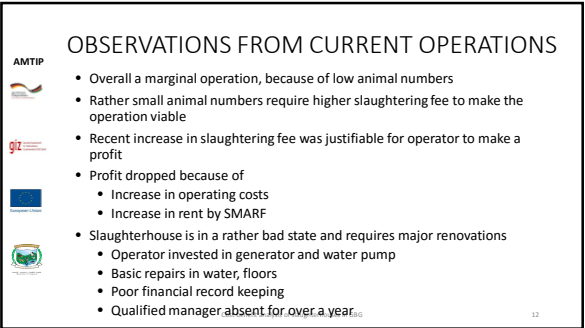
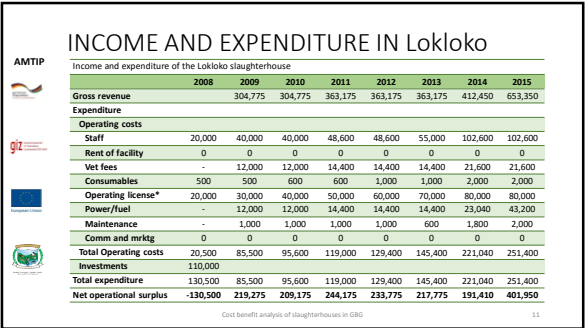
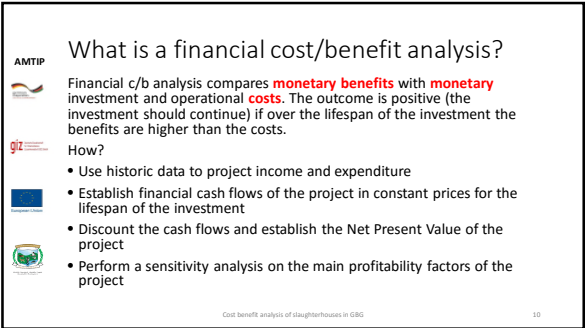
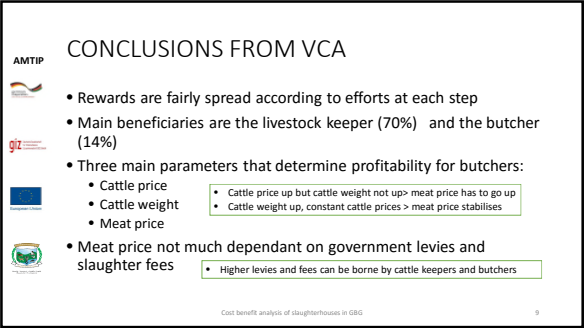
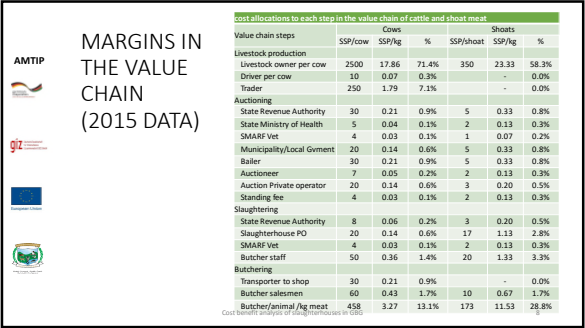
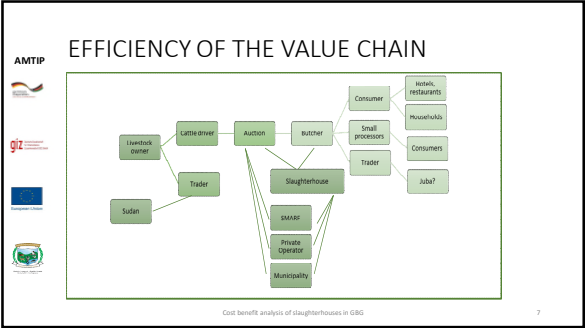
Conclusion: there is a sustainable production of shoats in GBG





	Number of Shoats	Growth rate	Annual sustainable offtake	Sustainable meat offtake (kg/year)	Meat consumption in GBG
WRBG	1,764,600	2.5%	44,115	3,529,200	
NRBG	1,650,000	2.5%	41,250	3,300,000	
Warrap	4,935,000	2.5%	123,375	9,870,000	
Lakes	872,851	2.5%	21,821	1,745,702	
Total	9,222,451		230,561	18,444,902	13.4 million kg/year
Value in million SSP			115	738	

Town	Population	Shoats/year	kg/person/year	Annual meat consumption (kg)
Wau	151,000	161	3.9	587,650
Aweil	100,000	101	3.7	368,650
Kuajok*	50,000	50	3.7	182,500
Rumbek				
Total	347,500	374		1,365,100

Cost benefit analysis of slaughterhouses in GBG

6





CBA OF SLAUGHTERHOUSE Lokloko Wau





Slaughterhouse Cash Flow scenario high animal throughput, medium growth, low slaughtering fees

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	inc/yr
No of cattle per day	66	70	74	79	83	88	94	99	105	112	6%
Slaughtering fee per head	15	16	17	17	18	19	20	21	22	23	5%
Income from Cattle p/y	361,350	402,183	447,629	498,211	554,509	617,669	686,909	764,529	850,921	947,075	
No of shoats per day	171	181	192	204	216	229	243	257	271	289	6%
Slaughtering fee Shoats	7	7	8	8	9	9	9	10	10	11	5%
Income from Shoats p/y	436,905	486,275	541,224	602,383	670,452	746,213	830,515	924,386	1,028,841	1,145,100	
Gross revenue	798,255	888,458	988,854	1,100,594	1,224,962	1,363,382	1,517,444	1,688,915	1,879,762	2,092,175	
Expenditure											
Staff (monthly)	264,000	274,560	285,542	296,964	308,843	321,196	334,044	347,406	361,302	375,754	
Animal salary bill	14,520	15,101	15,705	16,333	16,986	17,666	18,372	19,107	19,872	20,666	5.50%
Staff insurance	41,253	45,848	48,599	51,514	54,605	57,882	61,354	65,036	68,938	73,074	0.50%
Vet Officers allowance	41,253	45,848	48,599	51,514	54,605	57,882	61,354	65,036	68,938	73,074	0.50%
Public Health Officer allowance	41,253	45,848	48,599	51,514	54,605	57,882	61,354	65,036	68,938	73,074	0.50%
Total salaries and allowances	361,025	381,356	398,444	416,326	435,040	454,625	475,126	496,585	519,050	542,569	5%
Total annual consumables	139,375	151,631	165,015	179,429	195,591	213,629	232,684	252,909	275,474	300,163	
Meetings and training	10,000	11,000	12,100	13,310	14,641	16,105	17,716	19,487	21,436	23,579	10%
Total Expenses	510,400	543,987	575,559	609,265	646,271	683,759	724,925	768,981	816,119	866,712	
Gross operating profit	287,855	344,471	413,294	491,329	579,892	679,623	792,519	920,934	1,063,651	1,225,463	

Conclusion:

- Operation is moderately profitable at a slaughtering fee of SSP 15 per cow and SSP 7 per shoat.
- Major investments need to be paid from operating profit

Cost benefit analysis of slaughterhouses in GBO





CBA OF SLAUGHTERHOUSE KUAJOK

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	inc/yr
No of cattle per day	30	31	32	34	35	37	38	40	42	44	6%
Slaughtering fee per head	35	37	39	41	43	45	47	49	52	54	5%
Income from Cattle p/y	352,500	384,372	416,508	450,376	485,025	521,150	558,860	600,000	646,800	699,480	
No of shoats per day	40	42	45	48	50	54	57	60	64	68	6%
Slaughtering fee Shoats	15	16	17	17	18	19	20	21	22	23	5%
Income from Shoats p/y	210,000	243,747	271,290	301,946	336,066	374,040	416,388	463,351	515,700	573,985	
Gross revenue	674,500	728,119	787,798	852,322	921,115	1,000,000	1,075,248	1,163,351	1,262,500	1,373,465	
Expenditure											
Staff (monthly)	183,600	190,044	198,582	206,525	214,786	223,377	232,313	241,605	251,269	261,320	
Animal salary bill	10,098	10,502	10,922	11,359	11,813	12,286	12,777	13,288	13,820	14,373	5.50%
Staff insurance	10,950	11,607	12,303	13,042	13,824	14,654	15,533	16,465	17,453	18,500	0.50%
Vet Officers allowance	10,950	11,607	12,303	13,042	13,824	14,654	15,533	16,465	17,453	18,500	0.50%
Public Health Officer allowance	10,950	11,607	12,303	13,042	13,824	14,654	15,533	16,465	17,453	18,500	0.50%
Total salaries and allowances	215,598	224,660	234,111	243,967	254,249	264,970	276,155	287,823	299,994	312,692	5%
Total annual consumables	68,000	74,200	80,984	88,408	96,594	105,430	115,171	125,886	137,518	150,113	
Meetings and training	10,000	11,000	12,100	13,310	14,641	16,105	17,716	19,487	21,436	23,579	10%
Total Expenses	293,598	309,860	327,195	345,685	365,423	386,506	409,041	433,146	458,948	486,385	
Gross operating profit	180,902	218,259	260,603	306,637	356,720	421,918	492,960	570,205	663,552	767,080	

Conclusion:

- Operation is moderately profitable at a slaughtering fee of SSP 35 per cow and SSP 15 per shoat.
- Major investments need to be paid from operating profit





Cost benefit analysis of slaughterhouses in GBO



Strengths of the livestock industry

- Skilled livestock keepers, who attach great value to animals;
- Moderately favourable conditions for livestock production;
- A surplus production of animals and meat in relation to consumption;
- A short and transparent value chain in which the players get a reasonable reward for efforts;
- A steady demand for meat products in urban areas, with moderate local growth prospects;
- A functional State Ministry of Animal Resources and Fisheries;
- Well organised and transparent livestock auctions, with a (potential) link to the slaughtering houses;
- A functional meat and public health inspection system, that works closely with private slaughterhouse operators and butchers;
- A commitment of the GOS to professionalise the slaughtering industry, as reflected in the National and State Development plans;
- Profitable slaughterhouses, that in principle allow for long-term and sustainable operations without further external inputs in the future;
- Skilled butchers, operating in a competitive and transparent market.
- Competition is not in terms of price but in terms of quality of meat and customer service





Cost benefit analysis of slaughterhouses in GBO



Weaknesses of the livestock industry

- Poor livestock statistics, due to an underfunded and undertrained SMARF;
- Poor animal health services and infrastructure, also due to an underfunded and undertrained SMARF;
- Relatively poor quality animals in the market, partly due to a cultural practice not to sell the best/most beautiful animals; partly because of climatic and environmental factors;
- SMARF officials specifically mention that they lack computer skills, and transport facilities
- Fluctuating animal quality in terms of weight due to climatic conditions, amplified by the absence of animal health infrastructure;
- Weak animal and meat inspection, due to the absence of diagnostic equipment;
- Poor location of modern slaughtering facilities in relation to the auction and the meat market;
- Low butchering standards and training;
- Supportive infrastructure, such as road and bridges, poorly maintained;
- Poor record keeping by private slaughterhouse operators;
- Poor labour standards by private slaughterhouse operators;
- Low maintenance standards by private operators

Cost benefit analysis of slaughterhouses in GBO







ECONOMIC FEASIBILITY

Economic c/b analysis compares the **wider economic benefits** for the society as whole with the costs; for example health benefits, environmental benefits, distributions of income, poverty reduction. The outcome is positive if the economic benefits are higher than the financial and economic costs.

In the case of slaughterhouses mJOR economic benefits are:

- Health and safety during slaughtering for workers and butchers
- Controlled environment for meat inspection
- Health and safety of meat consumers
- Environmental health and safety
- Potential for value addition and export

Cost benefit analysis of slaughterhouses in GBO



Opportunities in the industry

- A slow but steady growth in the local meat market;
- External markets, for instance in Sudan and Saudi Arabia for quality animals; and Juba for diversified meat products with added value;
- Upgrading/breeding of better quality and resistant animals;
- Expansion of the milk industry;
- Expansion and value addition of the hide and skins industry;
- Experience with modern commercial slaughtering practices in Aweil and Kuajok, and to a lesser extent in Wau; that can be brought to other facilities;
- A positive attitude of the government towards PPP for livestock auctions and slaughtering;

Cost benefit analysis of slaughterhouses in GBO







Threats to the industry

- Late detected disease outbreaks and a slow response, that would decimate livestock herds;
- Competition from quality animals and meat from other regions and countries, such as CAR and Uganda; and frozen meat from Kenya and Uganda;
- Illegal butchering, triggered by increased slaughtering fees and stricter government inspection;
- Erosion of purchasing power due to economic instability, leading to a reduced demand for meat

Cost benefit analysis of slaughterhouses in GBO

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Conclusions





The construction of a new slaughterhouse Wau/Kuajok and their management under a PPP make financial and economic sense.

The long-term success or failure of the enterprise depends on the **quality of governance and management** of the facility. Lessons from the past can be learned and applied in future:

- The PPPs must be **incorporated**, and strategic decisions about investments, slaughtering fees and revenue sharing must be taken by a Board with representation of the partners and co-opted experts.
- Create an **investment fund** under the management of the Board, from which expensive repairs that cannot be financed from the cashflow, be paid.
- Better **quality staff** across the board but certainly in the finance department, and regular staff training is needed to further professionalise the operations.
- Improve **financial management** including reporting to the Board.
- Based on the financial results, the **board decides on the distribution of income** to the investment fund, the private operator (bonus) and the GOSS
- There are **international standards** for food safety, such as the HACCP standard. In the medium term, the slaughterhouses would need to take steps to acquire a food safety certification.

Cost benefit analysis of slaughterhouses in GBO

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A business plan for Wau/Kuajok Slaughterhouse

Objectives

- The overall objective of the slaughterhouse is to guarantee the supply of safe and quality meat products to the population of Wau, which meet the expectations of the consumers and comply with international standards of the slaughtering industry.

Cost benefit analysis of slaughterhouses in GBO

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Specific objectives

- Provide a system of overnight keeping and killing of animals that minimises their pain and suffering;
- Provide a professional environment for ante-mortem and post-mortem animal and meat inspection;
- Provide a clean and safe slaughtering environment for private butchers;
- Build the slaughtering and butchering skills of private butchers to improve meat quality and diversify meat products;
- Add value to meat products, and diversify consumer demands for meat;
- Ensure safe and clean disposal of animal waste with minimum impact on the environment;
- Create quality jobs and learning opportunities for the local population;
- Within the confines of the objectives above, maximise profits for the partners in the PPP.

Cost benefit analysis of slaughterhouses in GBO

22







Revenue generating services

- The slaughterhouse's main service is to **provide a clean and functional environment for keeping and slaughtering animals, and the primary processing of meat**. The actual slaughtering and processing is done by private butchers, who operate on their own behalf and pay a fee for the service to the slaughterhouse.
- For this service the slaughterhouse provides clean holdings pens with water for animals, a slaughtering hall with hoists, slaughtering lines, hooks, wheelbarrows, water and electricity; and skilled workers to assist butchers in cleaning and moving animals, waste and meat.

Cost benefit analysis of slaughterhouses in GBO

23

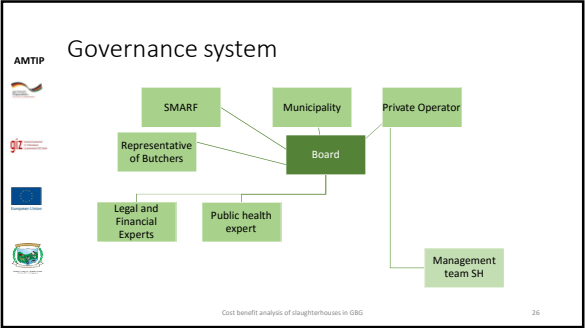
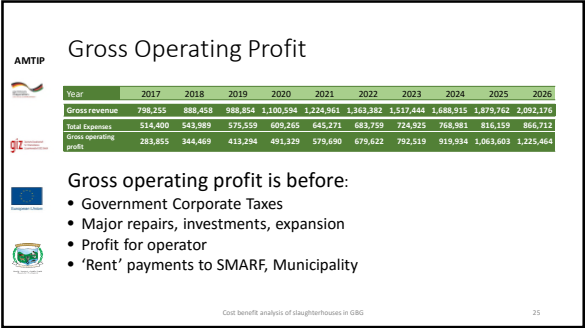


Non-revenue generating services

- An appropriate environment for **meat inspection**, and collection of fees and duties on behalf of the Municipality and SMARF.
- **Training opportunities** for butchers to venture into other meat products, so as to add value to unprocessed meat, and satisfy a diversified consumer demand. If successful, the slaughterhouse will provide space for the preparation of diversified meat products, such as sausages.
- **By-products such as blood and biogas sludge**. Blood is an important source of protein that can be added to chicken feed by mixing it with bran. Biogas sludge is a nutrient-high fertilizer for vegetable gardens. Although blood and sludge do have a commercial value, they will not be sold but can be collected free of charge.

Cost benefit analysis of slaughterhouses in GBO

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AMTIP

Board

The role of the Board is to take strategic decisions that ensure smooth operations of the facility, so as to provide quality services to butchers and a continued and safe supply of meat to the population of Wau. The Board approves:

- Budgets, progress reports, and expenditure/audit reports;
- Major investments;
- Slaughtering fees;
- The principles and levels of revenue sharing amongst partners
- The appointment of a General Manager for the facility as proposed by the private operator.

Cost benefit analysis of slaughterhouses in GBG

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