

# **South Sudan**

## **Linking the Agriculture and Food Sector to the Job Creation Agenda**

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## A. Preface and Acknowledgements

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The World Bank has financed two investment in South Sudan’s agriculture sector since 2009, each of which has focused on addressing emergency needs for food and nutrition security, including meeting short-term crop production needs to sustain households affected by conflict and soaring inflation. In the wake of the September 2018 Revitalized Agreement on the Resolution of the Conflict in the Republic of South Sudan (R-ARCSS), this report explores options for future Bank investments in agriculture, livestock, and the food system that can start the move from humanitarian to recovery and resilience. More specifically, it scans the environment to learn from other countries about technologies and practices that can be brought to bear on the situation in South Sudan’s agriculture sector. It promotes a value chain approach to guide future investment, and ultimately outlines next steps for the donor community and for the government to move agriculture from humanitarian aid to a sector that will ultimately generate jobs and growth.

The report was prepared by a team from the Agriculture Global Practice of the Bank and was managed by Melissa Williams, Senior Rural Development Specialist, who researched and co-authored the report with Abhinav Kumar Gupta, who also provided extensive background research and prepared a series of background notes on key issues as well as a Powerpoint deck with extensive reference material.

The authors would like to thank Imtiaz Alvi, Senior Agriculture Specialist, and Augustino Ting Morter Mayai, Consultant, who provide review comments on background notes and final report. The authors are also grateful to the constructive comments and advice provided by Sahr Kpundeh, Country Manager for South Sudan; Richard Spencer, Program Leader, Sustainable Development and Infrastructure; Holger Kray (Lead Agriculture Economist), Valens Mwumvaneza (Senior Agricultural Specialist), Hazem Hanbal (Senior Agricultural Specialist), and Ademola Braimoh, (Senior Natural Resources Management Specialist) in the Agriculture Global Practice; Jan van der Goltz (Economist) in the Jobs Cross-cutting Solutions Group; and Joseph Mawejji (Economist) in the Macro, Trade, and Investment Global Practice.

This report seeks to support the larger jobs study by examining how investment in South Sudan’s food sector can not only address food security needs, it can generate income and lay the foundation for livelihood and job creation in the country. It argues that applying a value chain lens to investments in the sector can contribute to creating direct, indirect, and induced labor in the food system. The goal is to move the country from a dependency on humanitarian aid to building recovery and resilience in the short term in a way that can produce stable jobs over the medium to long term. More specifically, it looks at the potential technology and organizational arrangements that investment programs can start supporting now to stimulate value chain development for increased economic activity and job creation.

There are limitations to the scope of this report:

- Given time and resource constraints the small report team focused on scanning the international environment through secondary sources for ideas and innovations that could be brought into South Sudan. It also identifies some existing innovations in South Sudan that could be reinvigorated or scaled up.

- This report does not go in depth on the livestock and fisheries sectors because the size, complexity, and potential of both sectors, particularly the political economy around cattle, merits a separate study with specialists in pastoralism and the blue economy added to the team. We hope to cover this soon.
- The team is working with the larger jobs report team to include questions on agriculture production and training in focus group discussions and key informant interviews, so that primary data can be added to the international good practice information from this report as programs are being designed.
- While the report describes the enabling environment for agriculture development, it focuses more on what investment programs can do in the short, medium, and long term to lay the foundations for job creation.

The assumption is that significant donor support will still be necessary for the short to medium term to support investments in reconstruction and food security. As security spreads, public sector capacity to support development can grow, private actors can establish or expand their operations, and the donor community can begin to disengage, addressing only the neediest communities while development organizations continue to work with the public and private sector actors to support development and economic transformation.

## B. Executive Summary

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Over the past several years, the donor community has invested about US\$1 billion per year to humanitarian aid in South Sudan, the majority of which went to food. Despite the implementation schedule of the 2018 Revitalized Agreement on the Resolution of the Conflict in the Republic of South Sudan (R-ARCSS) being delayed by six months, the agreement brings hope that the conflict that has plagued the South Sudanese since December 2013 has come to an end. If the peace holds, South Sudan could enter a new trajectory moving away from humanitarian dependence and towards development, poverty reduction, and economic growth.

In anticipation of reduced hostilities and renewed conditions for recovery, the World Bank in South Sudan is undertaking several studies to understand how to move along the continuum from humanitarian–recovery/resilience–development continuum. One flagship report explores the options for supporting a job-focused recovery by identifying potential entry-points for private sector engagement and the necessary macro policies and programs for public sector support. Given its dominance in terms of current employment composition and the potential for growth based on natural resource endowments, the food sector—defined as all upstream and downstream value chain activities in agriculture, livestock, and fisheries—will be at the center of that recovery.

This report explores how investment in South Sudan’s food sector can not only address food security needs, it can also generate income and lay the foundation for livelihood and job creation in the country. Applying a value chain lens to investments in the sector can contribute to creating direct, indirect, and induced labor in the larger food system. More specifically, it looks at the potential technology and organizational arrangements that investment programs can start supporting now to stimulate value chain development for increased economic activity and job creation.

For agriculture to move from humanitarian aid along a continuum to recovery, resilience, and then to development, investment activities must expand beyond a focus on household production for consumption to a focus on increasing production and productivity to help farming households generate income. This begins with bringing structure and organization back into the agriculture sector. Supporting the formation of farmer groups as a platform for farmers to access input, knowledge, and output markets will increase productivity and help farming be a more stable livelihood. As farmer groups develop and better information, training, and other support begins to flow to producers, incomes will rise and livelihoods will begin to stabilize.

With increased stability among farmers, government and donor programs can invest over the medium-to-long term in supporting farmer groups and entrepreneurs to create or grow service enterprises—e.g., input sales, equipment leasing and/or sales, land preparation or harvesting services, transport services, storage facilities, processing, etc.—which will create opportunities for more stable jobs and even wage employment.

With a structure to better organize the flow of information, goods, and services, new technology can start to be introduced that will reduce the drudgery of cropping and increase production, productivity, and therefore incomes. The introduction of technology will follow a continuum as well. New technology can

be introduced through donor-funded projects using demonstration plots and other teaching tools to training extension agents, lead farmers, youth, and other community resource people how to operate them. Cooperative management of the demonstration technology can be introduced so farmers can benefit from it on their own land and increase their trust of the technology and of each other. Ultimately producer groups and entrepreneurs can build enterprises around the manufacture, trade, and services this technology induces.





While new priorities for investment can start to stimulate increased agriculture production and move farmers to a more market-focused footing, there is the need for policy dialogue and reform to create the enabling environment that can facilitate the import of more technology, foreign direct investment, export promotion, and the like. GRSS, particularly the technical Ministries governing the food system, have drafted many policies and bills that can define the food system—the sum of value chains that make food available for people to consume. These are described in the paper with the acknowledgement that policy formulation and finalization will be a long-term engagement.



There are limitations to the scope of this report given time and resource constraints. First, it focuses on the international environment exploring secondary sources for ideas and innovations that could be brought into South Sudan. Still there some existing innovations in South Sudan are highlighted. Second, it does not go in depth on the livestock and fisheries sectors. The size, complexity, and potential of both sectors merits a separate study with the appropriate specialists in pastoralism and the blue economy added to the team. We hope to cover this soon. Finally, while the report describes the enabling environment for agriculture development, it focuses more on what investment programs can do in the short, medium, and long term to lay the foundations for job creation. Policy dialogue with the Government of the Republic of South Sudan (GRSS) will be promoted among the donor community in Juba to ensure the best information is available and to get broad advocacy for policy adoption.





## South Sudan Statistical Overview

Indicator	2010	2017
 <b>World view</b>		
Population, total (millions)	10.07	12.58
Population growth (annual %)	4	2.8
Surface area (sq. km) (thousands)	..	619,745 <sup>a</sup>
Population density (people per sq. km of land area)	..	..
Poverty headcount ratio at national poverty lines (% of population)	50.6	82.3
Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)	42.7	..
GNI, Atlas method (current US\$) (billions)	12.32	4.78
GNI per capita, Atlas method (current US\$)	1,100	390
GNI, PPP (current international \$) (billions)	22.28	17.6
GNI per capita, PPP (current international \$)	2,130	1,440
 <b>People</b>		
Income share held by lowest 20%	3.9	..
Life expectancy at birth, total (years)	54	57
Fertility rate, total (births per woman)	5.4	4.8
Adolescent fertility rate (births per 1,000 women ages 15-19)	86	62
Contraceptive prevalence, any methods (% of women ages 15-49)	4	..
Births attended by skilled health staff (% of total)	19	..
Mortality rate, under-5 (per 1,000 live births)	107	96
Prevalence of underweight, weight for age (% of children under 5)	27.6	..
Immunization, measles (% of children ages 12-23 months)	62	20
Primary completion rate, total (% of relevant age group)	26	..
School enrollment, primary (% gross)	84.8	66.6
School enrollment, secondary (% gross)	9	10
School enrollment, primary and secondary (gross), gender parity index (GPI)	1	1
Prevalence of HIV, total (% of population ages 15-49)	2.8	2.4
 <b>Environment</b>		
Forest area (sq. km) (thousands)	71.6	71.6
Terrestrial and marine protected areas (% of total territorial area)	..	15.5
Annual freshwater withdrawals, total (% of internal resources)	2.5	2.5
Urban population growth (annual %)	4.9	4.1
Energy use (kg of oil equivalent per capita)	60	61
CO2 emissions (metric tons per capita)	0.12	0.13
Electric power consumption (kWh per capita)	39	40
 <b>Economy</b>		

Indicator	2010	2017
GDP (current US\$) (billions)	17.27	2.9
GDP growth (annual %)	-52.4	-13.8
Inflation, GDP deflator (annual %)	35.3	273.4
Agriculture, forestry, and fishing, value added (% of GDP)	..	..
Industry (including construction), value added (% of GDP)	..	..
Exports of goods and services (% of GDP)	71	55
Imports of goods and services (% of GDP)	30	62
Gross capital formation (% of GDP)	5	17
Revenue, excluding grants (% of GDP)	..	..
Net lending (+) / net borrowing (-) (% of GDP)	..	..
 <b>States and markets</b>		
Time required to start a business (days)	14	13
Domestic credit provided by financial sector (% of GDP)	-6.3	13.4
Tax revenue (% of GDP)	..	..
Military expenditure (% of GDP)	4.1	2
Mobile cellular subscriptions (per 100 people)	14.9	22.2
Individuals using the Internet (% of population)	3.8	8
High-technology exports (% of manufactured exports)	..	..
Statistical Capacity score (Overall average)	26	43
 <b>Global links</b>		
Merchandise trade (% of GDP)	..	..
Net barter terms of trade index (2000 = 100)	..	..
External debt stocks, total (DOD, current US\$) (millions)	..	..
Total debt service (% of exports of goods, services and primary income)	..	..
Net migration (thousands)	425	150
Personal remittances, received (current US\$) (millions)	..	634
Foreign direct investment, net inflows (BoP, current US\$) (millions)	161	1
Net official development assistance received (current US\$) (millions)	435.8	2,183.20

Source: World Development Indicators database

## C. South Sudan Situation Overview

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1. **Resource-rich South Sudan gained independence in 2011 following decades of civil war with the Government of Sudan.** Five additional years of civil war between 2013 and 2018 have left both the society and the economy severely damaged. By 2016, 83 percent of the country's population were living below the poverty line. As of 2018, the country ranked 187 out of 189 countries in the Human Development Index, driven by the low life expectancy (57 years), average of 4.8 years of schooling, and a GNI per capita of US\$963. As the statistical overview (opposite page) shows, what confirmed data exists for the country shows the challenges it faces in rebuilding the society and the economy.

2. **South Sudan's economy has essentially collapsed since 2016.** The country's economy is too dependent on crude oil exports, which accounted for 90 percent of government revenue, 60 percent of GDP, and 95 percent of total exports in 2016. In recent years, the increasing imports of consumer goods and the declining oil exports have created trade imbalances. In 2017, imported goods and services increased to 75.4 percent of GDP up from 72.8 percent in 2016. Exports of goods and services declined to 61.1 percent of GDP in 2017 from 66.3 percent in 2016. The African Development Bank estimates that the current account deficit will widen to -8.8 percent in 2018 because of increasing imports and lower than expected earning from oil exports. The economy has had negative GDP growth for five of the past seven years (since 2012) due to conflict and economic shocks around oil and monetizing the debt. CPI increased by 88.5 percent between June 2017 and June 2018, driven by high prices in non-food items. While inflation has reduced since its historic highs, food prices remain high; the cost of the minimum expenditure basket increased by 489% between May 2016 and May 2018. Despite its natural resource endowment, foreign direct investment (FDI) has been volatile in the face of insecurity and was in fact negative 2016 and 2017.

3. As per Doing Business 2019 report, South Sudan ranks 185 out of 190 economies. This ranking is due to, inter alia, insecurity, poor roads, lack of storage, and lack of market infrastructure. Value addition is constrained by lack of raw materials, lack of power, lack of managers and skilled workers, and lack of finance. Transparency International ranked the country 179/180 in corruption perception index, which further stymies FDI.

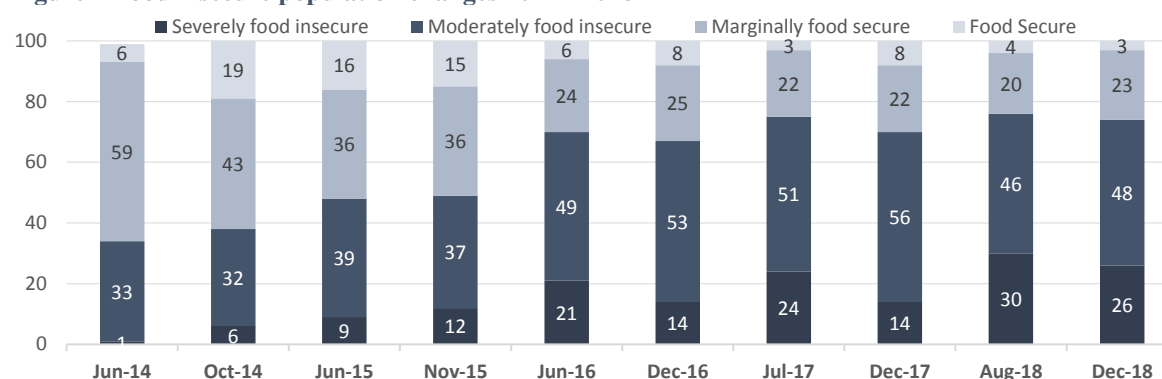
### FOOD SECURITY CONTINUES TO DETERIORATE

4. **The largest refugee crisis in Africa.** The country ranks third, behind Yemen and Somalia, on the Fragile States Index for 2019 (The Fund for Peace, 2019). Since 1955, the area that ultimately became South Sudan has been in active conflict at least 65 percent of the time—including two civil wars with Sudan and the civil war that broke out in December 2013. Currently, there are 1.85 million internally displaced people, 2.28 million international refugees, and 193,000 people seeking shelter with the UN. An estimated 7.1 million people will need humanitarian assistance in 2019. In 2019, an estimated 6.2 million people (54% of population) face IPC-3 (crisis) or worse acute food insecurity, and that is projected to rise to 6.87 million (60% of population) in the May-July 2019 lean season. Of this, 30,000 people (growing to 50,000 in May-July) are estimated to be in IPC-5 (famine). The number of children aged 6-59 months that are acutely

malnourished stands at 860,000, and the number of pregnant and lactating women in the same situation is 597,000.

5. Since conflict broke out in December 2013, investment by the international community has prevented starvation in many cases and has addressed the urgent needs of the severely food insecure. However, over the years, while severe food insecurity has been addressed (though not reduced), chronic food insecurity has increased (figure 1).

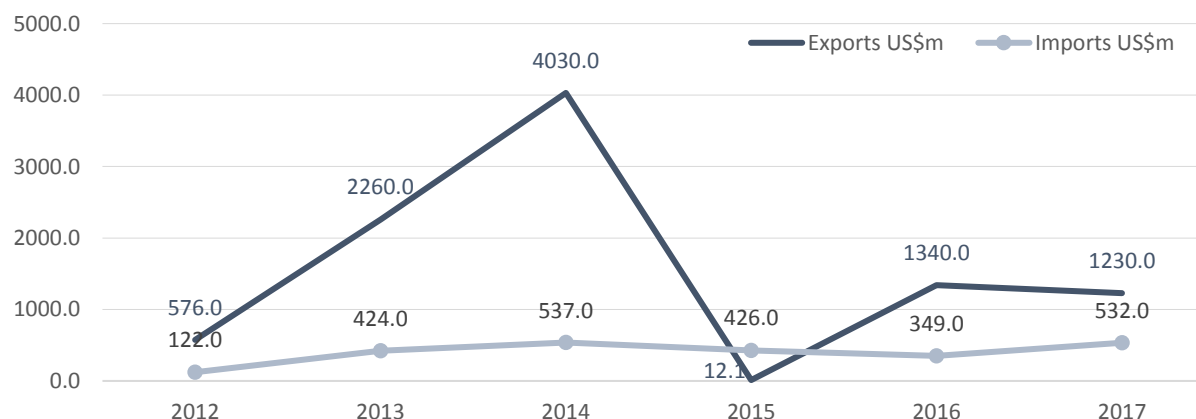
**Figure 1 Food insecure population changes 2014 - 2018**



Source: (FAO/WFP, 2019)

6. **Economic diversification is critical to growth and job creation.** Outside of the oil sector, the agriculture, services, and manufacturing industries are grossly underdeveloped (World Bank Group, 2018). In 2017, South Sudan exported US\$1.23 billion in goods, 99.2 percent of which was crude petroleum. Export of petroleum, mostly to China, accounts for at least 80 percent of government revenues and is the reason for any positive trade balance (figure 2). Within the remaining 2017 exports—valued at US\$9.77 million—agriculture, livestock, and forestry are small, but they indicate the presence of some commercial within the country despite the conflict. Exports of vegetable products (specifically gum arabic and sesame) show the highest 5-year growth rate of any South Sudan exports. Also, in 2017, South Sudan imported US\$532 million—led by US\$126 million in foodstuffs (processed foods) and US\$101 million in vegetable products (mainly legumes and cereal flours). The source countries were usually regional—Uganda and Kenya.

**Figure 2 South Sudan export value US\$ million 2012-2017**



(AJG Simoes, 2011)

## OIL DOMINATES REVENUES, BUT AGRICULTURE DOMINATES EMPLOYMENT

7. Two-thirds of employment is in agriculture, and 83 percent of households list agriculture as their primary livelihood source (World Bank, 2018). The country has 62 million hectares of land in the Nile river basin, approximately 75 percent of the which is suitable for agriculture and 50 percent is highly suitable for crop cultivation. With approximately 30 million hectares of arable land across six agro-ecological zones, South Sudan has about 5 times the area of agricultural land per capita than Kenya, Uganda, or Ethiopia and could feed itself and several other countries. The widely different climactic zones, fertile soil, and plentiful rain water create ideal conditions for meeting dietary needs plus a surplus for the market.

8. South Sudan produces a large variety of agricultural commodities for local consumption. Sorghum, maize, rice, sunflower, cotton, sesame, cassava, beans, and peanuts are the major crops. Coffee, tea, sugar and tobacco are also produced but on a small scale. Fruits and vegetables—such as, bananas, mangoes, lemons, pineapples, onions, okra, tomatoes, eggplants, potatoes, and cabbages—also have great production potential. The Greenbelt running through the former states of Western and Central Equatoria, produce oil palm, tea, coffee, fruit, Irish potatoes, maize, vegetables, cassava and tropical forestry. Sorghum, groundnut, sesame, sunflower, and livestock production are highly suited to the Ironstone Plateau. Sugarcane, rice, and sorghum are best suited to the Nile Sobat zone. Sorghum, rice, sugarcane, sesame, groundnut, and more are produced in the Flood Plains zones. The hilly and mountainous zone is suitable for cultivating tea, coffee, temperate fruits (apples and grapes), forest plantations and wheat are well suited for Hills and Mountain Zone. The pastoral zone is ideally favourable for cultivating gum acacia (National Institute of Agriculture, 2016). Despite the broad production base for the agriculture and the number of people working in agriculture, yields are low, and production does not come near meeting demand. Farmers cultivate an average of one to three feddans of land (0.4 to 1.2 hectares), and farm size has not increased much. Livestock is largely undeveloped for economic activity.

9. For the past several years, agriculture and livestock have operated on more of a humanitarian mode—providing seeds and basic hand tools and some training with the goal of helping households produce for their own food security. In more secure areas, organizations like FAO, have introduced input trade fairs to stimulate transactions in local markets. As security increases, taking a value chain approach to setting investment priorities could help shift from humanitarian to a resilience-building focus, and ultimately to development.

Figure 3 Livelihood zones of South Sudan



## **D. Agriculture as an Engine of Growth and Job Creation**

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10. Agriculture is the largest employer in most developing countries—usually providing jobs for up to 60 to 70 percent of the working population. This is the case in South Sudan. However, these jobs are not often seen as desirable jobs, especially to youth. Rather, agriculture is seen as a sunset sector characterized by low-skill, labor-intensive work for relatively low pay. These jobs—subsistence farmer, casual farm labor, and the like—while relatively plentiful are not secure and are viewed as a vulnerable employment (McKinsey Global Institute, 2012). There are better jobs in agriculture, but they are upstream and downstream on the value chain. Another reason behind the perception that agriculture does not create jobs could be because, as economies develop, agriculture’s contribution to GDP declines relative to industry/manufacturing and services. However, the discussion of jobs in agriculture usually focuses narrowly on primary production, the actual work on farm of growing the crops. Indeed, some analysis from the World Bank shows that primary production is not a source of job growth and largely remains unchanged until mechanization or urbanization displaces farm labor. As the agriculture sector develops technologically (e.g., mechanization), jobs in primary production decline. At the same time, productivity increases and jobs across agricultural value chains are created.

11. At the crux of the jobs in agriculture discussion is the understanding that agriculture is not just primary production. Rather agriculture encompasses the entire food system, which includes research, inspection/regulation, extension/training, production, food storage, processing, distribution, transport, associated logistics, retailing, food preparation, restaurants, promotion, import/export systems, and other services. There can be significantly more and better-quality jobs in the food system. The USDA Economic Research Service reports that while the output of farms in the United States contributed about one percent to GDP, the full-time and part-time jobs in the agriculture and food sector was about 11 percent of all employment, and food manufacturing is 14 percent of all manufacturing jobs in the United States (USDA ERS, 2019). In Malawi and Tanzania, food and beverages account for more than 40 percent of total manufacturing employment. In the European Union, food and beverage manufacturing provided more jobs, which was more stable during the financial crisis, and employed a larger proportion of women than in other manufacturing (World Bank, 2017).

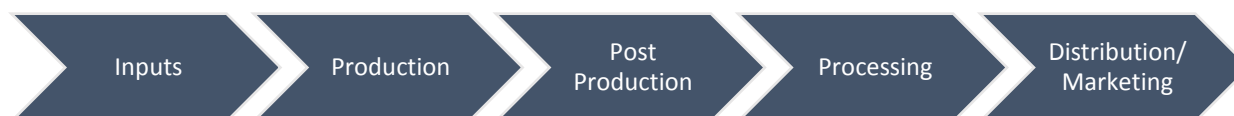
### **TAKING A VALUE CHAIN APPROACH CAN LAY THE FOUNDATION FOR JOBS**

12. The elements of the food system listed above are part of agricultural value chains, the series of actions and actors that get food to consumers. This is where the jobs will be, and it is important for investment programs to envision value chains in the food sector and understand how they will contribute to achieving food security, resilience, and development goals.

13. A value chain is essentially a framework that helps describe the collection of actors that add value (cost) to a primary agriculture product and the relationship between these actors as they transform a product from concept to the time it reaches the customer. As a product moves along a value chain, its value increases

as does the potential for profit (income). In very general terms, an agriculture value chain can be broken down into five functional nodes, each corresponding to a distinct stage in product creation.

**Figure 4 Functional nodes of an agricultural value chain**



14. Each node has one or more actors who perform a function, depending on the size and complexity of the value chain, and these actors interact to add value:

- *Primary actors* are directly involved in (for example) input supply, production, processing, storage, wholesale (including export), retail, and consumption. Farmers are the largest group of primary actors. Agronomists, researchers, extensionists, processors/millers are also in that category.
- *Secondary actors* are indirectly involved in the value chain by providing support services/functions to primary actors—e.g., credit providers, mechanics, drivers/transport hire, energy providers, etc.—but are not directly involved with crop production.

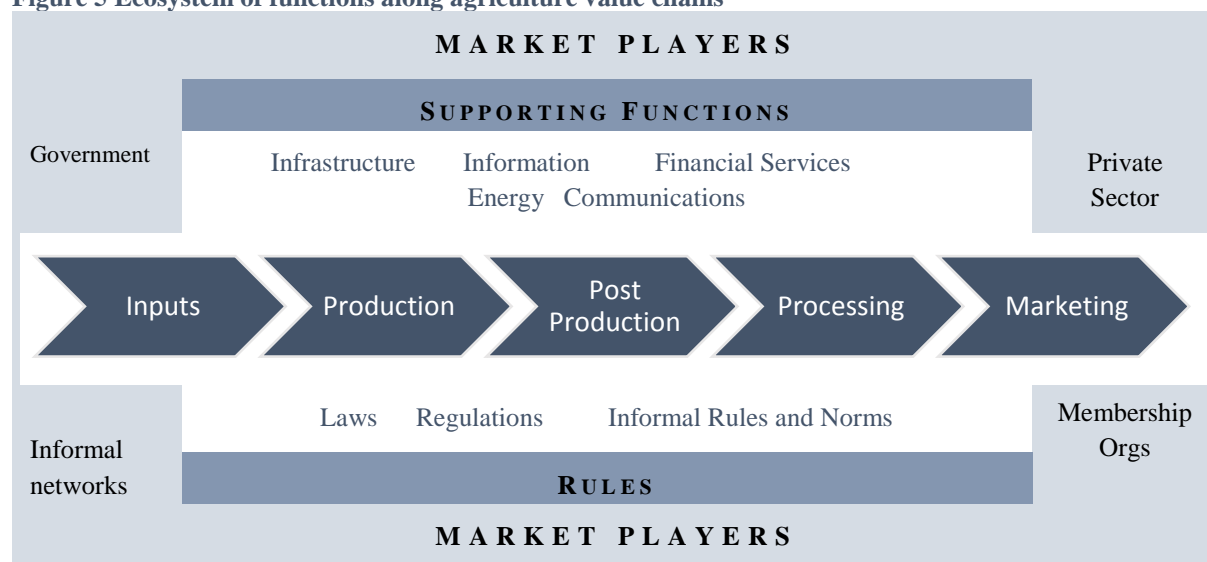
15. In terms of job creation terminology, primary actors are directly employed in the sector and can generate direct jobs along the agriculture value chain. Secondary actors are indirectly employed in the value chain and can generate indirect jobs in agriculture. There is also induce employment/jobs, which emerge in response to the increased spending power of those with direct and indirect jobs. In South Sudan, for example, if a seed company contracts 100 farmers to grow high-iron bean for seed multiplication, the farmers have direct jobs on that value chain as do the employees who sort, clean, and package the seed. The person who designs the seed packaging is indirectly employed as is the person who provides a business loan. The income these people earn can induce jobs in, for example, furniture making, hair-dressing, tailoring, and the like—the goods and services on which people spend their income.

16. In South Sudan, there is ample scope for the number of primary actors in agriculture to grow with investment in organization, production technology, and processing technology—first to close the 524,000 tonne cereal yield gap and then to provide more diversified products for local markets, national markets, and export markets. The expansion to markets further afield will progress over time as areas such as roads, energy, ICT, and policy regimes develop.

17. The primary actors provide the pull for increased services from secondary actors, which increases the demand for workers. For example, farmers, importers, traders, etc. need roads to access input and output markets. Road rehabilitation needs to take place on a massive scale in South Sudan to get the agriculture engine of growth moving, and this will create thousands of temporary, but relatively long-term jobs at various skill levels. Similarly, agriculture will have a pull effect for energy services, so importers and traders of energy equipment—particularly solar electricity—can expand their operations as that demand grows. A similar affect can be seen in financial services, information and communication services (ICT), etc. All of these are services, with associated jobs, that can be provided by the private sector. Simultaneously, some growth in public jobs—researchers, trainers, inspectors for food safety and imports, etc.—will emerge. Figure 5 gives an idea of how the value chain actors fit together.



**Figure 5 Ecosystem of functions along agriculture value chains**



Source: (Jonathan Mitchell and Christopher Coles, 2011)

18. The types of jobs that can be created in the food system vary greatly, and there are different ways to categorize them—e.g., full-time, part-time; permanent, seasonal/temporary; skilled, semi-skilled, unskilled. Most rural households would have a diversity of jobs adding up to full-time equivalent employment (at least 200 working days per year). For example, a family in a unimodal livelihood zone in South Sudan would have one cropping season to generate on farm work. Depending on the crop and the variety of that crop, this would generate 4 to 6 months of employment, but not full-time throughout the cropping period as much of the labor is concentrated in the sowing and harvesting periods. The same family would earn additional income from working as casual labor on another farm, raising livestock, fishing, harvesting non-timber forest products, working for a trader or other enterprise in the market, renting out assets (such as an animal team and plough) to other farmers, etc. (figure 6). This is a standard pattern for rural household incomes around the world, and it provides some hedge against risk so that if, for example, a disease strikes the livestock, the family still has alternative sources to draw on. The key is to have a vibrant local economy where these activities can take place.

**Figure 6 Example of income sources for farming households**



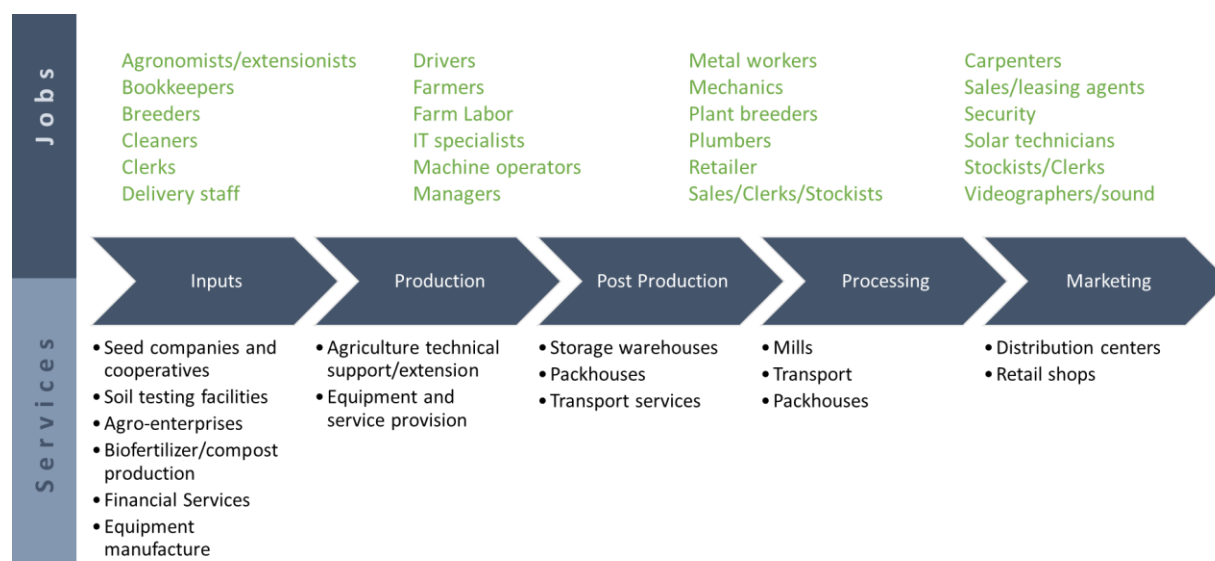
19. This study will not attempt to describe the specific types of jobs that can be created at each functional node of the value chain. Rather it will describe the interventions to upgrade value chains that can would stimulate job creation in the South Sudanese food system. A recent study by the Leao et al. (2018) examined the role agriculture played in creating jobs in Afghanistan. Part of the study analyzed World Bank-financed projects to get a best estimate of the jobs created. One example was the National



Horticulture and Livestock Project,<sup>1</sup> which focused on high-value products and sought to link producers to markets by introducing improved technologies and practices (essentially process upgrading of the value chains). The project is expected to run through December 2020 and had reached just over 285,000 farmers and herders (42 percent women) by the time of the study. The analysis showed that the project generated about 355,000 FTE jobs in one year alone, though not all of these are permanent. It is worth noting that the project did not have an explicit component focused on creating market linkages (Izabela Leao, 2018), rather, it focused on increasing productivity with the underlying assumption that market linkages would expand. Despite this, the employment creation was significant. The report goes on to highlight how a value chain approach, which has a built focus on market linkages, is preferred to stimulate job creation.

20. What is clear is that making the right investments in agriculture and livestock value chains can generate jobs along the value chain. The figure below provides general idea of the types of jobs that would be required along agriculture and livestock value chains as they are developed. As the value chains grow and mature, the jobs will spread out from production (where they are concentrated now in South Sudan) to service providers, technicians, managers, traders, etc. at the different value chain nodes.

**Figure 7 Potential service enterprises and jobs along the agriculture value chain**

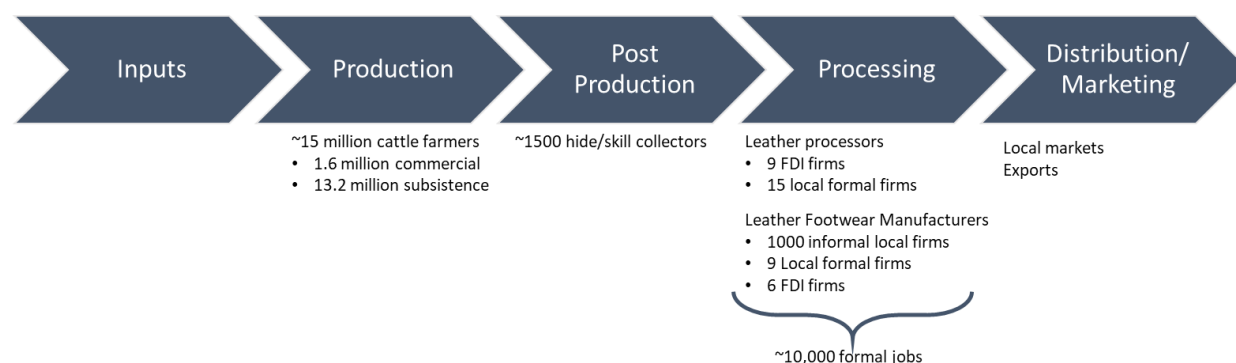


21. It is difficult, and even risky, to estimate the number of jobs that can be created at a given node of a value chain, because each value chain is different. For example, horticulture generates more jobs than cereal production, which lend themselves to mechanization. Shah (2019) reviewed the data on jobs in Africa and found the numbers varied greatly depending on conditions. For example, mechanized cereal production in South Africa creates about one full-time job per 1000 hectares. In contrast, a citrus plantation in the same country produce one full-time job per 2 hectares. It should be noted that the mechanized cereal production referred to in this comparison is most likely on large-scale farm with advanced machinery, and the numbers refer to the on-farm production jobs. The increased production from a mechanized farm will create direct and indirect jobs elsewhere on the value chain—e.g., tractor sales, tractor mechanics, post-harvest packers, transport, processing, etc. (Verma, 2008) That said, horticulture does create up to twice

<sup>1</sup> The National Horticulture and Livestock Project is a World Bank investment in Afghanistan (P143841) that was approved by the Board in 2013 and will run through 2020.

as much labor as cereal. Horticulture operations with backward and forward linkages from smallholder farmers to export markets, such as are found in Kenya, can generate 6 jobs per hectare, of which 3 are primary cropping and the others are further downstream on the value chain. The example in figure 8 from the leather footwear value chain in Ethiopia gives an idea of where jobs can be created along a value chain from the 15 million cattle herders to the 11,600 formal jobs in post-production and processing. Additional jobs that are not recorded in this example are the veterinarians, feed producers, transporters/drivers, retail workers, etc.

**Figure 8 Where are the jobs on a value chain? An example from leather footwear in Ethiopia**



Source: (Shah, 2019)

## PRIORITY VALUE CHAINS IN SOUTH SUDAN

22. South Sudan has enormous productive potential for staples (like sorghum, maize, cassava, pulses, and groundnut), nuts and seeds (like sesame and sunflower), horticulture (like bananas, mangoes, lemons, pineapples, onions, okra, tomatoes, eggplants, sweet potatoes and cabbages), and high-value commodities (like coffee, tea, honey, and sugar). Even with the constraints on internal trade and export, it is possible to develop value chains and invest in the conditions for job creation by focusing on building the value chains around the key staples that are critical to the food security of people in South Sudan. The total net national dependency (reliance on imports) of cereals is 49.8 percent, followed by livestock at 29.7 percent. Legumes, vegetable and oilseed dependency is 16.5 percent of the net national dependency with remaining four percent belonging to various other food sources such as fruits. Investing in core value chains that reduce this dependency can create jobs within a locality, build skills that can be applied to longer value chains as transport corridors open, and provide critical food supplies for the local population.

23. The crops that are most suitable for initial focus by government and the donor community would include sorghum, maize, cassava, beans, and groundnuts because they are core elements of the food security basket. Vegetables have been promoted by NGOs and the UN as part of the humanitarian response and are providing a good source of nutrition and income, especially for women. Poultry is not the largest livestock subsector, but it is a good source of income for women, can be done close to the homestead without access to land, are a source of nutrition through meat and eggs. Sesame and sunflower are also sources of good nutrition but are also important income sources for farmers. These priority crops were selected based on a combination of: local production capacity, food security potential, household consumption, livelihood sustainability (employment), export potential, local market demand, feasibility of production, and availability of base inputs.

### ***Overview of priority value chains***

24. **Cereal value chains—particularly sorghum, maize, and cassava<sup>2</sup>**—make up about 49 percent of the diet in South Sudan. Eighty percent or more of the cultivated area in South Sudan each year goes to cereals; however, a substantial amount—estimated at least 20 percent—is lost in post-harvest handling (FAO/WFP, 2019). The best areas for cereal production are the Greenbelt, Ironstone Plateau, Hills and Mountains, and the Flood Plains. National production does not currently meet demand—it supplied 61 percent of cereal needs in 2018 and is expected to meet only 52 percent of needs in 2019. The remaining demand is met through imports and food aid. Strengthening the value chain by expanding domestic food production and reducing losses is essential to prevent escalating food insecurity in the coming years. Insecurity and poor infrastructure constrain internal trade flows and households’ physical access to markets, so cereal development would have to focus on growth poles within smaller production areas, reaching local markets and then gradually expanding their reach as conditions allow.

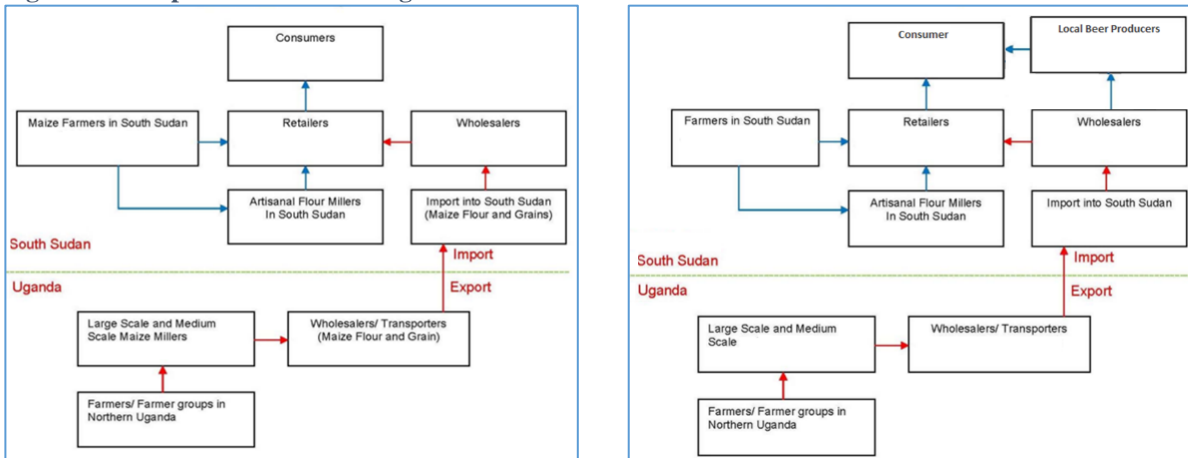
25. **Sorghum** is a warm weather indigenous crop that grows in nearly everywhere in the country and is resilient to harsh, drier environments. Farmers grow traditional and improved varieties. Traditional varieties are more readily available through informal seed networks, have a long growing season, produce taller plants, but have a relatively low yield. They remain popular because of seed availability and consumer preferences for texture and taste. Improved varieties are early maturing, high-yielding, input responsive, and drought resistant, and there are now open-pollinated hybrids available in the market as early maturing varieties; however, they increase the cost of production because they need more inputs. Sorghum must be stored in threshed form to lessen the risk from pests. Hard grain varieties store better and longer than soft-grain varieties. Traditionally sorghum is stored in mud-plastered bins (FAO, 2017), and improved storage options are not readily available. About 30 percent of local sorghum is sold commercially—e.g., to breweries, institutions, and individuals. South Sudan also imports sorghum from Sudan and the import parity prices imputed from the prices in Kadugli, a border town in Sudan, are much lower than in the major markets in South Sudan. The price wedge between Kadugli and Juba can reach US\$ 500-600 per tonne.

26. **Maize** has replaced sorghum as the most popular staple crop in Greater Equatoria, where it can be grown for two seasons in a year. Maize is sometimes intercropped with groundnuts, beans, cowpeas, or pumpkin. Ugandan maize dominates the country’s markets and is the largest imported staple in South Sudan—in 2017 of the \$101 million in vegetable imports, 15 percent was maize seed, 7.4 percent of maize flour, and 0.35 percent was maize (Simoes, 2017). About 70 percent of maize grown in Uganda is sold commercially. Ugandan maize growers have the lowest prices in East Africa, and the price gap between Kampala and Juba can be as much as US\$800 per tonne (Ministry of Agriculture and Food Security(South Sudan), 2016).

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<sup>2</sup> While cassava is not technically a cereal, it replaces cereals in some diets due to its high carbohydrate content, so this report has grouped it with the other cereals.

**Figure 9 Example of maize and sorghum value chains**

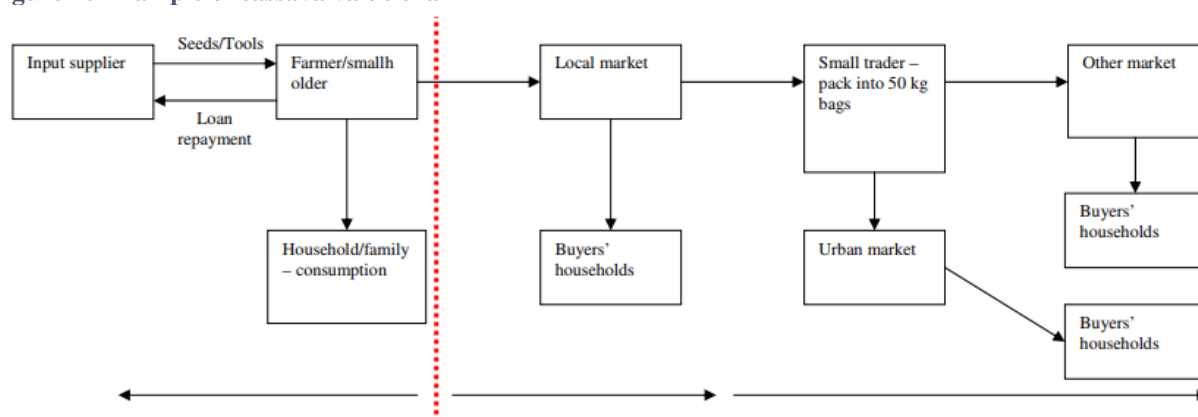


Source South Sudan Crop Watch Overview of cereal production in 2017

27. **Cassava** is a major crop in Greenbelt region that contributes to food security and commercial production. A 2007 study identified 198 cultivars being used by farmers in Greater Equatoria, and the most popular at the time. Popularity depends on a wide variety of attributes including, maturing time, sweetness, fiber content, suitability for flour, etc. (Pheneas Ntawuruhunga, 2007). Some varieties are important for their resistance to diseases like mosaic virus and brown strip. The study also found that most farmers plant more than one cassava variety in an unsystematic pattern in their fields, pointing to the need for farmer training for value chain process upgrading to increase their ability to target buyers in the market with cassava that meets their specific needs—e.g. flour millers, brewers, etc. Farmers rely on public research centers, like the Yambio Agricultural Research Centre (YARC), and private breeders for improved cultivars so the enabling environment of policies and institutions to support the value chain development. Cassava is used for food (both tubers and leaves), animal feed, cuttings for future production, alcoholic drinks, planting materials (seed), and as a firewood alternative. In the former states of Western and Central Equatoria, it estimated that 38 percent of the farmers grow cassava for food, 30 percent grow for the market, 29 percent grow cassava for brewing, 2 percent for animal feed, and very few for cassava cuttings and firewood.

28. Cassava's ability to adapt to marginal environments and its contribution to household food security and income makes it an important livelihood option in the Greater Equatoria Region. Farmers can harvest the tubers at any time when necessity arises, so cassava is an important food to cope with food shortages during the period of seasonal food insecurity. Many farmers derive income through traditional processing and sale of fresh roots, leaves, chips, flour, and/or alcoholic beverages at small-scale level. Large quantities of cassava flour are imported from Uganda. It is estimated that cassava consumption per capita will be of 53 kg in 2025, as it will remain an important component of diets in Sub Saharan Africa (Ministry of Agriculture and Food Security(South Sudan), 2016).

**Figure 10 Example of cassava value chain**



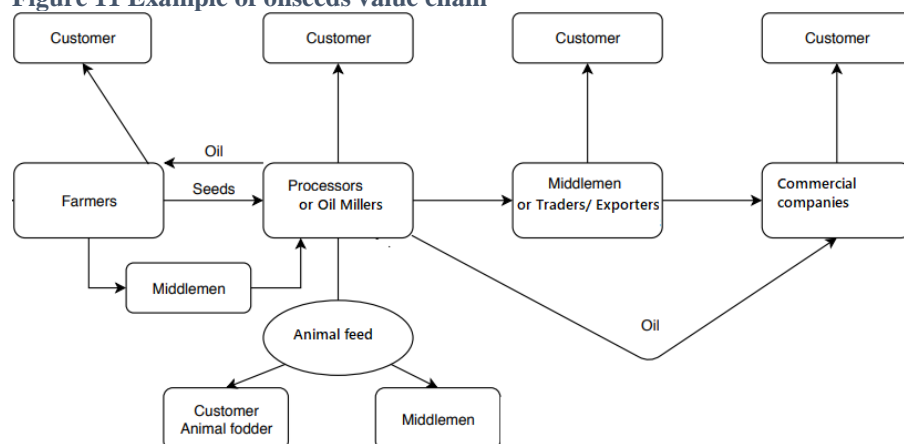
Source: South Sudan Crop Watch Overview of cereal production in 2017, CAAS-Lib Synthesis Report

29. **Oilseeds, particularly the sesame and sunflower value chains** are important due to the ease of production and underlying production potential. Both oilseeds are suitable for arid and semi-arid conditions and require minimal inputs. Additionally, they are viable cash crops and have huge export potential.

30. *Sesame*. South Sudan ranks 5<sup>th</sup> in the world for area harvested to sesame seeds, but it ranks 64<sup>th</sup> in the world for yield due to difficulties along the value chain, especially in production. Farmers use few inputs, little mechanization, and grow under rainfed conditions in traditional and semi-mechanized systems. Most sesame fields (about 80 percent) are 2 hectares and farmers broadcast seeds rather than planting in rows. This makes the rest of production and harvesting more difficult—weeding, harvesting, drying, and threshing are done manually. There are a few commercial farms engaged in sesame cultivation, creating direct and indirect employment opportunities for around 1.5 million people (Action Against Hunger, nd). Farmers have been producing sesame for subsistence and increasingly for income by marketing surplus production in domestic, regional, and international markets. Due to the fragmented and small-scale nature of production, traders put considerable effort into assembling economically viable volumes of sesame for commercial purposes. Wholesalers usually buy at the farmgate as the margins in sesame are not high. Usage of inadequately stored seeds from previous harvest has largely resulted in inconsistent quality of sesame production. Only a few farmers buy seeds, such as high yielding varieties, from formal networks.

31. *Sunflower*. South Sudan has immense potential for production of edible sunflower seeds and oil. The residue left after oil processing is used as a feed for animals, and value-added products—such as sunflower butter, nutrition bars that include sunflower, etc.—could ultimately attract higher prices. Beyond commercial value, sunflower is nutritious. A 100-gram serving of dried whole sunflower seeds have 584 calories and provide 42 percent of the daily allowance of protein, 36 percent of dietary fiber, as well as B vitamins, vitamin E, and essential minerals. The nutritional value would make sunflower seeds or other products a good choice for supplying school lunch programs. South Sudan is currently ranked 33<sup>rd</sup> in the world for harvested area and 34<sup>th</sup> in the world in term of yield. It is a dryland crop, growing well in the more arid northern parts of the country. Intercropping with beans or other legumes is common. There is an expanding demand locally and in the region. Production of sunflower is undertaken for household consumption and for income generation by smallholder farmers who sell their crops to processors or middlemen. Processors usually set the prices but due to lack of price discovery tools, farmers are at a disadvantage in negotiations with the middlemen.

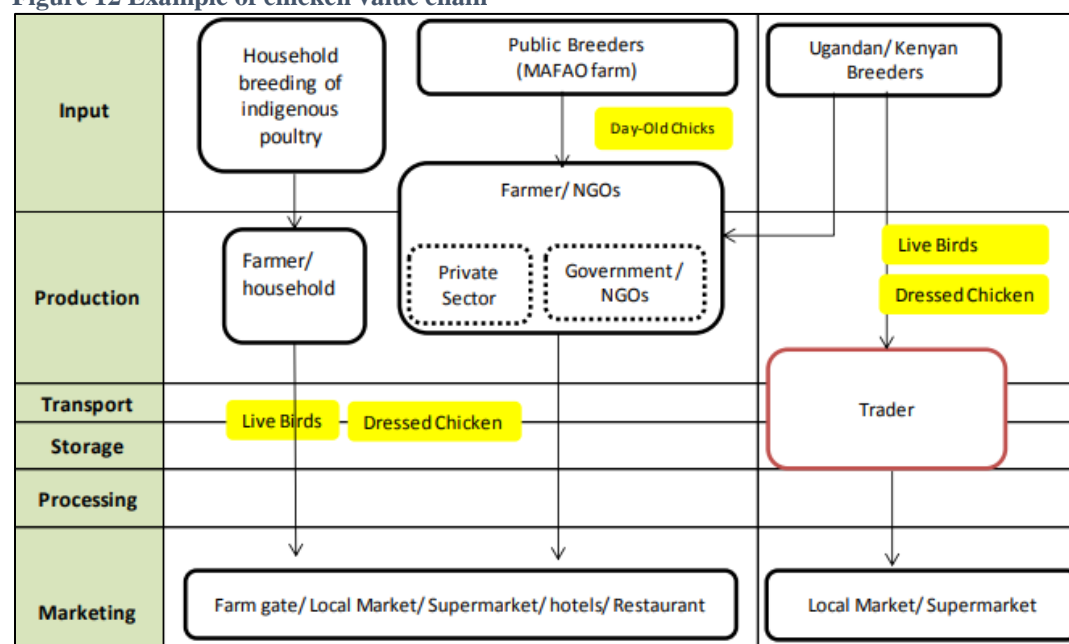
**Figure 11 Example of oilseeds value chain**



Source: Södertörn University (The sunflower value chain)

32. **Poultry** is the smallest subsector of the livestock sector in South Sudan, but it is growing in terms of consumer demand and is an important value chain for women and IDPs. Poultry is also important to nutrition. The meat is a significant source of B vitamins, and one egg can provide high-quality protein, fat, iron, vitamins, minerals, and carotenoids. In South Sudan, most domestic producers breed poultry (chickens, ducks, turkeys, and guinea fowl) for their own consumption. Foreign producers include commercial breeders in Uganda, Kenya, and Sudan that supply day old chicks. Other actors include the government, INGOs, and UN agencies (FAO) who promote and facilitate poultry production with farmers and groups. They support domestic producers with day-old chicks, feed, housing, vaccination, training, and market access support. Private commercial enterprises operate in urban areas without external support.

**Figure 12 Example of chicken value chain**

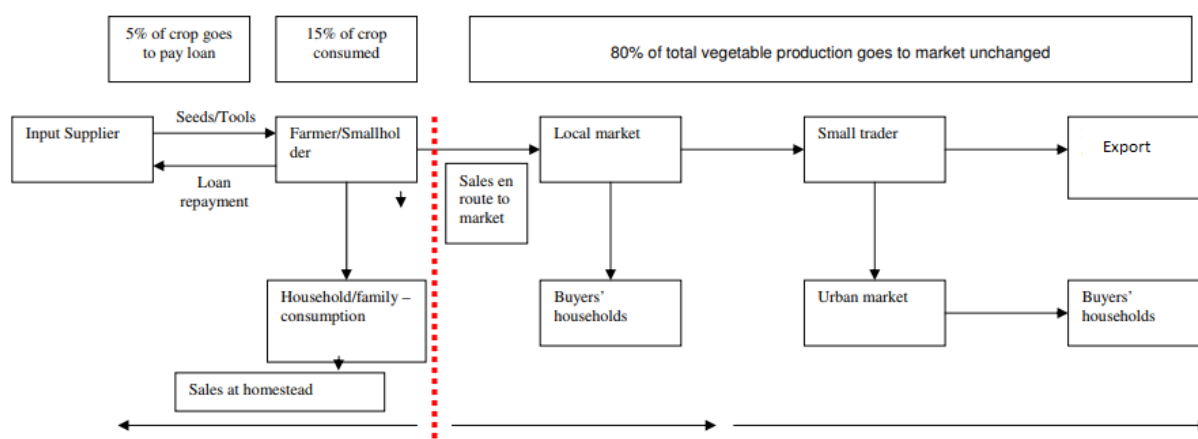


Source: Poultry training manual 2016

33. **Vegetables** are an important part of South Sudanese dishes. Their short maturity, quick ground cover, relative high productivity, and adaptation to more marginal soil conditions allow farmers significant flexibility in how they incorporate the crop into their farming system. Through INGOs and the UN,

promotion has focused on female farmers and women-headed households as a source of nutrition and quick returns on investment with a good profit margin. Most farmers cultivate vegetables in home gardens or in small field areas ranging from 0.1 ha to 0.5 ha; larger plots are rare and often associated with production for market. The biggest challenge to the value chain is the lack of transportation that can get the highly perishable product to local markets in a timely manner. Most vegetables are either harvested just at the onset or at the end of rainy season when roads conditions are the worst. Vegetables hold great income generating potential for farmers. Net vegetable production and yield has been increasing in recent years, which shows the potential of becoming a profitable value chain. Most actors, regardless of their position in the supply chain engage in retail activities. Farmers sell to final consumers at farm gates, on the street, or at markets in villages or in towns.

**Figure 13 Example of vegetable value chain**



Source: South Sudan Crop Watch Overview of cereal production in 2017, CAAS-Lib Synthesis Report

34. **Legumes, such as groundnut and pulses**, are a good food security crops with high demand in the market and good commercial potential. Indigenous varieties are drought resistant, and they can be stored for up to six months with appropriate post-harvest management. Groundnuts and pulses play a prominent role in agriculture because they can fix atmospheric nitrogen and increase the biological turnover of phosphorous—contributing to rather than draining from soil fertility. Legumes could be highly profitable crops, but due to food scarcity, most farmers eat what they produce instead of selling. South Sudan needs to produce legumes on a larger scale, commercially to become food secure and make farmers financially stable and less dependent on single crop per season. Pulses also contain important vitamins and minerals like iron, potassium, and folate. Farmers usually sell pulses at farm gate or bulk in storage facilities to various wholesalers. The core processes in the pulses value chain are, input supply, production, wholesaling, retailing and consumption.

35. **Cowpea** is grown in most of South Sudan by smallholder farmers—mostly women—as a subsistence crop under rain-fed conditions. Cowpea is drought resistant and less vulnerable to pests if properly managed at cultivation. Yields can be good (1600-3000 kg/ha) with minimum inputs but could be much better if fertilizer and irrigation were available. It can be consumed at different stages (young shoots, young leaves, young pods, immature seeds, mature seeds and sprouts) and is an important source of protein in daily diets (Johnson, 2012). Intercropping cowpea with cereals enhances the quality and production of the cereals due to nitrogen fixation. Cowpea can be used for animal fodder and human food—a research center in Senegal is testing bread from cowpea flour, which could be developed in South Sudan as well.



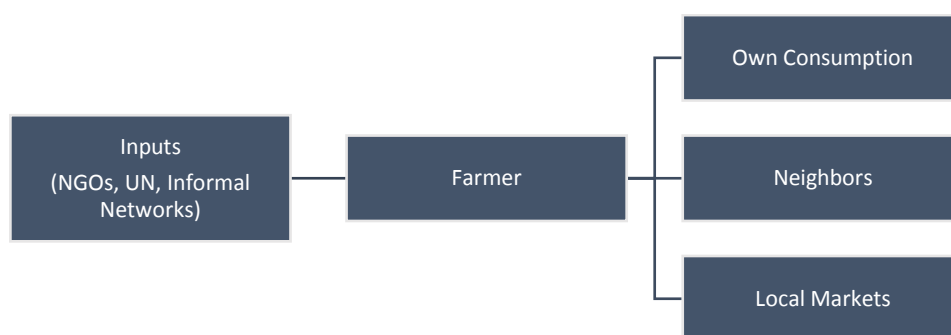
36. **Groundnut** are also grown mainly by smallholder farmers, who plant on average 0.2 – 0.6 hectares. Yields are low as compared to other countries, such as India and Nigeria, because of unreliable rains, traditional small-scale farming with little mechanization, outbreaks of pest infestations and diseases, use of low-yielding seed varieties, poor adoption of agronomic practices and limited extension services. Farmers usually sell unshelled groundnuts at farm gate to local traders or to storage facilities where local traders then collect and transport them to market. Occasionally, some farmers (usually those formed into groups) shell the groundnut using a shelling machine and sell directly at the local trading centers for a higher price. Like cowpea, groundnuts improve soil fertility by fixing nitrogen when intercropped; have improved the yield of subsequent maize and other grain crops up to 20 percent. Groundnut production is appropriate for small holder farmers because the cultivation requires fewer inputs, making it affordable and economical (Dalipagic, 2014).

**Figure 14 Example of legumes value chain**



Source: Basic Guidelines for Small Holder Farmers in South Sudan

37. The products discussed above are core to the food basket of South Sudan and investing in their value chains can stimulate local market activity and build systems that can be expanded as security spreads. The value chains shown above are characteristic for the products, but most are not operating as shown given the constraints facing farmers. In fact, most of the value chains would appear like this right now:



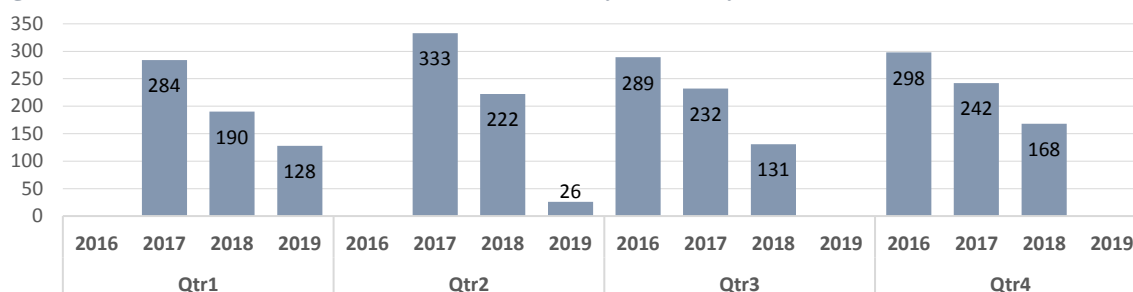
### ***Common challenges to agricultural value chains***

38. Conflict and violence have prevented farmers from sowing, planting, and harvesting crops, and this has contributed to the food shortages and increasing chronic food security. The prolonged conflict led to abandoned farms and a breakdown in agricultural supply chains, knowledge, and infrastructure (African Development Bank, 2013). However, the incidence of violence—defined as battles, explosions/remote violence, riots, protests, and violence against civilians—is declining. For example, a comparison of violent incidents in the first quarter of the year in 2017 through 2019 show a 30 percent decline each year. Moreover, the violence has not affected all areas equally—Greater Bahr el Ghazal has been relatively calm

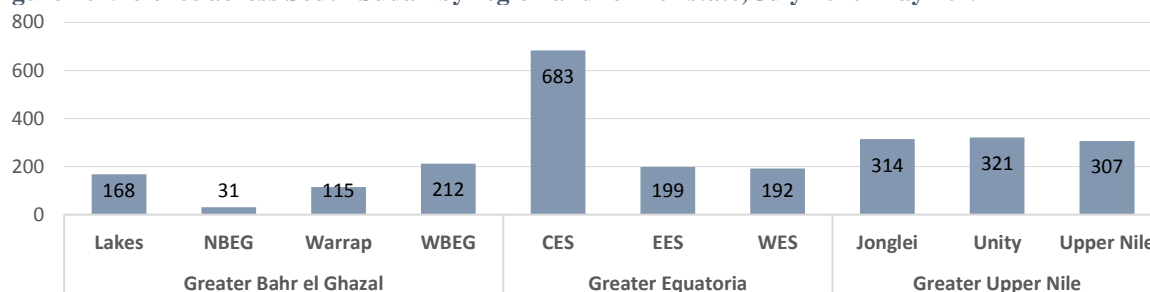


since fighting broke out in July 2016 as have the former states of Eastern and Western Equatoria. Despite this, cereal production is at its lowest level in 2018 with an estimated production gap of 524,000 tonnes. Conflict is not the sole factor in low availability of food.

**Figure 15 Recorded violent events in South Sudan, July 2016-May 2019**



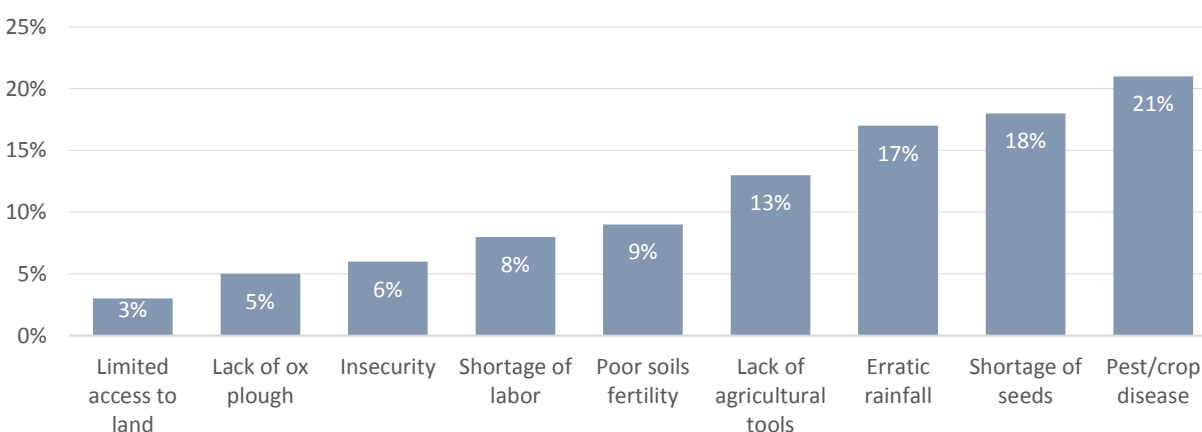
**Figure 16 Violence across South Sudan by region and former state, July 2016-May 2019**



Source: (ACLED, 2019)

39. Interviews with farmers across South Sudan before and during the conflict identified the core factors affecting their productivity, and as the figure below shows, insecurity is not foremost in farmer concerns. Certainly, in areas where battles, insurgency, and mining prevent farmer from accessing their fields, security tops the list of constraints. There are, however, an increasing number of areas where farmers have a long list of constraints that must be met to start closing the yield gap and improving the food security situation. These are described below.

**Figure 17 Farmer identified constraints to farming**



Source: FAO/WFP/MAFS data

40. Primary value chain functions include:

- a. **Pests and crop diseases.** Pests and disease are the biggest technical challenges faced by farmers and livestock producers. Fall armyworm (FAW) is now endemic in South Sudan. In its larval stage, FAW can feed on more than 80 plants—including, maize, rice, sorghum, millet, sugarcane, and vegetables. Losses as high as 50 percent of a crop have been registered, but the damage can be reduced through management practices. Striga, colorfully referred to as the violet vampire, is estimated to infest more than one million hectares of land in Africa, threatening the food security of over 100 million people. Its seeds can lie dormant in a field for over 20 years, becoming active when cereal is planted. Poultry producers must manage at least six diseases and several parasites, the worst of which is Newcastle disease, which can wipe out 50 percent or more of a flock.
- b. **Seed availability and the need for research.** Quality of seed is, perhaps, the most important variable in productivity, and right now farmers in South Sudan lack quality seed. Seed production is increasing, but slowly. In 2017, 1383 tonnes of seed were produced, up from 833 tonnes the previous year. In 2018, private seed companies produced 2000 tonnes, but this was still only 17 percent of the 12,000 tonnes needed by the farming sector, according to the latest survey from FAO. Moreover, private seed companies tend to focus on maize and sorghum, leaving a large gap in quality seed for other core crops. The rest of the seeds are sourced from savings from previous cultivation, borrowed from family/friends, or provided by NGOs and UN agencies. There are about 30 varieties of seeds that the Ministry of the Agriculture and Food Security (MAFS) have approved for release to farmers, but the lack of a system for seed multiplication and marketing has prevented that. In addition, there are new seed varieties bred for disease resistance, climate resilience, and nutrition that could be introduced to South Sudan with the proper protocols.
- c. **Farmer knowledge/lack of extension.** Estimates from 2014 showed each of the 86 counties in South Sudan had about 8-14 extension agents, which would be between 688 to 1204 extension agents in the country. If every one of those agents is still working today, it would mean that each would be trying to serve between 900 and 1500 farming households. Assuming four people per household working in agriculture (average household size is 7), the ratio would be one agent to between 3600 and 6300 people that need training and information. This is based on population estimates of 2.05 million households in mid-2018, of which an average of 53 percent is farming households (FAO/WFP, 2019). Alternative forms of extension—including radio, ICT, lead farmers, farmer field schools, and community resource persons—can create an ecosystem of agriculture information that can source and move knowledge to farmers when they need it.
- d. **Access to irrigation.** South Sudan gets plenty of rain, and most of its farms are 100 percent rainfed. However, the timing, intensity, and duration of the rains varies greatly and impacts productivity. Infrastructure for irrigation is limited to a few production areas developed decades ago, and security and transport infrastructure limit the potential for irrigation systems. Technology for efficient on-farm irrigation exists but needs supply to chains and training to effectively disseminate.
- e. **Tools and machinery.** Farmers in South Sudan use manual tools—primarily the maloda and to a lesser extent the East African hoe—for all elements of production. While a maloda can be manufactured locally (meaning local jobs) and it is familiar to the farmers, however, it is not conducive to preparing the amount of land needed to contribute to national food security.
- f. **Inadequate storage infrastructure.** Lack of storage facilities leads to post-harvest losses ranging from 15 to 50 percent. Near-farm storage (community or household) is usually a traditional open hut made

of thatched straw, wood, and clay/mud. Beyond the traditional, there are three main types of storage facility available in South Sudan: government run (concrete); commercial facilities, such as concrete warehouses; and mobile humanitarian storage. Most storage warehouses are government owned, but there are traders and trader networks that have their own infrastructure. Cold chains infrastructure is severely underdeveloped and is a capital-intensive investment. However, commercial operators are building capacity to provide cold chain solutions. Currently, charcoal coolers are the only available option for cold storage units but they have a limited presence. (Logistic Cluster, 2018)

41. Value chain supporting functions include:

- a. **Inadequate transport networks.** South Sudan's transport network is extremely underdeveloped. Most respondents to a 2013 household survey in Greater Equatoria Region by USAID reported living within "a little more than two hours of a market" and "slightly more than three hours of an agricultural extension office" (USAID, 2013). This is walking distance as few if any respondents had vehicles. The country's road density is the lowest in Africa with 15 km of road per 1000 square km<sup>2</sup> of arable land. Of the estimated 12,642 kms<sup>3</sup> of roads in South Sudan in 2013, about two percent were paved and only about 4,000 kms had been rehabilitated. The widespread conflict would certainly have led to deterioration of those roads. This makes reaching markets with undamaged produce an especial challenge for farmers. Logistical costs are also very high—renting a 25-ton truck from the Uganda border to Juba, costs around US\$2000—and contribute to high food prices.
- b. **Inadequate market infrastructure.** The recent civil war was a major setback in the development of local markets and marketing channels. The undeveloped transport network will constrain its recovery. Most market places are concentrated near Juba. There are markets in rural areas, but supply channels are not organised. The market system in South Sudan is dominated by a nascent private sector, and trade is driven by the individual trader's desire to make profits. Neither the distribution channels from seller to buyer nor the role of the different stakeholders are well defined. Some people fill several roles—middleman, transporter, wholesaler, retailer, importer, and exporter—simultaneously. Wholesalers sell their produce to other wholesalers (especially if they are importers), retailers, and individual customers. Some traders sell imported produce directly off the back of their trucks instead of operating shops or warehouses (Henderson, 2015).
- c. **Access to finance.** Only about three percent of the population has access to financial services. As per the World Bank 2019 Ease of Doing Business report, South Sudan ranks 178 out of 189 economies in ease of getting credit because of an inadequate regulatory infrastructure, weak investor protection legislation, undeveloped credit bureau, and inexistent collateral registry.
- d. **Access to power.** Only 8.9 percent of South Sudan's population has access to electricity—per capita electricity consumption is lowest in the world at 1-3 kWh. The World Bank's Doing Business report 2019 ranked South Sudan 187 out of 189 countries for access to electricity, with only one percent of the population having access to grid electricity. There is no national interconnected network of transmission grids. Grid electricity is produced mainly through diesel generators and provided by SSEC (South Sudan Electricity Corporation), and accounts for just 1.4 percent of the electricity generated in South Sudan, with the balance coming privately through small diesel generators. The paucity of

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<sup>3</sup> UNOPS, South Sudan Rural Roads Project, Road Sector Development Plan, Sep. 2016.

electricity hampers the growth of the industrial and agricultural sector—irrigation, processing (African Development Bank, 2013).

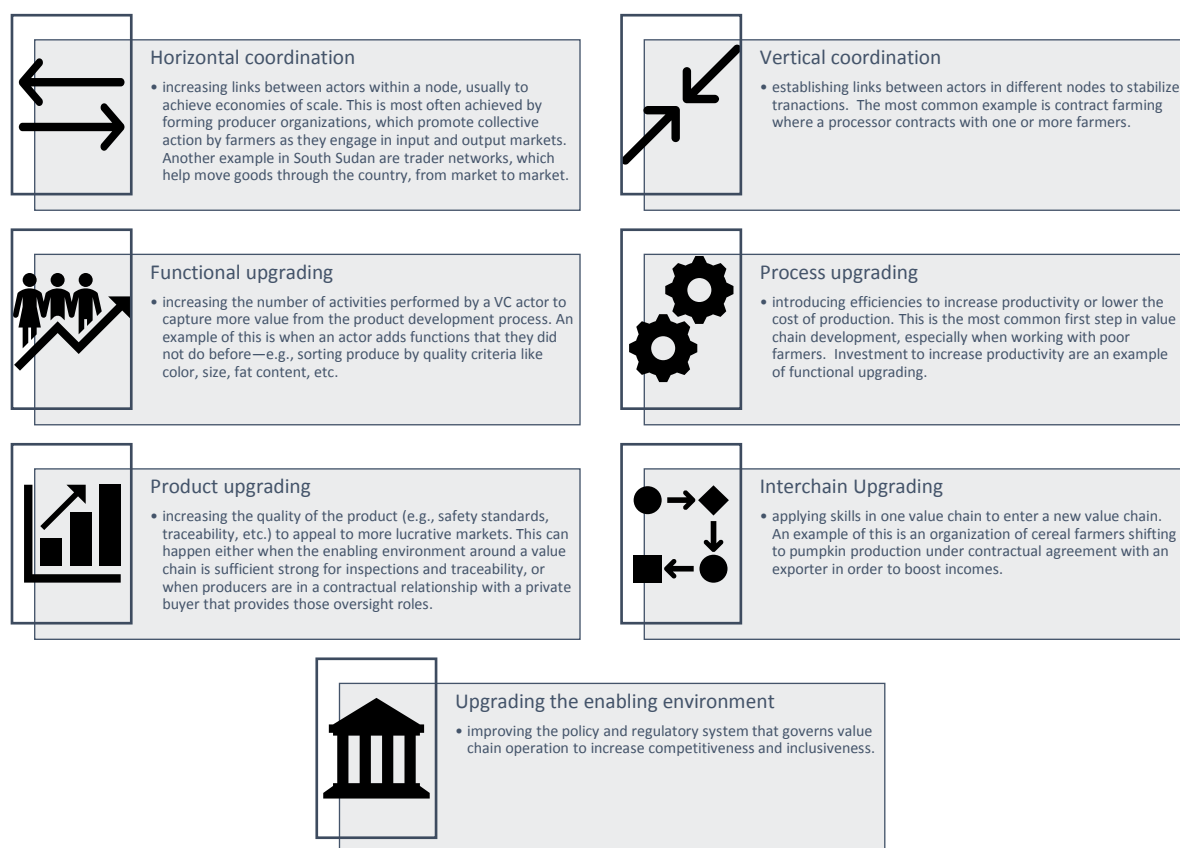
42. As the agriculture sector moves from a humanitarian to resilience building, producers need to access more land, better technology and seed, and better knowledge. Currently only 17 percent of the demand for quality seed is met by domestic production, and the lack of quality seed in addition to lack of knowledge and appropriate tools has contributed significantly to the 524,000 tonnes cereal gap in the country. Upgrading along the entire value chain is needed to move South Sudan out of chronic food insecurity, and horizontal organization will allow farmers to undertake the necessary process upgrading.

43. The following section describes value chain investments that can start now to generate more jobs in local areas while addressing chronic food security, and lay the foundation for job growth in the food system as South Sudan emerges from conflict.

## E. Developing Value Chain to Facilitate Jobs in Agriculture

44. The IDRC framework for value chain upgrading describes seven strategies for pro-poor value chain development that can make each value chain more productive, efficient, and profitable. Some of the strategies focus on organization within value chains—either building linkages horizontally or vertically that increase efficiency. Some, such as process upgrading, focus on introducing technology and/or management practices that can increase productivity, lower the cost of production, reduce losses, etc. A couple of the strategies focus on the enabling environment—policies, regulations, etc. Other strategies—such as functional upgrading, would expand the number of activities that a given actor would perform within a node on a value chain or would create new products. These could , which or increasing the number of activities performed by an actor within a node and :

**Figure 18 Value chain upgrading strategies**



Source: (Jonathan Mitchell and Christopher Coles, 2011)

45. This section describes how investments in select value chain upgrading strategies applied to the staple crops that are critical to food security for the population and income for producers can help South Sudanese farmers address the challenges identified in earlier.

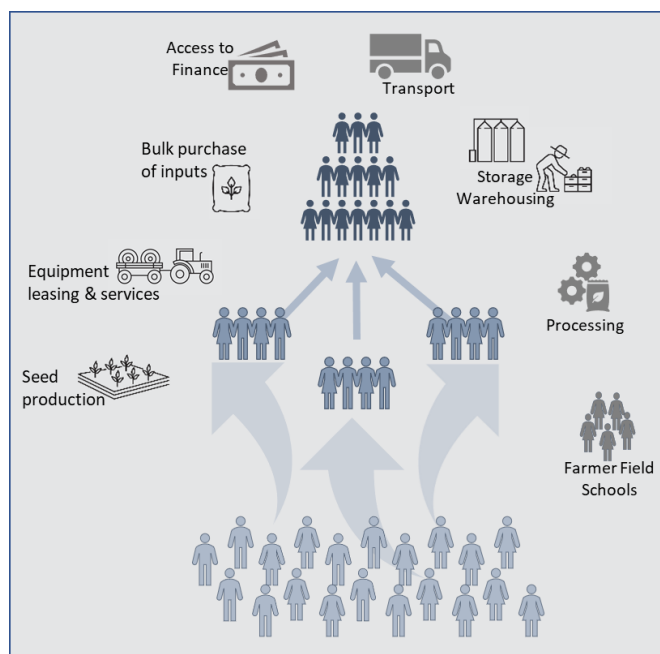
## IMPROVING ORGANIZATION ALONG VALUE CHAINS

46. After years of conflict and population displacement, the food sector has been left largely disorganized. This increases transaction costs for each producer and those who try to provide services. For example, few individual farmers use inputs like improved seed and fertilizer to increase productivity because they lack access to them and the income buy them. According to FAO/WFP, there were just over 1.2 million farming households in South Sudan in mid-2018. Data from 2014 showed that each the 86 counties at the time had 8-14 extension agents. If the same number remained today, and the probability of that is low, this would mean that the public extension system would have a 1:3600 to a 1:6300 ratio of extension agents to farmers in a country with very low population density.<sup>4</sup> Moreover, extension agents have very little access to new information and training to then impart to farmers. In brief, a public extension officer would never been able to reach the population in need of his or her services. The same would hold true for a banker, a trader, NGO, or any other value chain actor that needs to engage with farmers. The value chain upgrading strategy of horizontal coordination can bring much needed structure to agriculture.

### *Horizontal Organization*

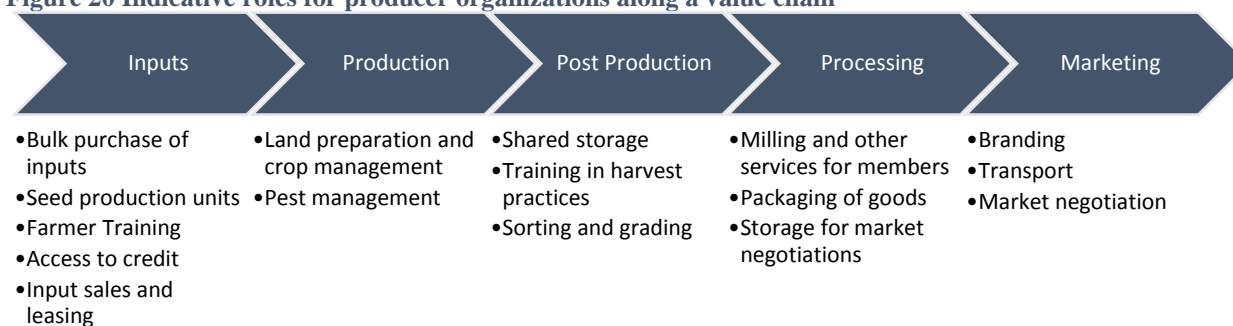
47. The most common form of horizontal coordination, and one that would build on existing experience in South Sudan, is the creation of producer organizations (POs), a producer driven model of organization. Before the conflict, POs operated in many areas of the country. Some have remained in operation through the conflict, others could be reconstituted with donor/government support. The benefit they bring includes organization, structure, and scale to enage in input markets to lower the cost of improved production technology; specialization within their membership to offer training, equipment, and ultimately even credit, to all their members; and negotiating power with output markets to maximize their profits. The structure POs could bring to farming within an area of operation could facilitate other value chain upgrading strategies. The role POs can play in the value chain is shown in the figure below.

**Figure 19 Leverage through producer organizations**



<sup>4</sup> This assumes four people per household working in agriculture (average household size is 7)

**Figure 20 Indicative roles for producer organizations along a value chain**



48. As the agriculture sector moves from a humanitarian to resilience building, producers need to access more land, better technology and seed, and better knowledge. Currently only 17 percent of the demand for quality seed is met by domestic production, and the lack of quality seed in addition to lack of knowledge and appropriate tools has contributed significantly to the 524,000 tonnes cereal gap in the country. Upgrading along the entire value chain is needed to move South Sudan out of chronic food insecurity, and horizontal organization will allow farmers to undertake the necessary process upgrading.

49. In **Rwanda**, **Cooporiz Abahuzabikorwa** is a multi-purpose cooperative that provides a range of services focused on productivity and income. It gets inputs at a lower cost; ensures access to quality seeds, which it then multiplies; provides access to fertilizers and pesticides, and it provides training in modern agriculture techniques to its members. Post-harvest, the coop operates a drying yard and storage warehouse where it can ensure better quality produce, which it holds until it can negotiate the best price. Another Rwandan cooperative, the **Cooporiz Ntende**, offers these core services, but it has also developed started providing access to credit, medical insurance for members, school fees for members' children through secondary school, as well as an old age pension for its members over age 75.

50. The **Uganda Cooperative Alliance (UCA)** contributed to the institutional development of the farming sector in that country. UCA is an apex body of cooperative unions that organized and fortified grassroots farmer organizations to maximize their membership. Grassroots community organizations, parish/community farmers associations, and other small farmer groups were aggregated under the rubric of rural producer organizations (RPOs). RPOs were strengthened to collectively market produce. At the sub-district level, they were aggregated into Area Cooperative Enterprises (ACEs) which acted as smaller cooperative unions for the RPOs. The ACEs identified markets and bargained for higher prices. All ACEs are a part of the union and if the union offers a competitive price, then ACEs may also trade with the union. Produce may also be sold to individual traders working in local markets or traders connected to export markets (Nannyonjo, 2013). UCA tried several strategies to ensure sustainability and promote the development of the cooperative sector, including: treating cooperatives as independent business units and autonomous democratic institutions; providing both technical and management education; and promoting clear policy guidelines covering cooperative operations. Over 90 percent of RPO members reported positive changes in their income after joining and marketing their produce through the cooperatives (Nana Afranaa Kwapong, 2010).

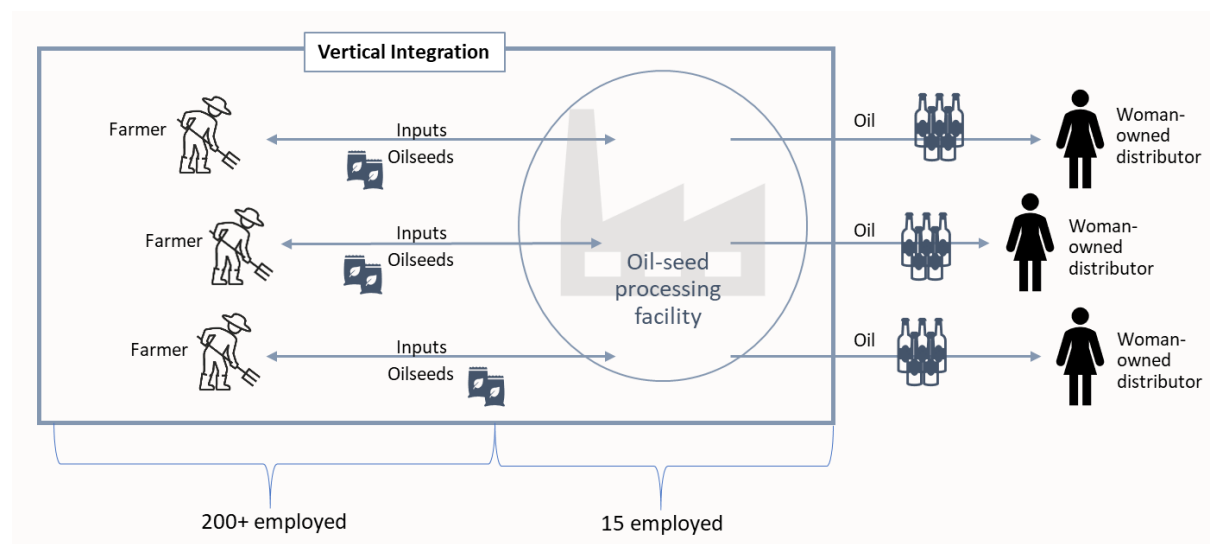
51. Trader networks are another form of horizontal coordination that could be strengthened within South Sudan. A 2017 World Bank study found trader networks operating between markets across South Sudan. They include both small and large traders, each of which face different constraints and use different coping mechanisms to stay in business. For example, large traders, who are more likely to have their own

storage capacity, so they can keep more inventory making them more likely to operate year round. They either own trucks or can lease them, so they can travel longer distances, and they do report security as a major constraint. Smaller traders do not report security issues as a top constraint because they tend to work within a locality. However, they lack for storage—some store inventory in their stores, while others lease storage together. Access to finance is another constraint, especially given the lack of income elsewhere in the locality. Members of trader networks benefit from information about security on the roads and about prices in different markets. With proper strengthening trader networks could increase market integration, especially between surplus production areas (generally Greater Equatoria) and deficit production areas (Greater Upper Nile and Greater Bahr el Ghazal). The report calls for strengthening trader networks with financial support and linking them with ongoing humanitarian efforts as suppliers for food. Particularly in the early stages of resilience building in South Sudan, the smaller traders in local areas can play a significant role in stimulating the growth of value chains. While the employment opportunities will low at first, the more trade that starts, the more opportunities will be created.

### ***Vertical Organization***

52. Vertical organization—or establishing direct links between two different nodes on the value chain—is particularly useful for linking producers to markets. Perhaps, the most common form is contract farming, where a processor or trader organizes producers around a common product. An example from South Sudan is Agroplan Oils and Fats Processors in Kajo Keji. Agroplan operates a sunflower oil press with a workforce of 15 employees. It uses an out-grower model that provides inputs to its producers (over 200 women) and buys the sunflower seeds for processing. The business model is also pro-women and pro-poor because it sells vegetable oil in smaller packages (0.3 to 5 liters compared to 20 liters from most importers) under the brand NUTRISUN. A network of female retailers sells the oil to generate income (Spark, 2019). This is one agricultural enterprise that provides steady work for 215 people and provides stock to a system of independent vendors that can give them a competitive advantage in the eyes of consumers, thus increasing their business.

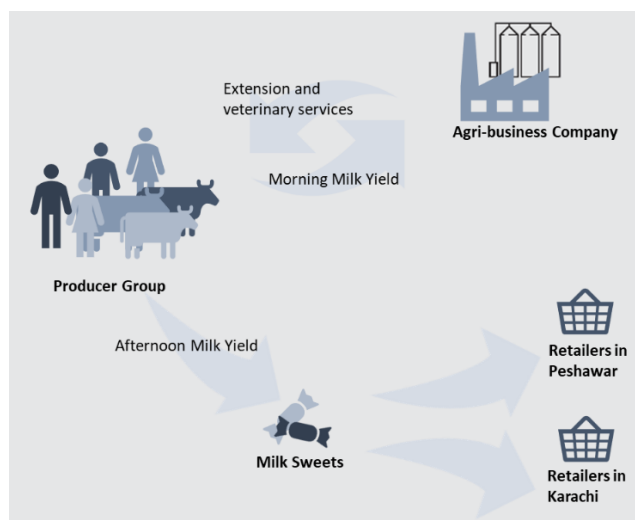
**Figure 21 Vertical integration in the Agroplan oilseed enterprise**





53. A similar model from Pakistan included a producer group that was vertically linked to an agri-business and diversified its products to access completely different markets. The dairy producer group included dairy farmers and a community member trained in making milk sweets. The group used the afternoon milk yield to produce candy, which they branded and sold in urban centers of Karachi and Peshawar. The morning milk yield was sold to a large-scale agribusiness firm that produced branded milk for urban markets. In return for the milk purchased at an agreed price, the company also provided extension and veterinary services to the producers to ensure product quality. In South Sudan producers in value chains with multiple market options—such as cassava, sesame, and groundnut could work toward such an arrangement.

**Figure 22 Vertical integration and functional upgrading for market access**



Source: Author based on Pakistan Poverty Alleviation Fund activities

54. In South Sudan, the seed production model supported by SNV Netherlands facilitated horizontal organization of farmers to establish smallholder farmer-led seed production. Working with a group of 50 smallholder farmers to establish individual seed producing farms ranging from 2 acres to over 10 acres each.<sup>5</sup> The farmers acquired foundation seeds from NASECO, a subsidiary of Uganda National Agriculture Research Organization (NARO). Community field facilitators trained the farmers on land preparation and agronomic practices. MAFS scientists provided technical backstopping to the production process. SNV identified a private sector seed company to enter into a contract farming agreement with participating farmers. The company bought seeds from the farmers at harvest and did the post-harvest processing (threshing, treatment, packaging, storage and marketing of qualified seeds). This project tripled the profits from seed production.

55. Horizontal and vertical organization models have been successfully implemented for cotton in Kenya and Zambia; cassava in Zambia, Malawi, and Cameroon; rice in Senegal, Mali, and Burkina Faso; and coffee in Cameroon. There are examples from around the world of models that bring structure to the farming sector in ways that benefit poor farmers while maximizing profits. There are several variations of horizontal and vertical organization:

- **Productive Alliances** (e.g., producer groups and private sector) combines the first two models by working with organized groups of producers and private sector actors and matching the supply and demand. Producers negotiate with buyers on terms of their contractual relationship—what each party promises to deliver to the other—and provides financial and technical backstopping to the producer groups for contractual conditions they cannot otherwise meet initially (e.g., machinery, training, etc.).
- **Intermediary models** (e.g., NGOs, development agencies, government) are most commonly led by NGOs, which provide technical assistance and support to identify and improve smallholder market

<sup>5</sup> With funding from International Fund for Agriculture Development (IFAD), Embassy of the Kingdom of Netherlands (EKN) and Government of the Republic of South Sudan (GoRSS),

linkages. The goal is generally local and national economic development and farmer empowerment. Variations on this model include:

- **Collective enterprise models**—where the NGO forms an enterprise that acts as the market intermediary for producers. One example is RUDI, a collective marketing enterprise by the Self-employed Women's Association (SEWA) of India—a registered union. RUDI buys produce from local producers who are members of SEWA while other members package it for the market and sell the packaged products door to door. As stakeholders of the enterprise, members receive dividend payments from profits.
- **Social enterprise models**—where the NGO is the market for producers. An example is the Bangladesh Rural Advancement Committee (BRAC), which, for example, provides markets along the poultry value chain, including chicks, poultry rearing, feed production and sales, commercial layer systems, and poultry processing—including dressed chicken for retail and chicken restaurants in urban areas. Overtime, BRAC has developed the full poultry value chain, which provides income for millions of smallholder producers and which contributes 50 percent of its profits to its socio-economic development programs.

56. Critical success factors for all these models include emphasizing governance models based on lessons of the failed cooperative movement of the 1980s and 1990s, providing business focused training to manage market activities of the POs and facilitate expansion and diversification in a sustainable way, and technical innovation and training to increase productivity and market access to increase income flows (Kelly, 2012).

57. Organizational upgrading of value chains increases the potential for success of other value chain investments by providing platform to receive inputs, manage processes, and generate innovation. This is especially relevant to the introduction of new technology and knowledge that can increase the productivity of cropping and processing for the major food basket crops.

## IMPROVING RESEARCH, DEVELOPMENT, AND KNOWLEDGE FOR VALUE CHAIN DEVELOPMENT

58. The food sector is very knowledge intensive. The practices and technologies needed to maximize yield for each seed and breed vary. The most successful farmers have access to knowledge and can use that knowledge to innovate with every cropping cycle. Getting the right knowledge to farmers at the right time is the function of a system of researchers, breeders, trainers, technicians—working in the public and private sectors and civil society.

### *Research and Development*

59. South Sudan's agriculture sector did not have a chance to establish a fully-functioning research and extension system in the time from independence in July 2011 to the outbreak of civil war in December 2013. As a result, the current research and development institutions in the country are limited in capacity. The three main objectives of research and development are to build community capacity to improve crop production, animal resource management, and water use; make improved agricultural inputs available to vulnerable households through public and private extension systems; and expanding smallholder farmers' access to appropriate technologies, markets, and infrastructure.

60. The Ministry of Agriculture and Food Security (MAFS) has continued working with NGOs as well as regional and international research institutions to develop technology, especially seed technology. There are already 30 improved seed varieties approved for release to farmers. Organizational reforms, such as those discussed in the previous section, will aid in the dissemination of this technology. As peace returns, and the country can turn to building resilience, there are several models for research and development that can provide lessons for the system design.

61. Rwanda recognized research as an indispensable tool in the development of the agriculture sector for their civil war. The reforms instituted included:

- a. *Merging research and extension institutions* under the Rwanda Agriculture Board (RAB) and to increase synergies between research and extension by merging the Rwanda Agricultural Research Institute with two other extension institutions;
- b. *Researching multiple and complementary areas* along key value chains;
- c. *Collaborating with stakeholders* to disseminate results to farmers to modernize the entire agriculture and livestock sector.

62. In Ethiopia, the Ethiopian Institute of Agricultural Research (EIAR) introduced client-oriented extension called Farmer Research Extension Groups (FREG). FREGS identify practical research questions; carry out corresponding research activities in farmers' fields; and evaluate and discuss the results with a broader range of stakeholders in Research-Extension-Farmer Advisory Councils (REFACS). This system has empowered farmers to choose variety of crops that meet their needs while generating findings for researchers. Since its founding in 2004, the FREG model has increased production potential; enhanced farmer learning; enhanced direct feedback from farmers to researchers; and increased the efficiency and effectiveness of the extension system (Endalkachew Zewdie Abebe, 2008).

### ***Extension and Knowledge Flows***

63. South Sudan does not have one established extension model. MAFS has not had sufficient time or resources to create and staff such a system; however, it does have an extension curriculum that has been adopted by the donor, UN agencies, and NGOs. A variety of models for are being used to deliver the curriculum, but two primary models dominate right now:

- *Conventional research and extension* include demonstration farms, on-farm trials, and farmer field days. The approach identifies and supports progressive farmers, model farmers, voluntary farmer promoters, and contract farmers who serve as a channel for information. One of the drawbacks of more traditional models is that the messages are often pre-determined and there is a lack of flexibility to respond to unexpected need.
- *Farmer Field School (FFS)* were started by FAO in 1989 to promote integrated pest management. It works through groups of about 20-30 farmers divided into smaller subgroups of about 5 farmers, who are facilitated to identify their production constraints with the aim of finding practical solutions through field trails. It combines principles of conventional extension with community driven development. People participate by identifying the constraints and the trainers facilitate them in finding feasible solutions, providing them with reliable and innovative inputs—such as, high yielding seeds (HYS), fertilizers, and general technical assistance until their produce reaches the market.

64. Both approaches have been used widely, and ultimately the choice of extension method depends on the demographics and stability of the targeted areas. For South Sudan, the FFS approach has been effective and various INGOs have successfully implemented with farmers and refugees who have been trained to be farmers. There are several challenges to the efficacy of ongoing extension efforts, including the remoteness of farming communities and low literacy levels—at just 27 percent for adults.

### ***Digital Disruption***

65. The latest development in agriculture is *digital disruption*, harnessing ICT to accelerate innovation in extension, monitoring, price discovery, marketing, and more. One model potential model is based on Digital Green (DG), a development organization that provides extension services to remote rural communities using information and communication technology. DG specializes in producing customized video made with local farmers for local farmers in their own language and without the need for literacy. The model builds the capacity of communities to develop their own content with the help of technical professionals (agriculture specialists but also people trained with video equipment and information technology). It is participatory and inclusive—70 percent of the community members that have participated in the model in South Asia and Sub-Saharan Africa are women.

66. The current connectivity rate in South Sudan, limits the potential of such models now. According to the Digital 2019 report, only 14 percent of the population have a mobile subscription, and only 1.8 percent of the population use social media. With these numbers, any use of multi-media materials will have to follow a progression until the technology infrastructure. GRSS is planning investments to rapidly scale the information infrastructure in the country but reaching remote communities will take time. There are still areas only accessible by satellite phone at this point. There is a way to cascade video extension to get audio-visual resources to remote communities.

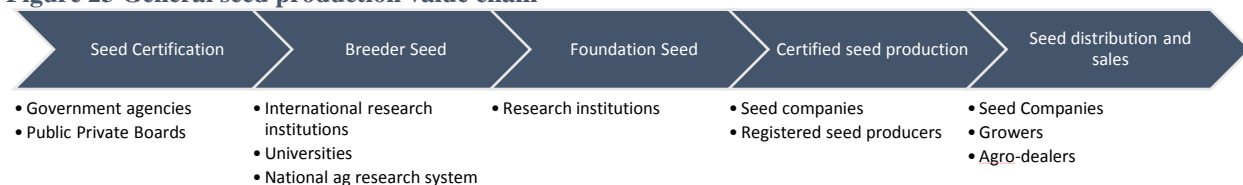
67. As the farm sector is reorganizing in the aftermath of conflict and the requisite ICT infrastructure is built, off-line video is an immediate possibility. Equipping extension teams with USB drives of training videos and pico projectors with battery packs or solar power to show videos in remote communities can expand the reach of the extension system with clear how to videos and success stories. This approach has been used in very remote communities in India with great success, as shown in the picture to the right. The videos can feature progressive farmers in the same cropping system, and screenings can be synchronized with cropping schedules in an area so the information is immediately relevant. Facilitation by local experts (extension staff, NGOs, etc.) means questions raised by the videos can be answered quickly. Video extension is an efficient and cost-effective way to expand good agricultural practices and increase adoption rates. Agro-dealers and/or producer organizations can be channels for video extension, especially when rains prevent external experts from reaching communities.

### ***Ensuring a supply of quality seeds—enterprise and cooperative models***

68. Seeds are perhaps the most critical technology in agriculture systems, and certified seeds are the product of an extensive research and development system involving research institutions, breeders, growers, and agro-dealers. MAFS has prioritized strengthening national research and extension systems to support the production, distribution, and use of quality seeds. It also endorses the creation/support of a robust system of private seed companies and agro-enterprises as a critical part of the country's future seed system. In the absence of a fully operational certification system, quality declared seeds can be produced, but this requires knowledge of propagation techniques. Most farmers in South Sudan currently use local seed varieties that

they save, borrow from family or friends, or get seed from donor projects. Modern high-yielding varieties and high-quality local varieties are being introduced largely through emergency seed distribution imported from border areas. Only two percent of seeds planted in South Sudan are bought from the formal sector—and this is limited mainly to maize and sorghum.

**Figure 23 General seed production value chain**



69. Breeder seed and foundation are developed through research collaboration with regional and international centers. The system to produce seeds for farmers follows either an enterprise model or a cooperative model. Programs supported by MAFS, AGRA, and others have supported an enterprise model for seed development by establishing seed companies, many of which continued functioning during the conflict. The most common operating model for companies is an out-grower model that contracts independent farmers to produce the seeds, which the company collects, cleans, packages, and sells (vertical integration). Capacity remains limited, so there is room for expansion of seed enterprises.

70. Where security conditions permit, FAO supports community seed production by supporting farmer field schools (FFS) and seed producer groups for seed multiplication. The selected farmers receive quality seeds and are trained in production, conditioning, storage, and marketing. Local quality assessment councils ensure that the seeds produced meet agreed quality standards. Through input trade fairs, FAO facilitates local markets for farmers to purchase quality seeds from the seed producers—a form of restarting local markets in remote farming area (FAO, 2018). There are other models from other countries that can provide lessons for increased seed development in South Sudan.

**Figure 24 Input trade fair for seeds in Renk County 2018**



Source: Christian Mission for Development

71. *Community seed banks* in Spain, India and Mali have made it possible to conserve and promote thousands of globally significant indigenous crop genetic resources, which are adapted to native climatic conditions. Aggregating these seed banks into cooperatives increases the market power for negotiation of members. Community seed banks tend to be small-scale organizations that store seed on a short-term basis and serve individual communities or several communities in surrounding villages. Such efforts can have a multiplier effect if the seed banks network and share information about seeds with other informal and formal seed system actors. In Spain, the *Resembrando e Intercambiando* seed network is an informal federation of 26 local seed networks located throughout the country.

72. In India, seed banks have formed networks (horizontal organization) with the support of the Centre for Sustainable Agriculture to access facilities—such as cold storage facilities for storing germplasm. Various other seed banks have joined to form seed cooperatives, some of which operate mobile seed processing units and market the seeds as well. Several village-based seed banks in Mali have formed cooperatives that collect membership contributions and use savings/credit funds to generate financial

resources for the seed bank and its members. Seed producer cooperatives make the seed affordable, available, and accessible to the community because they reduce transaction costs. Many farmer groups and cooperatives have diversified their services. The Dunka Fa cooperative in Safo, Mali, provides onion storage for seed bank members so they can wait for better market prices (Ronnie Vernooy, 2015).

73. Ethiopia's Agricultural Transformation Agency (ATA) and partner organizations started cooperative-based seed production (CBSP) to fill gaps in seed supply through localized production and distribution to meet the different needs of the different agro-ecological zones—a situation like South Sudan. Activities targeted production of self-pollinating seed varieties not provided by the formal seed sector. The program requires a strong focus on both institutional and physical capacity building for existing seed cooperatives and farmers because initially 95 percent of the 285 seed cooperatives could not meet the regulatory requirements to become accredited. CBSP helped weak cooperatives develop and manage business plans by modeling seed unions that are inclusive, environmentally conscious, and financially sustainable, with capable leadership and improved internal quality control capacity. It trained smallholder farmers on modern seed production and post-harvest handling, and it encouraged seed unions to use a direct seed marketing (DSM) modality. It also seed value chain (production, processing, storing, and marketing) with training and necessary assets—standard seed storage facilities, diffused light stores, offices, seed cleaning shades, tractors, seed cleaning machines, packing machines, ground balances, and water pumps (Ethiopian ATA, 2019).

## IMPROVING MECHANIZATION ALONG THE VALUE CHAIN

74. As agriculture starts to rebuild in the wake of the R-ARCSS, the sector faces the challenge of bridging the largest cereal yield gap since independence, expanding the area under cultivation (less than 4 percent of potential land is being cultivated), and reducing food loss and waste. Achieving these goals at the scale at which they need to be achieved will not happen with the current technology being used.

75. It is estimated that a household must cultivate 2 feddans (.85 hectares) of land to be food secure and have a small surplus for the market. At the current average farm size as of mid-2018—just under 0.8 hectares—that means most farm households fall short of being food secure. To farm more land requires land clearance, which is estimated to take the equivalent of 50-person days for one feddan or .43 hectares. In terms of job creation, this could be a good thing; however, farmers report labor shortages as a bigger constraint to doing business than the conflict. The reasons for this are being investigated, but the prevailing theories include, competition with donor-funded programs for labor, lack of interest in agriculture on the part of youth, and a diminished labor force during the rainy season due to illness.

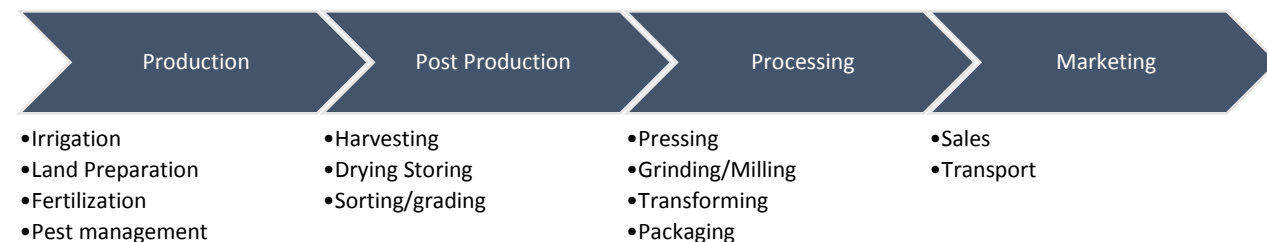
76. MAFS estimates that where traditional manual methods can clear  $\frac{1}{4}$  feddan in a day, an ox plough can clear one feddan, a power tiller can clear two feddans, and a tractor can clear four feddans, equivalent to 1.7 hectares (MAFS, 2016). Based on this information, tractors would seem the best solution; however, the poor road infrastructure, cost of fuel, lack of supply chains for parts, and lack of trained mechanics makes them unfeasible for now. Furthermore, the cost of tractors puts them out of reach of most farmers. Leasing operations or PO-owned tractors might be an alternative. While the larger issues impeding the adoption of tractors are being addressed, there are lower-tech mechanical solutions, and a few high-tech options, that can reduce drudgery and make expanding cultivated area feasible.

77. Technology solutions exist for every node of the value chain from inputs to production to processing. Research and development and organizational upgrading can make the introduction and



adoption of Currently Improving the technology used along value chains is a form of process upgrading that is critical to get farming back on track in South Sudan. Technology improvement in agriculture in the form of mechanization, now helping farmers leapfrog to more advanced production systems in some areas.

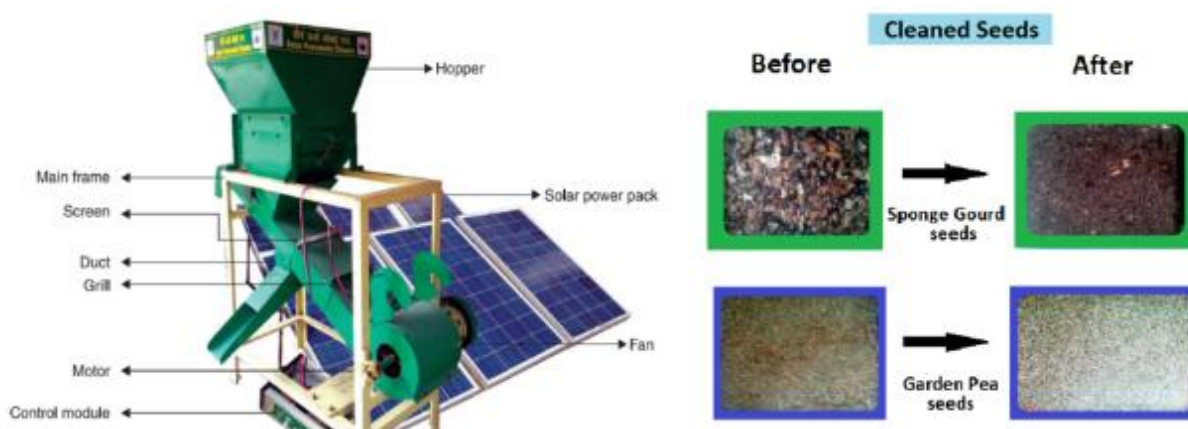
**Figure 25 Mechanization can improve each value chain node**



Source: Author and Adapted from: T. Breuer, K. Brenneis and D. Fortenbacher. 2015. Mechanisation – a catalyst for rural development in sub-Saharan Africa. Rural 21, 2: 16-19. In (Malabo Montpellier Panel, 2018)

78. There is great scope for introducing innovation into production systems that will generate economic opportunity, increase productivity, and raise incomes while addressing food insecurity. Process upgrading can be applied to each step of agriculture value chains to make the sector resilient in the future. This section describes some potential technologies and innovations that could be introduced or strengthened to deliver on immediate needs for production while laying the foundation for enterprise and job creation moving into the future. It goes through each nodes of the value chain to describe how process upgrading can help South Sudanese producers now.

79. The previous section described the research and organizational models that can support the production of quality seed. In terms of technology, machines like the solar-powered pneumatic seed cleaner can help a company or PO produce higher quality seed more efficiently. The machine lowers the operating costs for seed processors by eliminating the cost of fuel; the cost of operating a solar operated cleaner is estimated at US\$0.14/hour with a throughput capacity of 90 kg/hour. This can put the option of processing seeds within reach of producer organizations (with some assistance in capital investment costs) that are interesting in vertical integration (capturing more nodes of the value chain) to increase their revenue. Developed in India, the solar powered pneumatic grain/seed cleaning system achieves a 99 percent level of physical purity of the processed seeds, regardless of their purity when poured in. (IMSCS) (ALKA MISHRA, 2018).



Source: (ALKA MISHRA, 2018)

### ***Production efficiency and reducing drudgery***

80. Even without tractors, farmers can increase their production efficiency with low-tech tools on the farm. These use no or low levels of fuel, and they help a farmer follow good agricultural practices throughout the cultivation process. For example, preparing rows for planting instead of broadcasting eases weeding, surveillance for pests and diseases, and harvesting; however, preparing rows is difficult with a maloda. Human powered machines, like the hand cultivator—a no-energy, manually-operated tool that is more ergonomic and efficient than the maloda or hoe. The equipment comes with a tiller and similar extensions that can connect to the cultivator to perform specific functions like weeding. Farmers in India developed an even less expensive version from old bicycles. Known as the *cycle plough*, it is a low-cost option for farmers who cannot afford mini ploughs, bullocks, and tractors. In terms of cost, a pair of bullocks is about 10 percent of the cost of a tractor, and the cost of a cycle plough is about six percent of the cost of the bullocks, and it does require fuel or fodder to operate.

81. Manually-operated automatic seed drills can carry up to 3 kgs of seed and can be used for multi-crop sowing. Again, these help farmers sow in straight lines, which is important to improved production throughout the cropping season and eases the task of weeding throughout the season. The cono weeder and the twin-wheel hoe ease the drudgery of weeding in wet and dry conditions, respectively, and make it plausible to weed more often during the season. One study found improved yield of Costs are very low and maintenance is easy. Using the machine also facilitates good soil aeration allowing for the better root systems. Animal driven equipment offer a more efficient alternative than the human mechanical versions. For example, the plough and seed/fertilizer drill pulled by oxen can clear enough land for a farmer to produce for the market using good agricultural practices (e.g., planting in rows). The drill can distribute 10 kg of seed or 6-8 kg of fertilizer.

82. All these technologies are affordable, relatively easy to use, and require no energy to operate. While they might displace manual agricultural labor, they create opportunities for more skilled job opportunities—e.g., machine operator, mechanic, sales and leasing agent/trader. Some of these could be fabricated in country with appropriate training of current artisans. Existing trader networks can identify source markets for imports and sell the equipment to individual farmers or to POs who can lease them out to members.

**Figure 26 Low tech production equipment**



**Cycle Plough**



**Hand Cultivator**



**Manually Operated Automatic Seed Drill**





Cono Weeder



Animal Driven Seed-Fertilizer Drill



Animal driven plow

83. Alternative technology is progressing sufficiently rapidly that solar powered machines could address these challenges and increase the adoption of farm machinery and increase agricultural production by bringing more areas under cultivation. Solar technology in agriculture is becoming more prominent by the day due to low cost and long life of the equipment. This innovation is vital for the development of agriculture and innovative models, such as pay-as-you-go, make it easier for low-income farmers to afford the solar-powered machinery.

### ***Access to water in the right amount at the right time***

84. South Sudan does not lack for water, but farmers are challenged by having the right amount of water at the right time. Depending on the crop, water is a critical input before sowing, within weeks of sowing, closer to harvest. Some crops need moist soil for sowing, others need dry soil that is wetted shortly after sowing. Being left to the vagaries of the weather has one of the biggest impacts on production in the country. With few irrigation command areas in the country, farmers either resign themselves to the vagaries of the weather or they can use pumps, usually run on diesel. There are several technologies for irrigation that require gravity, human power, or solar energy to irrigate farm crops.

85. The *treadle pump* is already being used introduced in various locations. They are inexpensive and are easy to install. Operation is straightforward, the pumping is controlled by foot levers that an individual operates. However, these are labor intensive instruments that provide relatively little water for the energy expended. In a country affected by widespread food insecurity and malnutrition, the physical exertion may be beyond the ability of some populations. It is only suited for small plots.

86. Another technology that could be used for smaller plots, like vegetable gardens, is *gravity drip irrigation*. The containers can hold water pumped from a tubewell or they can hold captured rainwater. The systems use hoses for drip irrigation, which provides a more efficient use of water and allows for delivery of water directly to the plant.



Example of a treadle pump



Gravity drip irrigation



Solar Irrigation pum

87. *Solar-powered irrigation pumps* have the potential to provide enough water for larger plots for farmers who are not cultivating in an irrigation command area—i.e., most farmers in South Sudan. The pumps should be combined with water efficient technology, such as drip irrigation or sprinklers, as well as education on water management and appropriate irrigation for crops to avoid two common problems: (a) over-exploitation of water resources; and (b) over irrigation of plants that can lead to microbial growth.

88. As with the other technology, demand for irrigation solutions creates opportunities for entrepreneurs to manufacture or import and trade in irrigation equipment near high-production areas. Supporting the technology will require trainers, installation and maintenance technicians for the solar panels, the pump, and the other equipment.

89. POs can also support the introduction of the technology and use it as a source of diversified income. The Dhundi Saur Urja Utpadak Sahakari Mandali (DSUUM) solar cooperative in India was established in 2016 with the help of the International Water Management Institute (IWMI) to support solar powered irrigation. DSUUM started with six farmers in Dhundhi village of Kheda district of Gujarat state, where farmers had no previous access to grid-electricity and irrigated using diesel pumps. Each farmer invested around ₹54,000 for solar panels, pumps, and a micro-grid. The project provided initial funding to set up the solar pumps. The farmers irrigate their fields using the solar pumps and sell water for irrigation to other farmers in the area at half the cost of pumping with diesel. They also sell surplus power to the Madhya Gujarat Vij Company, Ltd. The farmers' annual incomes have jumped from ₹30,000 per year to ₹130,000 (Chandra, 2018).

### ***Post-Production and Processing***

90. Agro-processing adds value to the primary product by improving its usability, shelf-life, nutrition, or by creating new products from multiple inputs—e.g., cassava chips, energy bars, biscuits, etc. All processes add value to the primary input—e.g., vegetable oil, flours, dried products, etc. Agro-processing can also reduce post-harvest losses, and—more importantly—it creates sustainable jobs can bring development to a rural area and check rural-to-urban migration. Simple value-addition can be achieved through grading, packaging and branding a product with care and systematic handling. Value-addition is achieved through an efficient marketing strategy which help identify the value-added products in demand. (Prakash)

91. The agro-processing industry has yet to develop fully and is predominantly in the hands of small-scale processors and farmer-processors. Farmers in South Sudan have adopted simple crop processing or preservation techniques with support from NGOs, donors, and MAFS. This includes producing maize and sorghum flours, cassava chips and cassava flour, shelling of groundnuts, and edible oils. Maize, sorghum, and cassava flour processing units are the most common mills in South Sudan.

92. Private ownership models include sole proprietor and cooperative models. For example, Agro-Plan, a vegetable oil producer, and OBI Millers, a producer of high-quality cassava flour, are owned by progressive farmers who received support through a SPARK business support program. Savannah in Kajo-Keji and Ngindo Millers in Yambio are cooperatives that own and operate processing units. The 38 farmers of Ngindo Cooperative benefited from the Emergency Food Crisis Response Project, which provided a maize huller to grind their maize at reduced prices. They quickly entered into a contract with a buyer in Juba to provide maize flour branded to the cooperative.

93. Several programs in South Sudan have introduced post-harvest processing technologies to farmer groups, and as investments progress in the country, solar powered options should be considered due to their low operating costs. They are easy to operate and can produce flour from raw agricultural produce. The corn huller cum flour mill, can produce more than 200 kg of corn flour per day from dried corn cobs. The multi-feedstock flour mill can produce fine to course grained flour and process a range of other grains including soy bean, sorghum, other cereals, and dried root vegetables such as



cassava. The standard system can be upgraded with 30A control unit to accommodate up to eight solar panels to produce more than 400kg of corn flour per day. It comes with 4 x LED tube lights, 12V lighter socket outlet and mobile phone charging kit. The prices are around US\$900. The power generated by the solar PV system can also be used to provide household power. The village lamp lighting can extend the working hours until night time and thus provide an opportunity of additional income for South Sudanese.

94. FPOs and cooperatives can come together and invest in agro-processing units and set up solar mills in their areas, which would not only generate good income by adding value to their raw produce but also make them self-sufficient and sustainable. The challenge of higher initial capital can be addressed by group funding and the increased processing capacity of the central processing units could fetch good profits due to economies of scale.

95. The **Presidential Solar Milling Plants Initiative in Zambia** was initiated by Zambia Cooperative Federation (ZCF) and funded by Zambia Development Bank. Since 2015 Zambia's Government has been installing hundreds of small solar-powered mills in rural areas to lower the price of staple foods by reducing processing and transportation costs. The plants are completely solar powered units for processing flour from various grains.

96. The mills are combined with a single borehole solar pump for irrigation and have the capacity to produce two metric tons of maize flour. In addition to more affordable water for farmers and flour for households, the plants have also created jobs. The establishment of solar milling plants has also enabled farmers sell their maize at their door steps than having to travel long distances. (Miller Magazine, 2018).

97. The solar winnower/dryer is an energy-efficient machine for winnowing threshed agricultural produce. It is also useful if there is a lull in winds used to dehydrate fruits and vegetables with forced circulation of air. The system comprises a photo voltaic module, a compatible winnower, a pre-air heating tunnel, and a specially designed solar drying cabinet with proper interconnections to use the fan of the winnower for enhanced air circulation while dehydrating the produce. When used as a winnower, it can produce 35-50 kg of cleaned grains/seeds from raw produce in one hour. It can also be used to dehydrate different types of fruits and vegetables in less than half the time of sun drying (MeitY, 2019).

### ***Safer Storage***

98. Inadequate storage infrastructure is a major cause of South Sudan's food because the lack of facilities leads to post-harvest losses ranging from 15 to 50 percent. Permanent storage facilities are in severe shortage; most storage solutions are temporary and mobile units. Near-farm storage is usually a traditional open hut made up of thatched straw, wood, and clay/mud. Beyond the traditional, there are three main types of storage facility available in South Sudan: government run-storage facility (concrete);

commercial storage facilities, such as concrete warehouses; and humanitarian storage facility such as mobile storage.

99. The commercial sector has realized the need for storage facilities and is ramping up investment. There has been an increase of private warehouses and storage facility in major towns. These warehouses are usually rented by NGOs and humanitarian aid organizations to store imported food supplies, medicines, etc. Humanitarian agencies also use mobile storage. Cold chains remain underdeveloped due to lack of capital investment and poor condition of transport infrastructure. However, several commercial operators are currently developing their capacity to provide a complete cold chain solution. Currently, charcoal coolers are the only available option for cold storage units but have a limited presence. (Logistic Cluster, 2018)

100. There are several low-tech (no electricity) options that could be imported from neighboring countries to help farmers preserve their produce until they can get it to market. Examples include multi-layered, air-tight hermetic bags that deplete O<sub>2</sub> and produce CO<sub>2</sub> to restrict pests. These cost about USD \$2-3 and are available in Kenya. More expensive, less movable options include metal silos of galvanized iron that are hermetically sealed and have a capacity of 540kg. Heavy molded plastic containers are durable and air-tight, but they are cheaper than metal silos and have a lower capacity (100kg).

101. These technologies can increase storage time by preventing air and moisture from reaching the produce, which leads to mold contamination and the risk of aflatoxin contamination. It also protects grain from rodents and other pests while minimizing the use of pesticides, which are in short supply and affect food safety. Other equipment like solar dryers, tarps, and other protective layers for drying on concrete pads can also reduce post-harvest losses with (Intellectap, 2017).



102. There are more complex technical solutions, including solar-powered on-farm storage that could benefit traders or producer groups, especially horticulture producers. Micro-climate tents provide affordable and low-energy on-farm storage with a capacity of 200 -1000 kg for fruits and vegetables that could benefit the growing number of horticulture producers in South Sudan. The tent creates a protective microclimate powered by 10-watt solar panel. It increases the humidity to keep produce cell structure intact and ozone sterilization to reduce mold growth (Wakati, 2018). Portable cold storage units are being used by smallholder farmers in India. That have back-up power for 30 hours and can be easily transported from one farm to another. Analysis shows that the investment in a unit reaches breakeven point after two years; generally, farmers realize over a 40 percent increase in their profits (Ecozen solutions, 2018).



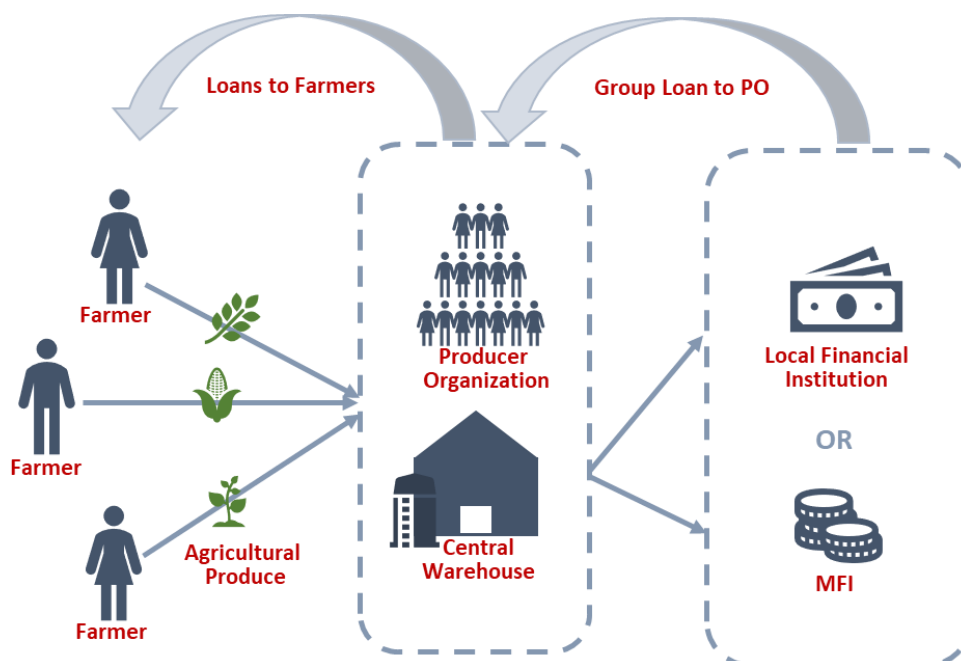
103. Looking to the future, a more formal system that provides storage and access to finance is the warehouse receipt system (WRS). In a WRS, farmers deliver their goods to a warehouse, which issues each farmer a receipt. The receipt can then be used by farmers as a negotiable item—they can trade it, swap it, or use it as collateral. The WRS model widely used in Sub-Saharan Africa countries is called the Warrantage

System. Under this system, a farmer organization builds a central warehouse facility. The produce of farmers is collected in the central warehouse and used as a collateral by the farmer organization to apply for the group loans, thereby increasing access to finance for additional production.

104. In Niger, the warrantage system has significantly decreased post-harvest losses and increased agricultural exports. This has helped Niger to quickly improve its economic condition, despite being one of the poorest countries in the world. A producer organization (PO) at the group, cooperative, or federation level decide with their members to make group loan requests to a lender backed by the bulk of cereal, groundnuts, or peas collected from member farmers in the warehouse. The PO builds simple but safe warehouse to store the stock, negotiates and signs a loan contract with the lender, and disburses loans to individual farmers based on their contribution to the stock.

105. The group loan received is equal to about 70-80 percent of the current market value of the stock. Loan maturity is usually 4 months with an interest of 2.5 percent/month. The warehouse has two locks, one key going to the PO and the other to the lender. Due to a weak contract enforcement framework prevailing in the country, lenders assess borrowers based on future cash flows to be generated by the stock, as well as their character and past track record. The PO can be any cooperative or group of farmers. The lending organizations are usually local micro-finance institutions.

**Figure 27 Warrantage System in Niger**



106. The model has become popular to the extent that all MFIs in the country offer this scheme, and it represents an important share of the credit portfolio. The number of rural households under financial inclusion has been increasing over the years with an estimated penetration rate of 5.3 percent. ( Salmou Hassane, Fatouma Déla Sidi, 2014).

### ***Marketing & Distribution***

107. Even before the conflict markets were under-developed and not well integrated. A study by the World Bank in 2017 found that markets in surplus areas (Greater Equatoria) were not integrated with



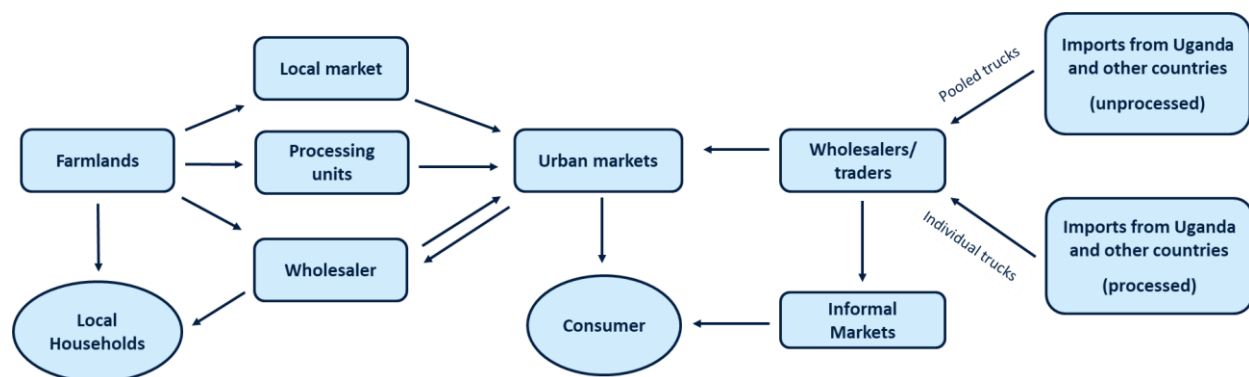
markets in deficit areas (Greater Bahr el Ghazal and Greater Upper Nile). Poor transport and lack of storage were two of the major reasons for this. The war has largely destroyed what markets there were. There are three primary types of markets currently existing in South Sudan:

- Rural primary markets located in villages and often held on a periodic basis;
- Rural assembly markets located in agricultural surplus areas; and
- Urban retail markets: serving consumers in main town and cities.

108. The rural primary markets are little more than a small collection of mud hut shops serving a cluster of villages. Disrupted local production has meant that they rely on supplies and traders coming from urban markets.

109. Local agricultural production is only about 10percent of the volume sold in the country's markets, where imports from neighbouring countries, especially Uganda, dominate. Smallholders largely what they produce, or they sell to neighbours or in the rural primary markets. Large farmers and producer groups sell down the value chain to traders or wholesalers, or to processing units.

**Figure 28 Distribution and marketing channels in South Sudan**



110. As investments are made in other nodes of the value chain, markets may begin to respond. For example, producers with surplus have sold to WFP when other local buyers were not available. Still, but they will most likely need priming to re-establish.

111. South Sudan's markets are marked by impermanence and low levels of investment and lack of transparency in market transactions. To address this, the Government in partnership with FAO have developed a crop and livestock market information system named CLiMIS. This MIS network has been existing in the country for 4 years and it involves monitoring of the food security and nutrition situation by collecting and analyzing information on food security indicators, crop production data, market data, livestock data, rainfall data, etc. Similarly, RATIN (Regional Agricultural Trade Intelligence Network) is widely popular in East African nations and is a quick way for farmers, traders and processors to get regional market information by using mobile phones or computers. In South Sudan, RATIN has access to five markets—Yambio, Yie, Juba, Morobo and Magwi. This innovation is beneficial for South Sudan as it heavily depends on imports from East African nations

## IMPROVING SUPPORT SERVICES TO AGRICULTURE

112. Agriculture depends heavily on many other sectors to be productive, and it will be the driver for growth in those sectors as the economy moves from a war to peace footing. Chief among these are transport for access to input and output markets, power for production and processing, and finance for all nodes in the value chain. This section reviews options to increase the availability of these services as quickly as possible as the larger systems are established.

### *Transport Infrastructure and Services*

113. Transport, or more specifically the construction of transport infrastructure, will most likely be the largest source of unskilled and semi-skilled jobs in the near term as the peace is implemented. South Sudan's road density is the lowest in Africa—15 km per 1000 km<sup>2</sup> of arable

**Table 1 Road density in South Sudan**

Category	Paved Road Density	
	By Area (km/1000 km <sup>2</sup> )	By Population (km/million)
Sub-Saharan Africa	16.8	533.0
Low income fragile states	9.9	275.0
South Sudan	0.2	15.0

land (table 2). Before the conflict began in 2013, there were approximately 12,642 km of roads, 4000 km (3 percent) of which were all weather gravel roads. There are 192 kms of paved national road—in Greater Equatoria Region—and 65 km of upgraded urban roads in Juba (Central Equatoria), Wau (Northern Bahr el Ghazal), and Malakal (Upper Nile). The remaining are earthen roads and tracks.

114. South Sudan's rainy season runs from April to October, meaning that most of the country is largely inaccessible for the much of the year. Poor road conditions translate into higher food prices for South Sudanese consumers. According to one World Bank study, at least 16 percent of the total cost of food and beverages in South Sudan is due to transport problems. Freight tariff rates are as high as US\$20.0/ton-kilometer, which is almost three times higher than the rest of East Africa.

115. The implications for agriculture value chains is significant in terms of impact, strategy, and enterprise/job potential. Transportation networks and transport services impact every element of agricultural value chains. In the short to medium term, agriculture producers will be limited by their ability to get to lucrative markets, and a focus on closer markets will dominate. For example, focusing transport investments around Aweil, or Torit, or Wau to get more food in those local markets can start generating jobs and enterprises in the local area that can expand as routes are opened and secured.

#### **Box 1 A farmer in conflict in need of transport**

A 2015 profile of a farmer in Bor illustrates the costs of lack of transport services. The farmer, Paul Alim Amuol, operated a 4.5 hectare farm with over 800 fruit trees and vegetable fields. Despite comparatively high productivity, his market was limited to the local community because did not have access to a truck to go the 200 kms to the markets in Juba. This was a farmer in the former Jonglei state where the conflict was quite pronounced who was not only producing, but willing to pay for transport services—either vehicle hire or vehicle and driver—to help him reach markets. If there are profits to be made, there can be an enterprise response, and with each enterprise at least one job is created.

Source: (Achiek, 2015)

116. Outside of infrastructure investment, farmers and traders need transport services—enterprises that increase farmers' access to markets and services. Entrepreneurs or POs could provide transport services, starting within a limited accessible area and building out as roads improve. A range of services could be on

offer—a vehicle, or vehicle + driver, or vehicle + driver + security for hire to get to market. These are services with a strong growth trajectory as transport corridors open.

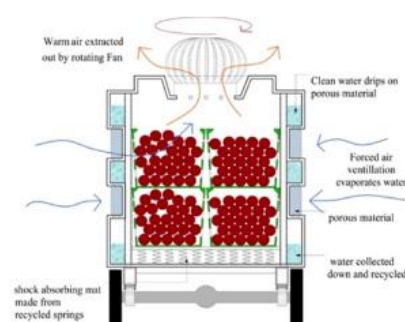
117. Where cars and trucks cannot access, there are alternative vehicle options. Animals that are used for traction—which appears to be growing in the country—can also be used for transport. Boats are increasingly being used during the rainy season. Three-wheeler vehicles are steadily increasing in Sub-Saharan Africa and could provide a more affordable and flexible transport option for producers who to navigate roads in poor condition. Three-wheelers are cheaper than trucks (generally under US\$2000 each), which makes them a better option in income deprived areas. The Government of Ghana introduced 3-wheelers in a remote district of the country in 2015. As a results, about 97 percent of the farm families were able to access transport within 24 hours of harvest, up from 50 percent beforehand. This contributed to the 45 percent of families who reported no produce loss due to delays in getting to market. The tricycles enabled farmers to move more of their produce than in previous years, and at a cost savings (Malabo Montpellier Panel, 2018).

118. As the country’s transport system develops and incomes rise, entrepreneurs or POs may be able to invest in more advance transport technology as shown in box 4.

#### Box 2 Future Look: the Fruiti Cycle

Looking to the future, as producer groups or farmers accumulate income and develop their enterprise, **solar and electric options**, such as the Fruiti-Cycle, an electric 3-wheeler vehicle invented and manufactured in Uganda, could become a low-energy, high value option. The electric motor is charged by peddling, and the cycle includes a solar-powered evaporative cooling unit that can be detached in the market to store produce for up to five days. Fruiti cycles offer the logistical advantages of 3-wheelers, plus they require no diesel, which cuts significantly on operating costs over time.

Fruiti-cycles can carry up to 300 kg of produce at a time and make 1-5 trips to markets within a radius of 80 kms of a farming area. It costs about US\$1200 or three times less than the motor-tricycles in the market. Fruiti-cycle also has an after-sale service in the form of an SMS phone application system to help farmer/s access market information about prices and locations to increase market accessibility (Fruiti-Cycle, 2018).



Source: (Global Innovation Exchange, 2018)

#### *Access to Power*

119. Doing Business 2019 ranks South Sudan 187 out of 189 countries on access to electricity due to reliability of supply, time, and cost constraints. There is no national grid and only 8.9 percent of the population have access to grid electricity. South Sudan Electricity Corporation provides grid electricity through diesel powered generators and currently to only 8.9 percent of the population. This accounts for just 30MW of the 2100MW generated in the country; the rest is provided by private suppliers using diesel generators. Electricity from diesel is expensive—\$1.1/kWh in South Sudan compared to \$0.18/kWh in other Sub-Saharan African countries. In rural areas 90 percent of the population rely on firewood and biomass for energy, which contributes to natural resource degradation while contributes to greenhouse gas emissions.

120. In agriculture, electricity is vital for value chain mechanization—e.g., irrigation pumps; cold chain storage for horticulture, livestock products, vaccines; and processing machinery for value addition. The



best option to meet those needs now and in the foreseeable future is solar power. South Sudan gets approximately 12 hours of sunshine per day throughout the year. The cost of tapping that power has dropped dramatically, and systems now have a life-span of more than twenty years. The newest technology can also be relatively easily installed in remote areas. To ensure sustainability of solar initiatives, and to create sustainable livelihood options, new investments should be coupled with significant training, especially local youth for jobs in installation, maintenance, and repair of systems. Agro-dealers and POs or cooperatives could operate solar equipment sales and service outlets—either as independent retailers or as franchisees of larger firms.

121. ‘Pay As You Go’(PAYG) model is becoming wide-spread across East Africa and is a sustainable way to bring electricity and mobile banking to households in rural South Sudan. In this business model, a company essentially rents consumers a solar home system that comes with a battery, a charge controller, a solar panel, LED bulbs and a mobile charger. Basic systems have enough power to charge phones and lights, and larger ones could power small appliances such as radios or TVs. Equipped with a mobile charging facility, people can adopt to wider use of basic mobile phones, which are widespread in East Africa. Thus, ‘Pay as you go’ model will not only fulfill the energy need, but also help in facilitating mobile banking, which could bring in a financial and agricultural revolution in South Sudan.

122. Off-Grid AC Solar panels have been successfully working in South Sudan and have a huge potential to become a major source of power. The solar-powered radio station in Turalei in Greater Bahr el Ghazal helps Internews power a network of local radio stations across the country (internews, 2018). The Akuach water yard switched from a diesel generator to solar power in 2014 when ICRC renovated it. The system now supplies water to 15 water kiosks across Rumbek (International Committee of the Red Cross, 2018).

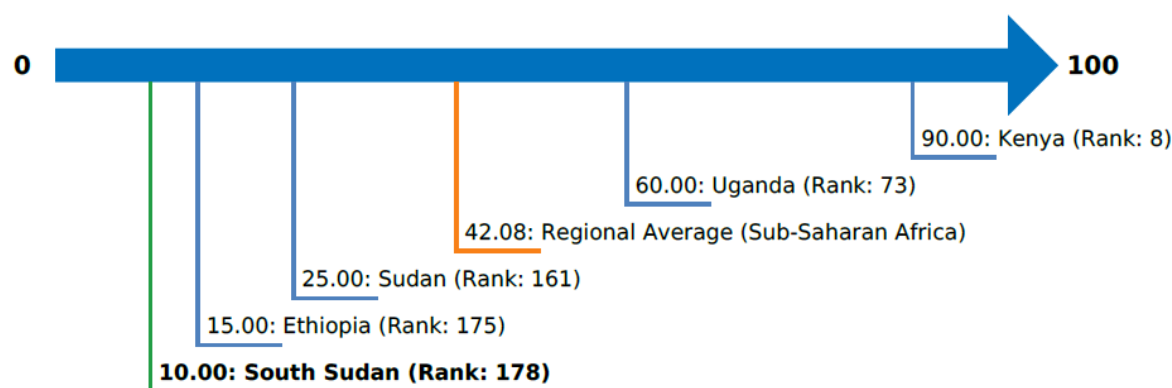
123. The immediate need among farmers is for solar powered irrigation pumps, as discussed earlier. However, as individual incomes rise, some farmers may be able invest in a mobile photo-voltaic (PV) unit. This is a mobile power system that can be used for a variety of domestic, agricultural, and other activities—such as, operating a churner to extract butter, a blower, a winnower, etc. A unit could be particularly useful in isolated locations where grid electricity does not reach and people cannot afford to buy multiple units. These have become popular in western India and have the potential to be used on a custom hire basis in South Sudan as a cost-effective way to access power ( MeitY, 2019).



### ***Access to Finance***

124. South Sudan is working to expand its financial sector, but at a slow pace. From 2011 to 2015, the number of commercial banks increased from 10 to 29, and bank branches increased from 42 to 75. This number has reduced with the conflict. As of February 2018, South Sudan had 10 microfinance that had reached only about 5 percent of the potential clientele in the capital (Juba) and less than one percent of the potential clientele in the entire nation (Fortune of Africa, 2018) (IFC,World Bank Group, 2012) (World Bank Group, 2019). As a result, South Sudan has one of the lowest rankings on access to credit in the region.

Figure 29 Getting Credit in South Sudan and Comparator Economies, Doing Business Score



(World Bank Group, 2019)

125. Only one percent of the population have bank accounts in South Sudan. Financial sector is under-developed due to various intrinsic factors such as scarcity of skilled and experienced managers, lack of regulatory framework, lack of security, and poor transport facilities. Recent market demolitions, limited access to funds, high cost of operation in the country had made the financial sector even weaker. As the financial sector rebuilds and the ICT sector expands, mobile money offers a secure and convenient model to get financial services to farmers and rural communities.

126. **Kenya's mobile banking model**, for example, has made it possible for the proportion of the adult population in Kenya with access to formal financial services and products to rise from 27 percent in 2006 to 75 percent in 2016. **M-pesa** is Kenya's most popular mobile money service that now has more than 30 million customers in 10 countries and over 110,000 agents handling deposits and withdrawals around the country (World Bank, 2018). M-pesa has impacted other mobile-money services in Kenya according to a study by MIT. It has helped an estimated 185,000 women move from farming to business occupations in Kenya. A financial services model like this in South Sudan could help people employed in primary cropping move further up the value chain by opening buildings in the agriculture and food sector or to move into the service sector in their locality. The platform can be a game changer in a conflict hit country where sending money by roads is unsafe and costly (IFC, World Bank Group, 2012) (Ventures Africa, 2018).

127. **Group lending models** can start immediately to introduce the practice of savings and financial planning even before the financial and ICT sectors reach rural areas. These models can help to re-establish trust and confidence among the rural population. It is common in war affected areas for people form groups or alliances according to their political, ethnic, or other inclination. The group acts as protection and a source of information to the group members. Financial intermediation can be channeled through these groups with proper facilitation. Holding frequent meetings discourages the participation of untargeted individuals, and practices for transparency and accountability minimize collusion between the staff of financial intermediaries and group members. Groups can also screen potential members to ensure that members are trustworthy. In India, self-help groups self-select the members based on trust relationships, so that saving and inter-lending happen more naturally. Through frequent meeting, groups provide incentives for members to repay their loans and exert necessary social pressure on defaulters.

128. **Bolivia's BancoSol** is an early example of an MFI that focused on lending to the poor without requiring collateral and targeting self-employed entrepreneurs in the country. Four years after inception in

1996, BancoSol had 71,000 borrowers with a total loan portfolio of US\$47.4 million. The repayment period for their unsecured loans ranges between 12 and 24 weeks. Loans go to solidarity groups of four to ten members instead of individuals. The group divides the loan among its members, who are jointly liable for each other's loan. BancoSol's lending technology operates on low cost repayment incentives that have focused on contract design and enforcement rather than intensive screening and monitoring. The success of group lending was noted in territories that are coming out of conflict and whose socioeconomic and political arrangements mirror those of South Sudan.

129. As Colombia recovered from one of the world's longest civil wars in the world, **Opportunity International**, a global microfinance network, partnered with two local organizations, the Asociacion General de Apoyo a la Pequena Empresa and Oportunidad Latino America Colombia. These organizations offer microfinance to improve the livelihood of internally displaced persons (IDPs) (McNulty, 2005). They employ three lending methodologies: trust groups, solidarity groups, and individual lending. The trust group methodology is of particular relevance because it combines financial services and social interventions such as health awareness and self-governance (McNulty, 2005). The groups, meet once a week to share personal and business advice, receive financial training and vote on loan-related topics. Trust groups elect leaders and build a safety net for each other by guaranteeing each other's loans (Opportunity International, 2014). When a loan is repaid the money is then available for the next person. The method has led to a loan repayment rate of 98 percent.

130. **The Grameen Bank model** is known worldwide for its innovative lending to the poor, who would otherwise have no access to credit from formal lending institutions. The practices collateral-free lending that relies on peer monitoring and social capital to enforce loan repayment. As of December 2017, Grameen had 8.93 million borrowers, of whom 97 percent were women. Grameen's group lending methodology works with peer groups of five members. Unlike, BancoSol, loans are granted to individual members of the group, but the group is liable for repayment. If a member defaults, the other group members cannot get a loan until the outstanding loan is repaid. Peer groups are aggregated into a community called a "center", comprising six to eight peer groups. The center monitors repayments and ensures transparency in transactions to prevent potential collusion among selected groups. Grameen Bank loans less than US\$100/individual/year, which is repayable in 50 weekly instalments. The loans are used to finance business activities identified by peer group members. The selection of business activities and the loans received are discussed at the center meetings.

131. There are many financial access models, which can be elaborated in other studies focused on financial access. This selection serves to illustrate how different organizational models and technology can be used to increase access to finance. As the agriculture and food sector develops in South Sudan, it will be one of the primary sources of demand, and therefore, of growth in the financial sector of the country.

## F. The Policy Environment for Agriculture

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132. Within the IDRC framework, upgrading the enabling environment—improving the policy and regulatory system that governs value chain operations to increase competitiveness and inclusiveness—is another strategy for value chain upgrading. In South Sudan, the Ministry of Agriculture and Food Security (MAFS) is the main authority responsible for transformation of agriculture from a subsistence system to market-oriented one while ensuring food self-sufficiency, poverty reduction and contributing to national GDP. MAFS’ remit includes drafting policies pertaining agricultural production, availing agricultural inputs and credit facilities at affordable costs, rehabilitating/expanding rural infrastructure, providing research and extension services and market linkages, and developing institutional and human resource capacity.

133. Between the time South Sudan became a country and the time it fell into civil war, there was only two and a half years to set up completely new laws and regulations necessary for a robust food system. However, in that time, the country also suffered economic crises resulting from the 2012 blockade of oil exports that saw heavy constraints on public investment. As a result, the enabling environment for agriculture has not been established, though many of the component parts, which are described below, have been created by MAFS and other technical agencies.

### OVERVIEW OF THE POLICY LANDSCAPE

134. The **South Sudan Water Policy**, which was drafted in 2007, defines access to sufficient quality water as a human right. It provides for the establishment of water management institutions at the central, state, and county levels and lays the foundations for sub-sector strategies, including for water resources management. The policy also underpins the use of water resources in accordance with international agreements and obligations. It calls for Private-Public-Partnership (PPP) in water sources management and water supply in which local communities participate in the management and maintenance of water sources. There is no specific policy for irrigation and drainage, but the Ministry of Electricity, Dams, Irrigation and Water Resources’ developed an Irrigation Development Master Plan (IDMP), which has been developed as part of the Comprehensive Agriculture Master Plan (CAMP), which is discussed below.

135. The **Local Government Act (2009)** establishes the powers, structure, and functions of local governments, which includes land administration and management and broad functions to improve agriculture and community livelihoods. It also defines the roles and responsibilities of traditional authority councils in dispute resolution, which has implications for agriculture investment programs.

136. “**South Sudan Vision 2040: Towards Freedom, Equality, Justice, Peace and Prosperity for All**” is the foundational document for all government policies. Drafted in February 2011, the Vision acknowledged the need to diversify the economy away from oil and noted the huge potential agriculture and animal resources among other sectors. The Vision has yet to be officially adopted by the government. recommended that the government adopt and implement the Draft Vision 2040 as soon as possible. It should also strengthen environmental governance by increasing the capacity and financing for the Ministry of the

Environment and Forestry, which would help to ensure the country's natural resources are both protected and used sustainably.

137. **The National Agriculture and Livestock Extension Policy (NALEP)**, which was drafted in 2011, promotes extension services as critical to helping households move from dependency syndrome to sustainable production by rural farm households. The NALEP promotes pluralistic and participatory extension services, including private extension. Consistent with the CAMP and other policies, it advocates for research priorities and extension messages to be driven by farmer needs. It also calls for developing human resources to meet the emerging technical needs of farmers as well as cross-cutting issues like gender and environmental impact.

138. **The Agricultural Research Policy** was finalized in July 2012 with the objective of promoting the generation, acquisition, adaptation, and dissemination of new knowledge and improved technologies and policies necessary for transforming farming in South Sudan from subsistence to commercial. The policy would establish (a) the National Agricultural Research System with demand-driven public research institutions serving producers; (b) an agricultural research network based on the country's six agro-ecological zones; and (c) a semi-autonomous South Sudan Agricultural Research Organisation (SSARO) to coordinate all agricultural research in the country. The policy remains to be approved through the Government approval process.

139. **The Agriculture Sector Policy Framework for 2012-2017** outlined an ambitious agenda for policy and program development. This included collaboration with the Ministry of Environment and Forestry on a climate change strategy and green agriculture policy. The two ministries did collaborate on developing the National Adaptation Programme of Action. Plant protection and management of genetically modified organisms featured strongly in the policy framework including recommending a law to regulate the importation and use of genetically modified organisms in the country and development of a plant genetic resources conservation programme and a biosafety framework. Other priorities included mainstreaming gender in agriculture, preparing a dry land initiative and an irrigation and drainage policy.

140. MAFS drafted a **Seed Policy** in July 2012 and a **Seed Bill** in October 2013. The policy and bill would establish: (a) the Seed Council to guide and supervise policy-making; (b) the Seed Testing and Certification Agency to control quality of seed in the country; and (c) the Directorate of Plant Protection to effectively carry out the necessary inspections. Neither has gone through the Government approval process yet.

141. The erstwhile **Ministry of Animal Resources and Fisheries (MARF)**<sup>6</sup> produced a **Policy Framework and Strategic Plan 2012-2016** that promoted investment in training capacity for animal husbandry best practices, range and livestock research, water development for livestock use, wildlife conservation and management, community based natural resources management for drought preparedness. Importantly, it also sought to promote the criminalization of cattle rustling and sensitize and train communities on issues related to risks of cattle rustling.

142. The ministry also produced a **Fisheries Policy for South Sudan 2012-2016** that sought to maximize production and avoid overfishing, while preventing the destruction of fragile wetlands. The policy intended to ensure compulsory environmental and social impact assessments for all development

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<sup>6</sup> The ministry is now called the Ministry of Livestock and Fisheries.

investments that affected fisheries, including large-scale aquaculture development. It also committed GRSS to observe all international treaties and protocols that protect fishing communities and fish habitats. The Fisheries Bill of 2012 was the vehicle for implementing the policy. It provided guidance on sustainable aquaculture development and production, outlined the strategy for attracting private investment to aquaculture and sought to promote integrated agriculture/aquaculture production in rural areas.

143. South Sudan also has a **National Nutrition Policy** and has been a member to the Scaling Up Nutrition (SUN) initiative since 2016. SUN seeks to achieve nutrition justice and an end to malnutrition in all its forms. In early 2019, SUN facilitated a workshop hosted by the Ministry of Health in collaboration with WFP and Save the Children on behalf of the UN Network and Civil Society Alliance. MAFS was among the participants from government, civil society, parliament, and academia, and participants agreed on strategic priorities for nutrition and to establish a task force to develop a concept note and a roadmap towards a Multi-sectoral Nutrition Action Plan for South Sudan (Scaling Up Nutrition, 2019). There is a **Food Security Council** under the Office of the President, responsible for coordinating resources, supervising, planning and conducting monitoring and evaluation of food security-related activities. Since its formal launch in 2014, it has not yet started any activities. It could be that the SUN initiative could reactivate this council as the task force called for in the 2019 meeting.

144. The **National Environment Policy (passed April 2016) and Environment Protection Bill of 2014** promotes sustainable development and provides guidance on mainstreaming the environment and natural resource management in development programs. The 2018 *South Sudan: First State of Environment and Outlook Report*, produced by the Ministry of Environment and the United Nations Environment Program with funding from the Government of the United Kingdom outlines the primary activities in support of environmental protection in the country and the role of agriculture in maintaining the environment.

145. The Ministry of Environment has developed an Environment Policy Framework and Environmental Bill that is expected to regulate the exploitation of natural resources and all forms of socio-economic development in the country. Neither the Environmental Policy nor the national development plan mentions climate change adaptation as urgent.

146. South Sudan is a signatory to the Paris Climate Change agreement. The Ministry of Environment (MOE) and MAFS collaborated to create the 2015 Intended Nationally Determined Contribution (INDC) to the UN Framework Convention on Climate Change (Lamanna, 2019), and Working with UNEP, MOE delivered its National Adaptation Program of Actions (NAPA) in 2017. In addition, GRSS has drafted a disaster risk management policy, and prepared an environmental health policy. These programmes and policies can underpin the development of a sustainable and inclusive low-carbon and green economy that is resilient to climate change and integrate it in national strategies to eradicate poverty. Preparation of the Intended Nationally Determined Contribution is also critical. Effective implementation of these programmes and policies remains a challenge, due to the country's institutional and human capacity weaknesses.<sup>7</sup>

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<sup>7</sup> [https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/country\\_notes/South\\_Sudan\\_country\\_note.pdf](https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/country_notes/South_Sudan_country_note.pdf)

## *Land Tenure*

147. Less than 10 percent of rural communal land is documented, and the rest is informally administered by traditional institutions, whose authority has been considerably eroded by the conflict. Two pieces of legislation exist but have not been enacted or enforced. The South Sudan Land Act of 2009 defines land use and management and sets principles for legal rights to land. It classifies land into public, community, and private, giving owners full rights to use land for livelihood, farming, or cattle rearing in accordance with existing laws and regulations. The Act contains provisions on:

- a. resolving land disputes;
- b. recognizing customary law and practices;
- c. establishing a land administrative system;
- d. encouraging investment;
- e. facilitating the reintegration and resettlement of internally displaced persons, returnees, and other people whose rights to land were affected by the civil war [with Sudan];
- f. promoting a land management system to protect and preserve the environment and ecology; and
- g. guaranteeing fair compensation to anyone who loses the right of occupancy to their land.

148. The act emphasizes equal rights to access and ownership of land for all, but women's rights were still not guaranteed. The main decision-making power lies at State level. Nevertheless, the lack of coordination between institutions at various levels of the government, the lack of capacity and of financial resources undermines their performance.

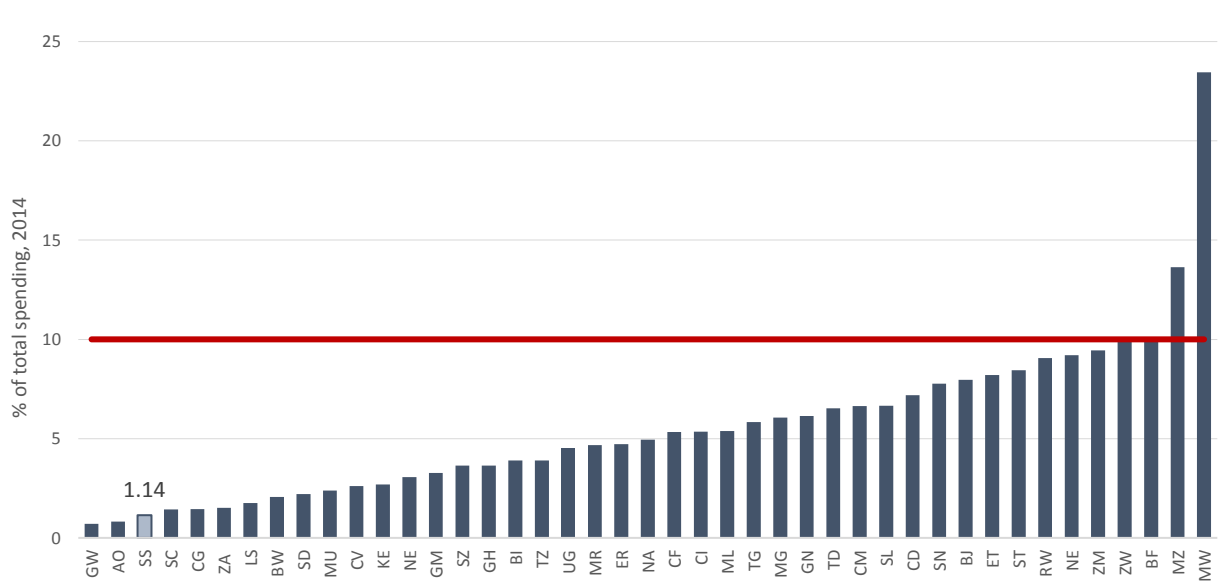
149. The Council of Ministers approved a new draft Land Policy in 2013, but the legislature has not approved it. The policy recommends greater statutory protection for land held under customary tenure through a Community Land Act, but it does not reconcile customary land tenure, individual ownership, and investment and development incentives. Finalizing and implementing the policy, especially the proposed Community Land and Land Registration Acts, is critical to addressing existing policy and implementation gaps. Settling land reform policies and regulations will be a long-term goal that will be critical to achieving transformation of the agriculture sector.

## *Financing Agriculture*

150. The principles enshrined in the **Comprehensive Africa Agriculture Development Programme (CAADP)**, the **Maputo Declaration** (2003) and the **Malabo Declaration** (2014) call for, inter alia, all African countries to dedicate at least 10 percent of public spending to agriculture. The best estimates available show that South Sudan dedicates about 1.14 percent. More important than meeting the 10 percent target, which very few countries have done (see figure 30), is making the right investments in agriculture. GRSS ended subsidies on grain and pulses when revenues from oil declined. In the wake of the 2018 R-ARCSS agreement, investments in agriculture infrastructure (markets, farm-to-market roads, storage facilities) through work for cash programs would help get farmers producing and give a jump-start to local markets. Public investment in the research and extension systems (research centers, training centers, etc.) outlined in the multiple policy and strategy documents for the agriculture, livestock, and fisheries sectors would Given the enormous task of reconstruction and the high costs of food, food-for-work programs for

the able-bodied combined with training to enhance skills—under a social protection strategy—are preferable to generalized subsidies.

**Figure 30 Agriculture spending share of total spending, 2014**



### ***Trade and Markets***

151. South Sudan is still building its trade strategy to support economic growth. Its trade tariffs are low compared to those of neighboring countries; however, non-tariff barriers—such as, lack of clarity among government agencies operating at the border, lack of coordination within the government, multiple taxes levied by different administrative units, unclear customs procedures, and significant paperwork—all increase the cost of importing goods. The country has a set of tariff lines, but they are not entirely known, which makes import duties difficult to predict. South Sudan joined the **East African Community** on April 16, 2016, which can provide structure to the trade reform program in terms of customs, trade, and monetary policy among other things. Also in 2016 (December), South Sudan established a Working Party to prepare for accession to the **World Trade Organization (WTO)**. The conflict delayed progress on accession, but the Working Party met for the first time in March 2019—a positive step forward on the trade agenda (World Trade Organization, 2019). The country is now a member of the **Africa Trade Insurance Agency** and was recently provided \$27.62 million in commercial risk insurance coverage, facilitated by an African Development Bank project (Ecofinagency, 2019).

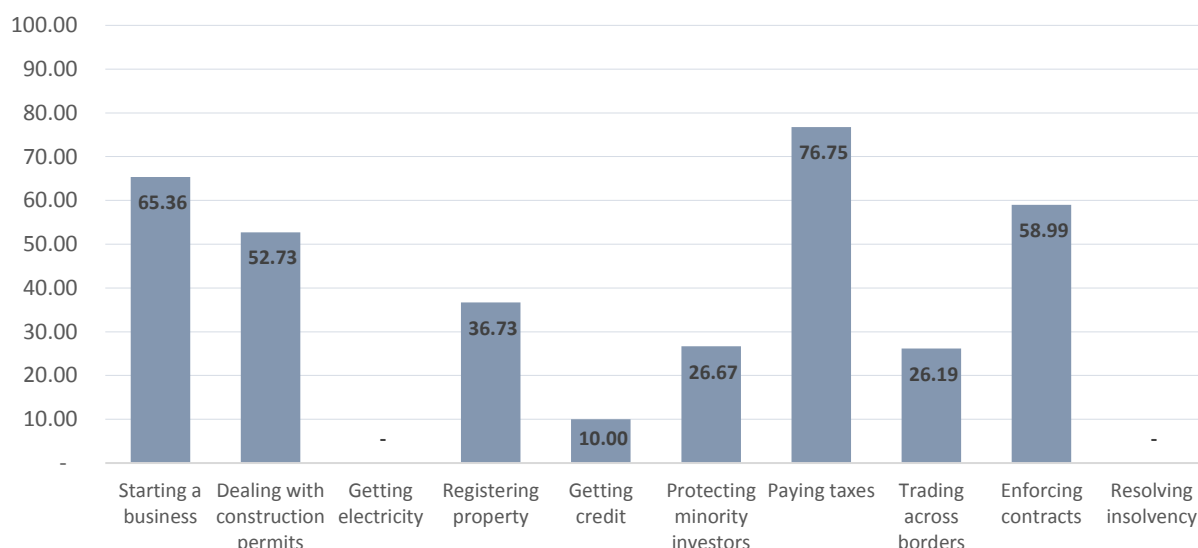
152. South Sudan has several national policy documents on **private sector development**: South Sudan Private Sector Development Strategy; South Sudan Investment Climate Reform Programme; South Sudan Access to Finance Programme; and South Sudan Enterprise Fund (SSEF). However, these are not operational due to the absence of operational framework and lack of resources. These policies and programs can support the development of trader networks to provide not only seeds, low-energy farm machinery/equipment, and access to output markets, but also renewable energy technology, transport technology, etc.

153. The private sector faces many issues that constrain its competitiveness in delivering services, including agricultural services. The Ease of Doing Business 2019 survey ranked South Sudan 185 out of



190 economies based on ten parameters. The country ranks relatively well on paying taxes (score of 66) and enforcing contracts (score of 85). However, the other indicators show the challenges facing the development of the private sector (see figure 30).

**Figure 31 Ease of Doing Business Criteria Scores 2018**



154. The private sector is characterized by small and medium-sized enterprises that focus on the wholesale and retail trade. Companies face various supply-side constraints, including difficulties in accessing finance, expensive energy (the country relies heavily on fuel generators for daily operations), and low direct foreign investment due to weak foreign investor confidence.

## COMPREHENSIVE AGRICULTURE MASTER PLAN (THE CAMP)

155. South Sudan's agriculture sector is anchored by the Comprehensive Agriculture Master Plan (CAMP), which was approved by GRSS in March 2017. It serves as the national agricultural investment plan under the Comprehensive Africa Agriculture Development Programme (CAADP), a regional framework for improving agriculture across all Sub-Saharan Africa. CAACP consists of four pillars:

- a. extending the area under sustainable land management and reliable water control systems;
- b. improving rural infrastructure and trade related capacities for market access;
- c. increasing food supply and reducing hunger; and
- d. agricultural research, technology dissemination, and adoption.

156. Cross-cutting areas such as investing in academic and professional training for agricultural and information and knowledge systems to support strategy development underpin the pillars.

157. The CAMP covers four subsectors—crops, livestock, fisheries, forestry—and describes the sequencing of development themes that can be applied to those sectors, all of which is underpinned by institutional development (figure 32).

**Figure 32 Development themes defined in the CAMP**



158. It also provides prototype project profiles (PPPs) to be implemented over a 25-year time period—CAMP has 110 and IDMP has 152 PPPs. Table 2 lists the PPPs for crops, livestock, and fisheries for reference. The CAMP also outlines the way forward for building human resource capacity and supporting the legislative and institutional frameworks necessary for agriculture sector development. The policy and regulatory framework for implementing the CAMP remains to be created (Kanisio, 2019). The irrigation development master plan (IDMP) is a sub-component of the CAMP that defines agriculture water needs, and it is in process.

159. Establishing sound policy and regulatory frameworks that promote principles of responsible agro-investment are absolutely necessary for the transformation of the agriculture sector. It is the policies and regulations that set the “rules of the game” for commerce, and they will increase the in-flow of investments that can stimulate growth, while simultaneously protecting the rights of local communities and farmers. However, on the continuum from humanitarian support to recovery, resilience building, development, and transformation a strong enabling environment is a preferred but not a necessary condition to get started. In fact, continuous consultations among donors and government officials as investments are made can inform the policy and regulation creation process.

**Table 2 Priority projects for crops, livestock, and fisheries under the CAMP**

	<b>Crops</b>	<b>Livestock</b>	<b>Fisheries</b>
<b>High Priority</b>	<p>IDPs and returnees settlement/resettlement support</p> <p>Quality seed production</p> <p>Subsistence farmer sorghum production</p> <p>Subsistence farmer maize production</p> <p>Subsistence farmer rice production</p> <p>Subsistence farmer vegetable and fruit production</p> <p>Subsistence farmer cassava production and value addition</p> <p>Subsistence farmer peas and beans production</p> <p>Subsistence farmer groundnut production and value addition</p> <p>Promotion of integrated farming for risk reduction</p> <p>Farmers organisation support</p> <p>Farmers and pastoralists conflict resolution</p> <p>Strengthening of extension service delivery</p> <p>Strengthening and establishment of training institution infrastructure</p> <p>Urban and peri-urban vegetable production and marketing</p> <p>National crop pest and disease control</p> <p>Establishment of firm legislative framework</p> <p>Enhancement of laws and regulations enforcement</p>	<p>Grazing allotments and land-tenure</p> <p>Livestock census, disease surveillance, early disease response, and quarantine system</p> <p>National and State livestock policy and legal framework establishment and maintenance</p> <p>Development of livestock marketing</p> <p>Formulation of animal health and disease control plan</p> <p>Enhancement of livestock producer associations</p>	<p>Fisheries and aquaculture law</p> <p>Micro credit for fishing communities</p> <p>Prevention of HIV infection in fishing communities</p> <p>Fisheries information and fisheries resource management systems development</p> <p>Development of urban fish market infrastructure</p> <p>Establishment of fisheries training and research institute</p>

	Crops	Livestock	Fisheries
Medium Priority	<p>Enhancement of animal power utilisation</p> <p>Promotion of market oriented farming</p> <p>Enhancement of private sector agro-input providers</p> <p>Enhancement of tractor hire service providers</p> <p>Tractor operator training</p> <p>Sesame production</p> <p>Fruit and nut production</p> <p>Development of research institution infrastructure</p> <p>Development of research capacity</p> <p>Extension system reform and efficient service delivery</p> <p>Establishment and enhancement of national higher educational institutions for agriculture</p> <p>Establishment and enhancement of agricultural vocational institutions</p> <p>Private sector investment</p>	<p>Creation of animal diagnostic laboratories, early disease response, and quarantine system</p> <p>Development of a central and regional veterinary drug stores</p> <p>Development of feed testing and analysis laboratory</p> <p>Veterinary services delivery</p> <p>Beekeeping extension</p> <p>Dairy production and processing extension</p> <p>Forage crops production</p> <p>Hides and skins processing extension</p> <p>Livestock auction facility improvement and management</p> <p>Livestock harvest facilities improvement and management</p> <p>Meat production and processing extension</p> <p>Pig production extension</p> <p>Poultry production and processing extension</p> <p>Development of livestock extension systems</p> <p>Enhancement of inter-government, donor agencies, civil society, and private sector coordination</p> <p>Livestock public sector institutions capacity development</p>	<p>Private sector promotion of small scale aquaculture investment</p> <p>Small scale aquaculture development and promotion project</p> <p>Development of urban fish market infrastructure project</p> <p>Private sector establishment of feedmills for aquaculture</p> <p>Private sector establishment of ice production facilities</p> <p>Establishment of national aquaculture research and training centre project</p> <p>Fishers and fisheries communities training project</p> <p>Private sector fisheries and aquaculture technical training project</p> <p>States aquaculture training project</p> <p>States fisheries services capacity development project</p>
Longer Priority	<p>National phytosanitary infrastructure</p> <p>Establishment of a national phytosanitary system</p> <p>Quality standards and quality control for agricultural products</p> <p>Tractor assembly plant establishment support</p>	<p>Development of feed mills</p> <p>Livestock identification and traceability</p> <p>Enhancement of demonstration farms</p> <p>Rangeland management</p> <p>Creation of livestock research centres</p>	<p>Private sector promotion of large scale commercial aquaculture</p> <p>Development of fish landing site infrastructure project</p> <p>Private sector promotion of value adding for local and export markets</p> <p>South Sudan national fisheries competent authority project</p> <p>Regional fisheries and aquaculture research project</p>

## G. Conclusions and Recommended Next Steps

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160. With the R-ARCSS, South Sudan could start on a prolonged trajectory of recovery and growth. This gives an opportunity to start making investment in the food sector that take a longer view in terms of outcomes and goals. This paper has tried to show how taking a value chain approach to agriculture investment can not only address ongoing food security imperatives, but also lay a foundation for future development and job creation in the food sector.

### WHAT DOES THIS MEAN IN PRACTICE?

161. For the World Bank, the first step in moving to a value chain approach is improving collaboration with donors, GRSS, the UN, and NGOs to ensure better coordination across agriculture/food security programs. Platforms like the CAMP on the government side and the Partnership for Recovery and Resilience (PfRR) already exist for this purpose, and they are discussed further below.

162. For the humanitarian-recovery-development agenda, the nature of investments would need to expand and ultimately shift to begin introducing some of the technological and organizational innovations that can boost production and create new opportunities for income generation, livelihoods, and ultimately stable jobs. This will involve a shift in priorities.

#### Technology

- Innovative labor-saving and productivity-enhancing technology will need to be imported under donor investment project in the short-term.
- Through demonstration plots, field days, videos, etc. the technology can be introduced to farmers, especially youth, via farmer groups.
- In the short-to-medium term, agro-dealerships and trader networks can be supported to begin importing/selling the new technology and
- Over the medium to long term, artisans can be trained to manufacture or grow technology inside South Sudan.
- More funding should go to developing multi-media training materials (e.g., radio, meetings, training, videos, peer engagement, etc.) that, in the short term, can be introduced through donor programs.
- In the medium to-long term, networks of trainers telescoping out from the public sector extension agents can create new training in response to farmer demand and develop materials to deliver that training using digital technology to exchange materials and information.

#### Organizations

- Target households for increasing food production can, in the short term, be mobilized into farmer groups based on shared geography, shared crops, and trust. The groups should receive training on

the importance of cooperation and collaboration in addition to technical production and market training.

- In the short-to-medium term farmers can be linked with a buyer or lead farmer to produce a product (e.g., seed or food) for a guaranteed market. These arrangements for contract farming or productive alliances should be promoted once farmers have received sufficient technical and business training to be able to engage competitively with buyers or other market actors.
- In the short-to-medium term, the farmer groups can be aggregated into larger groups that can better engage with the public and private sector—a producer association or cooperative framework. The aggregate organizations should receive rigorous training in governance and business management in addition to technical training. The farmer groups can operate storage warehouses, equipment leasing operations, etc. on as enterprises to create a corpus fund for the group to invest.
- In the medium to long term, when the policy environment is better defined, foreign direct investment can be encouraged to bring new technology and sources of finance into the food sector. Options for franchising or business agents can be promoted to create new enterprises and jobs.

163. Finally, policy dialogue is critical to establishing the systems wherein the government agencies are empowered to implement development priorities in the food sector. As shown in the previous section, several policies and laws have been drafted. Review and discussion of these laws followed by joint advocacy for their passage can advance the policy agenda more rapidly.

164. The transition will be more evolution than revolution, but the sequencing of interventions will impact the pace of future activities. For example, investing in the governance, technical, and business know-how of producer groups can increase the adoption of new technology and good practices among members and increase the potential for the groups to develop successful social enterprises like certified or quality declared seed production, equipment leasing, etc. Targeting will also be critical so that interventions match the readiness of the communities. For example, where farmers are asking to be paid to attend training, additional safety nets and food aid may be needed either before the agriculture intervention or simultaneously with the intervention.

## PRIORITIES FOR ENGAGEMENT AND COLLABORATION

165. Different platforms are emerging to facilitate collaboration from donors, the UN, and GRSS to facilitate improved coordination and collaboration to invest in recovery and resilience. **The first is the CAMP**, which was discussed in the previous section. The CAMP represents the combined priorities of the four major Ministries working in the food system space: Agriculture and Food Security, Livestock and Fisheries, Environment and Forestry, and Water Resources and Irrigation. As such, it creates a framework for engaging the government from the national level to the county level. The value of the CAMP is that it lays out a full selection of investments that are prioritized in terms timing (see figure). While the temporal dimension of CAMP implementation has necessarily shifted due to the conflict, the themes tie into priorities expressed by donors and the UN (see figure 32 and table 2). GRSS also has structures such as the Inter-Ministerial Steering Committee and other technical committee can coordinate among the core Ministries as well as bring in Ministries responsible for critical contributing sectors such as transport (roads and waterways), energy, women and social welfare, etc.

166. The **Partnership for Recovery and Resilience (PfRR)** has been developed by the donor community, the UN, and NGOs working across peacebuilding, humanitarian, and development areas with the goal of increasing collaboration to reduce vulnerability and start building the resilience of citizens, communities, and institutions (PfRR, 2019). The membership of PfRR comprises representatives from 10 countries (including South Sudan) and the European Union, the NGO Forum, the United Nations Agencies, and the African Development Bank and World Bank.

167. The goal of PfRR is to “increase the ability of households and communities to absorb context-specific shocks and stresses; enable households and communities to create new opportunities to adapt; and increase social cohesion within communities that can contribute to increased stability, prosperity, and healthy lives. Its focus is to achieve impact at the community level. Through the PfRR, members would either coordinate, collaborate, or both in candidate partnership areas (CPAs) to increase the scale, effectiveness and efficiency of investments. The current CPAs include Bor, Yambio, Torit, Yei, Aweil, Wau, and Rumbek (PfRR, 2019) and they would be engaged when stability in the area allows. Priority activities to implement in the CPAs fall under 4 pillars in figure 34, and that investments/innovations like those described in this paper fall within Pillar 3.

**Figure 33 Pillars of the PrRR**

<b>1 Re-establish Access to Basic Services</b>	<b>2 Rebuild Trust in People and Institutions</b>
<ul style="list-style-type: none"> <li>▪ Humanitarian assistance</li> <li>▪ Social protection and safety nets</li> <li>▪ Social service delivery strengthening (WASH, Health, Education, Shelter)</li> <li>▪ Capacity development for service providers</li> </ul>	<ul style="list-style-type: none"> <li>▪ Local governance and state-building</li> <li>▪ Early warning, preparedness, and early action</li> <li>▪ Hazard risk and vulnerability mapping and conflict analysis</li> <li>▪ Conflict and risk-informed gender responsive planning and budgeting</li> <li>▪ Access to justice, community policing, and SGBV elimination</li> <li>▪ Local reconciliation and peace-building to support voluntary and sustainable return, reintegration, and resettlement</li> </ul>
<b>3 Restore Productive Capacities</b>	<b>4 Nurture Effective Partnership</b>
<ul style="list-style-type: none"> <li>▪ Agricultural production and productivity (value chains, access to resources, etc.)</li> <li>▪ Livelihood skills development</li> <li>▪ Employment generation and SME development</li> <li>▪ Financial inclusion and risk financing</li> <li>▪ Market development and infrastructure support</li> <li>▪ Climate change adaptation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Resilience M&amp;E and investment tracking system</li> <li>▪ Knowledge management and resilience analysis platform</li> <li>▪ Multi-mode flexible financing facility</li> <li>▪ Coordination Platform</li> </ul>

168. The advantage of the PfRR, is that through coordination and collaboration, the World Bank's agriculture investments can build on investments by others to restore social capital within communities and meet basic service needs. Agriculture can apply the World Bank's new targeting protocol to the criteria used by the PfRR and the priority agriculture production zones identified in the CAMP to triangulate the most optimal locations to begin value chain-guided investments.

169. The **Agriculture and Livelihoods Development Working Group** (ALDWG) is a knowledge sharing and coordination mechanism that brings together the Juba-based donors, UN agencies, and NGOs. Under the leadership of the Japan International Cooperation Agency (JICA), ALDWG is forming a CAMP/IDMP working group to start exploring areas of mutual interest and potential collaboration in the food system. The **Office of the Humanitarian Coordinator for the United Nations** can use its convening power to bring together humanitarian actors with more development-focused actors to explore areas for coordination or collaboration—e.g., where food aid or cash for work programs can bring stability to a community, thus allowing them to begin engaging more strategically in cropping, livestock production, and marketing activities.

170. While South Sudan faces incredible challenges moving from humanitarian dependence to a development and growth agenda, the country is rich with partners and ideas that can move the country forward. Strategic engagement will be the first step to identify partners both for investment and for policy dialogue.



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