



AFRICAN DEVELOPMENT BANK GROUP

BUILDING CLIMATE RESILIENCE FOR FOOD AND LIVELIHOODS IN THE HORN OF AFRICA (BREFOL)

Djibouti, Ethiopia, Kenya, Somalia, and South Sudan

Annex 2.4. Feasibility Study for South Sudan





SOUTH SUDAN



**PROGRAM TO BUILD RESILIENCE FOR FOOD AND NUTRITION
SECURITY IN THE HORN OF AFRICA (HOA)**

FEASIBILITY STUDY

FINAL SOUTH SUDAN COUNTRY COMPONENT REPORT

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1 INTRODUCTION

The Inter-Governmental Authority for Development (IGAD) is a regional organization in the easternmost Africa Region known as the Horn of Africa (HoA). This sub-region comprises the countries of Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, South Sudan and Uganda. In the mid of 1980s, parts of the Horn were hit by drought, which left clear fingerprints to date on the life of the inhabitants. Following that climatic blow, in January 1986 an Intergovernmental Authority on Draught and Development (IGADD) was established among governments of: 1) Djibouti, 2) Ethiopia, 3) Somalia, 4) Sudan, 5) Kenya and 6) Uganda, first as a regional integration organization for addressing drought-related problems affecting the Horn. After a decade, with an expanded mandate, IGADD was revitalised as the Intergovernmental Authority on Development (IGAD) and launched on 25th November 1996 in Djibouti City where it is now based. IGAD is now an eight-country trade bloc (economic community) with a total area of about 5.2 million kilometres square and an estimated population of 247.4 million, to deal with issues related to drought and desertification in the Horn of Africa. Arid and semi-arid lands known as ASAL's typically cover 30% of the land cover. The ASALs are characterized by dry climatic conditions and a rainfall pattern of about 600mm of rain annually. It should be emphasized here that Over 80% of livestock in the IGAD region are kept in the ASALs. This region is typically characterized by erratic and unpredictable rainfall and suffers from perennial extremes of weathers events.

South Sudan the newest member of the IGAD block since 2011, is a landlocked country with an area of about 640,000 sq. km and an estimated population of 12.5 million, placing it among the less densely populated countries in Africa (Tizikara and Lugor, 2009) with population density of about 19.53 people per square kilometres. It has three levels of government, namely national, state and local. The local government is further subdivided into the County, Payam and Boma administrations, with the Payam and Boma corresponding roughly to the district and village levels, respectively. Currently, there are ten states and more than 79 counties in the country (Deng, 2014).

Of the total population, 80% is rural and 20% is urban; and about 90% of the total area is arable, with 50% considered as good and prime agricultural land. Of the total prime agricultural land, only about 5% is currently being utilised and 12-15% is covered by ASALs. (CIAT, 1991; CIAT et al., 2011; Draga, 2020). Livestock has been listed to have a great potential in South Sudan to contribute to economic wealth of the country. However, it is equally a contentious resource and a major source of conflict amongst the pastoralists, agro-pastoralists and crop-based farming communities and is thus, a major source of insecurity in the country (Prasad, 1992).

Most of the people (76%) in South Sudan derive their livelihood from crop farming and animal husbandry (South Sudan IDDRSI Progress Report, 2020). However, more than half of the country's estimated 12.23 million people are expected to face severe food insecurity at the height of the annual hunger season (from April to July 2021) according to WFP's 2020 report on food security. About 28 million people in the region were recorded to be worse affected by food insecurity in 2019 (FSNWG, 2020), with an estimated 9 million children under the age of five suffering from acute malnutrition, including about 2 million facing severe acute malnutrition (UNICEF, WHO, World Bank, 2020).

The situation is further aggravated by the on-going COVID-19 pandemic, recent floods and the occurrence of desert locusts in South Sudan and across the HoA region (IGAD-FAO-WFP, 2020). The recent invasion of desert locusts in South Sudan posed a major food security threat as first cropping season and pastures for livestock were destroyed. This has impacted negatively on the livelihoods of 6.7 million people in the country (IGAD-FAO-WFP, 2020).

As a result of frequent and recurring calamities in the HoA, the IGAD heads of State of member countries convened a two-day workshop in Nairobi in September 2011 to deliberate on drought related challenges and new investments to end such emergencies in dry lands in the region. This gave birth to

Drought Resilience and Sustainable Livelihoods Program (DRSLP), a regional framework for disaster resilience building and sustainability in the HoA (Inception Report, 2021). The new and upcoming phase of DRSLP is the program to build resilience for food and nutrition security in the Horn of Africa (HoA) region, which emanated from the decision of the African Development Bank at the February 2019 roundtable on financing the Climate Investment Plan for the Sahel region.

1.1 CONTEXT AND GENERALITIES

Recurrent droughts and unpredictable rainfall patterns are characteristic of arid and semi-arid lands (ASALs), which receive less than 600 mm of annual rainfall and comprise more than 70% of the Horn of Africa region, where the eight IGAD member countries (Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda) are located. The IGAD region covers an area of 5.2 million km² with a population of over 250 million people. It is endowed with a tremendous range of natural resources and an enormous potential for a variety of opportunities to generate wealth and development. Despite this great potential, IGAD member countries are struggling to cope with the vagaries of their difficult and worsening ecological conditions. Over the years, the severity and frequency of droughts have increased and their effects are exacerbated by the increasing phenomena of desertification, land degradation, global warming and climate change. These circumstances have created conditions of chronic vulnerability in these countries with; persistent food insecurity, widespread economic hardship, conflicts, migration and unspeakable human suffering, all affecting the pastoral and agro-pastoral communities that inhabit the region.

As an example, in Ethiopia, Somalia, Eritrea and Kenya, more than 20 million people are in dire need of food, clean water and basic sanitation. The potential for large-scale loss of human life is real, and the crisis is expected to worsen over the next few years, especially for pastoral communities. It is no coincidence that the most affected areas are those that suffer from persistent poverty due to marginalization, conflict and lack of investment. While a severe drought undoubtedly led to the current scale of the disaster, the crisis was caused mostly by people and policies, as well as by exacting weather conditions. An adequate response to the current crisis must not only address urgent humanitarian needs, but also tackle these underlying challenges. The prolonged drought in the Horn of Africa is therefore the immediate cause of the severe food crisis which is already affecting more than 20 million people in parts of Kenya, Ethiopia, Djibouti and Somalia and South Sudan.

As a result of the negative impact of drought on the lives and livelihoods of several million people and the resulting suffering and loss of human and animal life, the heads of State of IGAD member countries met at a summit in Nairobi on September 8-9, 2011. At the summit, they deliberated at length on drought-related challenges and developed the Nairobi Declaration, committing significant new investments in dry lands to end drought-related emergencies. They pledged, among other things, to initiate regional projects addressing the underlying causes of vulnerability in drought-prone areas, focusing on the urgency to engage long-term joint interventions aimed at building resilience and economic development. The meeting also emphasised the importance of a coordinated approach to deal with the effects of climate change.

At the end of the Summit, an agreement was reached to develop the regional strategic framework for disaster resilience and sustainability in the Horn of Africa. The aim was to reduce the impact of disasters in the region taking into account the frameworks and existing action programs, and allocate a significant share of national revenues to finance the initiative. In support and solidarity with the preceding decision, the African Development Bank (AfDB) decided to finance part of the initiative in stages, and in a number of countries within the framework of the Multinational Drought Resilience and Sustainable Livelihoods Program (DRSLP).

The Multinational Drought Resilience and Sustainable Livelihoods Program (DRSLP) in the Horn of Africa were designed to be implemented in three phases of five years each. The first phase of the

program, which was to last from 2013 to 2017, is co-financed by the AfDB. The program aims to contribute to poverty reduction, food security and accelerated sustainable economic growth in the Horn of Africa through improved rural incomes. Specifically, it aims to improve the drought resilience of arid and semi-arid land communities. Project interventions cover water supply for humans, livestock, irrigation and sanitation; improving plant and animal production, marketing and disease management.

The new and upcoming second phase of the DRSLP titled; Program for Building Resilience for Food and Nutrition Security in the Horn of Africa, herein referred as the HoA Program, follows the decision of the African Development Bank at the February 2019 roundtable on financing the Climate Investment Plan for the Sahel region (PIC-RS 2018 -2030). The objective was to support the implementation of the “Priority program to catalyse climate investments in the Sahel (PPCI 2020-2025)”. This was made operational by the AfDB's commitment to support a regional program for CILSS countries (Western Sahel) and a regional program for IGAD countries (Eastern Sahel).

There are a number of diverse agro-ecological zones in South Sudan and their classification varies according to the specific use and biophysical properties. The country has seven (7) agro-ecological zones, namely: 1) the Western Flood Plains; 2) the Eastern Flood Plains; 3) the White Nile-Sobat Rivers (Bahr el-Jebel, White Nile); 4) the Ironstone Plateau; 5) the Green Belt; 6) the Hills and Mountains; and 7) the Semi-arid/ Pastoral Zones. These agro-ecological zones translate into specific livelihood zones as depicted below and in a way that: i) the Green Belt is characterized by exclusive agriculture dotted by mixed farming practices; ii) Hills and Mountains is characterized by mixed farming options; iii) floodplains characterized by high reliance on livestock/cattle; iv) Ironstone Plateau is predominantly agriculture with raising of some minimal livestock; v) Arid Belt is characterized by high reliance on trade; and vi) the White Nile and Sobat corridor is characterized by high reliance on cattle and fish.



Figure 1: RSS Livelihood Zones (Adopted from Annual Needs and Livelihoods Assessment 2009/10)

The most drought prone Zones are the Semi-arid/ Pastoral, the Western Flood Plains and the Eastern Flood Plains (IDDRSI, 2020). This follows rainfall distribution across the country as depicted below.

DESCRIPTION OF THE PROJECT

A team of consultants from ECU-GAIC conducted a field visit to Aweil and the three Kapoeta Counties of Eastern Equatoria State from 13– 17th July, 2021 to confirm the details of the proposed interventions and to collect primary data in support of costing of the interventions on different aspects of the feasibility study.

The visit to Aweil was to assess the Aweil rice irrigation scheme project which is located in Northern Bahr El Ghazal State, specifically in Aweil West County and Aweil Municipality and uses the Lol River water source for irrigation. Its potential area is estimated at 11,000 Fadden (4,620 ha). This project has been identified as a potential intervention for improving livelihoods of the people of South Sudan and thus achieving food and nutrition security in the Horn of Africa. Field data was collected using questionnaire, focus group discussions, field observations and interviewing key informants. The team responses to the pertinent issues for the implementation of the projects are as follows:

LEGAL ASPECTS OF THE PROJECT IN TERMS OF LAND OWNERSHIP

According to South Sudan Land Act, 2009, there are three classifications of land ownerships: public, private, or community land. Public land includes land for government facilities; transport corridors; urban parks and recreational areas; forest reserves, wildlife reserves and national parks; certain wetlands and waterways; and a number of pre-war agricultural schemes and agro-industrial complexes. Community land refers to land held under customary land tenure. Communities, defined mainly in terms of ethnic groupings or subgroupings, own virtually all land in the country in the sense that they retain the right to regulate its usage according to their own particular customary land tenure system.

The land where Aweil rice farm is located belongs to the category of land owned by the public according to the constitution of South Sudan therefore it's regulated by the government of South Sudan. The irrigation scheme land was formerly owned by three communities namely: Ajuet, Sheimel and Aweil Centre. The State government has jurisdiction over the land formerly owned by these three communities. The national government appoints the management of the irrigation scheme, clearly showing the influence of the national government on the irrigation scheme.

Currently the State Government is using crop sharing system for cultivating rice in the Aweil farm. The government supports the farmers in cultivation (tractor support), in availing improved seeds, in proper water management practices, and in availing modern harvesting mechanisms. The farmers in return share the crop with the government at a ratio of 60:40 with the government taking 40% and farmers taking 60% of the produce. The government buys the rice produce from the farmers.

ENVIRONMENTAL COMPLIANCE IN TERMS IMPACTS

An Environmental impact assessment was conducted on December 2010 by an Ethiopian company called ABCE and the Consortium Members for Irrigation Pump Installation & Rehabilitation of Water Control infrastructures. For this intervention, we are proposing the construction of an earth dam along the canal from Lol River to the rice farm. We are also envisioning the use of fertilizers to improve yield and integration with fish farming. There is need for environmental impact assessment for the earth dam, use of fertilizers and integration of fish farm. It's unlikely that any of these proposed activities would impact the environment. However, we propose an environmental audit to be carried out on the whole scheme.

Aweil rice irrigation has the potential of supplying food needs of South Sudan and even for export. During its best days, rice used to be exported to Europe from the irrigation scheme. The immediate beneficiaries are the inhabitants of the metropolitan town of Aweil municipality who will enjoy low-cost rice and members of the three chiefdoms of Ajuet, Sheimel and Aweil Centre. Once in operation,

considering the current allocation of 2 feddans per household, it's estimated that over 1,500 household would directly benefit from the project with even benefiting indirectly.

In the three Kapoeta Counties (Kapoeta South, Kapoeta East and Kapoeta North), the stakeholder consultations were planned prior to the field visit to present program components and to gather concerns and expectations about the project. In each county, the stakeholder consultation meetings brought together representatives of government technical services (agriculture, livestock, water and sanitation, rural engineering, infrastructure, environment, forests, soils conservation, climate change and rural development donors, NGOs, etc.) chiefs, community members and associations of users of natural resources in the trans boundary clusters (Atekere Foundation).

Kapoeta Area was identified as intervention areas in South Sudan due to its location within semi-arid lands and its huge dependence on livestock resources though it is re-enforced with a few other agricultural activities. The area is faced with severe drought particularly in the eastern part as witnessed by the Team of Experts during the visits and therefore, it needs water reservoirs / hafirs (dams) and boreholes to reduce the runoff and store that water for agro-pastoral activities during the dry/harsh seasons. The water reservoirs/hafirs (dams) can store water for irrigation, domestic use and livestock. The area also experiences floods and inter-communal conflict (insecurity) associated with pasture and water sources.

The Team of National Experts comprising of a Team Leader, two members and a government representative who are professionals in Environment, Gender, Livestock Development and Water Resources visited different government departments and sectors (such as Water and Sanitation, Agriculture, Livestock and Gender), UN Agencies and local organizations in the three Kapoeta Counties. The team collected information and data on: (i) communities in the three Kapoeta Counties, with further discussions held with stakeholders to identify potential target areas / populations; (ii) discuss activities that generate income in the three counties (what has been done, what has worked, what has not worked and why, etc.).

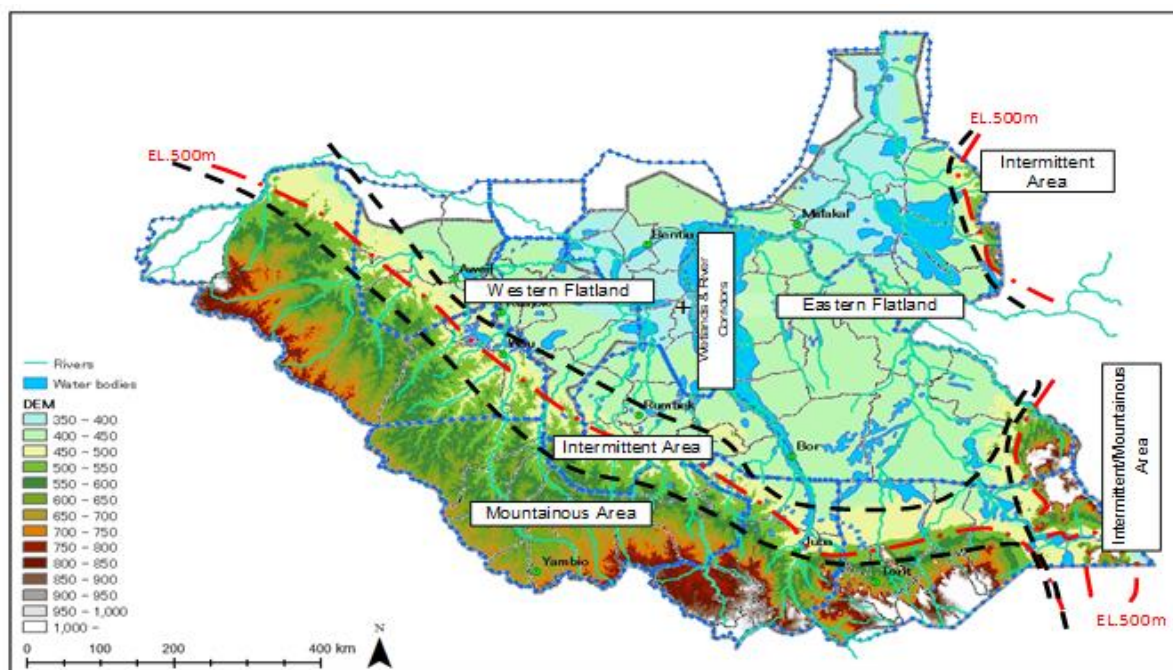


Figure 2: Zoning Map for Irrigation Development in South Sudan (RSS' IDMP, 2015)

Key informant interviews were held with key local government staff, paramount chiefs, community members, project beneficiaries, impacted people, donors and non-governmental organizations to collect available data on watershed ecosystems, information on agriculture and livestock production systems and the impacts of climate change, as well as other information related to capacity gaps in communities and in governmental institutions. As consultations with stakeholders involved key government departments, paramount chiefs and organizations, the elaboration of the project strategy will ensure a strong national ownership, a fast agreement on Program activities, as well as a smooth approval process by IGAD and AfDB.

Furthermore, information and data were collected on gender to determine gender disparities that can influence the feasibility and the success of the program. At the same time, the needs and possibilities for women to participate and benefit from the Program were identified. On the other hand, the project design will have to include a full risk analysis, with a focus on climate risks for water, agriculture and livestock resources management, and ecosystems management in arid and semi-arid lands in the three Kapoeta Counties.

1.1.1 Country Programming Paper (CPP)

In reference to the RSS' irrigation development master plan (IDMP), 2015 (Chapters 2 & 4), based on elevation, terrain slope, applicable irrigation development mode/model and potential irrigable lands, RSS is divided into four (4) zones, namely: 1) Mountainous; 2) Intermittent; 3) Plains; and 4) Wetlands and River Corridors.

These irrigation potential zones are derived from the same geographical features and associated natural conditions that divided the country into distinct agro-ecological zones. Analogically, the four (4) irrigation potential zones correspond to the seven (7) livelihood zones in such a way that: i) mountainous area irrigation potential zone is equivalent to the greenbelt plus hills and mountains; ii) intermittent area irrigation potential zone is similar to ironstone plateau together with eastern semiarid; iii) plains irrigation potential zone is the same with western and eastern floodplains combined; and iv) wetlands and river corridors irrigation potential zone corresponds to Bahr el-Jebel, White Nile and River Sobat Corridors.

South Sudanese have led their lives in accordance with the conditions of each livelihood zone; and the zoning for irrigation development will help adopting of appropriate types of irrigation and water control techniques. As an analogy, this will help adapting and transforming the existing livelihoods to a better condition of living through improved ways of harnessing and managing water resources for crop and timber production; animal husbandry (including establishment of irrigated rangelands); and fish farming.

On the basis of: 1) Land productivity, 2) Socio-economic and 3) Water resources potentials; in addition to excluding of protected/reserved, oil and wetland areas, about 11% (70,000-km² / 7 million ha) of country land has been identified as very high potential; and about 19% (120,000 km² / 12 million ha) as high potential irrigable area. Hence, a total potentiality of 30% (190,000 km²/19 million ha), with consideration of surface water as major source for irrigation.

The Sudd, the world's most extensive wetlands and a Ramsar Site have a substantial freshwater catch and aquaculture fisheries potential which are estimated to be close to 300,000 metric tons (MT) annually; however, only about 40,000 MT is currently being caught which is an underutilization.

IDDRSI (2020) stipulated that in South Sudan the IDDRSI coordination unit as the only body at national level that exists, has been handicapped by the events of December, 2013 and July, 2016. This cascaded the unit to subnational levels and the realization of its mandate became a real challenge. However, it was able to realize several results and outputs namely: -

- Mainstreaming of CPP Elements in National Development Plans Promoted.
- Regional gender and resilience platform established.
- Climate Information on Rainfall Seasons Disseminated at Regional Climate Outlook Forums three times each year.
- Uptake of Climate Early Warning Information and Early Response Capacity of Karamoja Cluster Enhanced.
- Threat and risk to agro-pastoral production and vegetation cover posed by Fall Armyworm is managed and mitigated in South Sudan.
- Threat and risk to agro-pastoral production and vegetation cover posed by Desert Locust (DL) is managed and mitigated in a timely manner in South Sudan.
- The Capacity of the government staff for agriculture production and productivity improvement is strengthened.

Most of the strategic interventions underscored in the CPP under natural resource management, market access and trade, livelihood and basic service support, pastoral disaster risk management, research and knowledge management and peace building and conflict resolution can be articulated majorly into the following as: -

- Addressing the causes of structural natural resource-based conflict and insecurity as an Underlying expander of the impact of drought.
- Strengthening the livelihoods, coping and adaptive capacity of households and Communities in drought and flood prone areas.
- Articulation and appropriate development of dry land/ arid and semi-arid areas with a focus on agro-pastoral and pastoral communities to dislocate structural causes of vulnerability to drought and vitalizing the exchanges between drought prone areas and the national and regional economies that are important for resilience through market and road infrastructure and other appropriate investments.
- Delivering options that protect and or expand capacities including timely and appropriate humanitarian response, diversification and safety nets with a focus on vulnerable groups.
- Given the trans-boundary and landscape nature of drought, regional priorities are also articulated.

The priorities for the next five years are to be articulated in a Medium-Term Plan that will also act as the instrument for resource mobilization. The CPP component also lays out the initial components of a results Framework against the priority intervention areas that should outline the expected outputs and intermediate outcomes.

Although the South Sudan CPP Phase (1) was adopted and launched in 2013/14 to achieve drought resilience in the country, but the country has since December 2013, faced numerous challenges of insecurity, which has compromised effective implementation of the CPP. In light of this, most investment interventions were mostly humanitarian and emergency. With the implementation of the Revitalized Peace which was signed in Addis Ababa in September, 2018, investments are likely to shift to developmental in nature therefore, decentralization and devolution of IDDRSI coordination mechanism to State, County and Payam levels could be realized in the second phase of implementation. In conclusion, the South Sudan CPP recommended the following: -

- The Government of the Republic of South Sudan and IDDRSI Regional Platform Coordination Unit should strengthen and operationalize IDDRSI Coordination mechanisms/ implementation of coordination structures at national and sub-national levels and provide avenues through which development partners can align and relate to the national IDDRSI coordination structures and share information on drought resilience programming.
- The Government of the Republic of South Sudan should create IDDRSI budget lines in its annual national budget to support the implementation of IDDRSI.
- Member States should promote investments in the ASALs, including supporting the engagement of the private sector in the development of ASALs infrastructure.

- Member States should promote investments in the cross-border clusters in order to realize sustainable development and equitable regional integration.
- IDDRSI should be housed at the presidency to reduce long bureaucracy.
- The Government and IGAD should harmonize their plans with development partners in the Country.
- There is need for the Ministry of Environment and Forestry to address the issue of mismanagement of wetlands.
- IGAD should develop standard policies to protect the environment and manage the waste in Oil and other mineral exploitation.
- IGAD to reconsider the establishment of regional research Centre in South Sudan.
- IGAD to strengthen its coordination system with the national governments.

1.2 DESCRIPTION OF THE PROJECT

Aweil Rice Irrigation scheme sits on a very virgin land and the farm's operations are not consistent over the years. This makes the land to regain its values once it starts to degrade. However, Land degradation due to cattle-rearing has also been widely observed in South Sudan. Though it is difficult to distinguish between bare earth caused by overgrazing and bare earth associated with tilled and empty fields for crops, the UNEP-ICRAF fieldwork and analysis made that observation in 2006 around the Aweil Rice Irrigation Scheme. Some of the abandoned cultivated land has reverted to bushland and could potentially be used for grazing. While land degradation is generally limited to strips alongside watercourses of the Lol river. It is severe in the drier land which is away from the wetlands. The primary cause of this degradation is overgrazing of pastures that are naturally vulnerable to erosion due to poor soil quality and low rainfall.

In 2009, the scheme was rehabilitated through the Aweil Irrigation Rehabilitation Project supported by GIZ under the Sudan Productive Capacity Recovery Programme (SPCRP), funded by the EU. During the project period, demining, dike and canal maintenance were carried out and agricultural machinery (e.g., large scale rice mill and heavy equipment) and technical assistance provided. However, after completion, the scheme has not operated effectively due to limited funds for operating costs and limited human resources. The Nile Basin Initiative recommended 3000 ha expansion from existing land (Diao, You, Alpuerto & Filledo 2012). The land around the scheme is inhabited by both the community and technical workers. The land, according to the government is basically in the hands of community leaders. The national government selected land for irrigation in which some parts of the land is not yet irrigated. The figures below present further information about Aweil.

On the other hand, Kapoeta is a territory that exists in Eastern Equatoria state. It comprises of three counties as follows; Kapoeta East, Kapoeta North and Kapoeta South. Kapoeta Area was identified as intervention areas in South Sudan due to its location within semi-arid lands and its huge dependence on livestock resources though it is re-enforced with a few other agricultural activities. The area is faced with severe drought particularly in the eastern part as witnessed by the Team of Experts during the visits and therefore, it needs water reservoirs / hafirs (dams) and boreholes to reduce the runoff and store that water for agro-pastoral activities during the dry/harsh seasons. The water reservoirs/hafirs (dams) can store water for irrigation, domestic use and livestock. The area also experiences floods and inter-communal conflict (insecurity) associated with pasture and water sources.

1.3 STUDY OBJECTIVES

1.3.1 Overall objective

The overall objective of the HOA program as defined by the AfDB project identification mission of June 2019 is to contribute to improving the living conditions of the populations and food and nutritional security in the Horn of the Africa.

1.3.2 Specific objectives

Specifically, the HoA program aims to:

- i) Increase, on a sustainable and resilient basis, the productivity and agro-sylvo-pastoral production in the Horn of Africa
- ii) Increase income from agro-sylvo-pastoral value chains, and;
- iii) Strengthen the capacity of populations to better adapt to the risks of climate change.

1.3.3 Components

To achieve these objectives, the HoA Program is structured around the following four components:

1) Strengthening the resilience of drought prone areas and pastoral and agro-sylvo-pastoral production systems to Climate Change,

- a) Sub-component 1, Sustainable agricultural land management and sustainable management of pastoral lands,
- b) Sub-component 2, Agricultural Infrastructure - adapting farming systems to climate change, pastoral infrastructures and economic diversification;
- c) Sub-component 3, Promotion and diffusion / vulgarization of Climate Smart Agriculture technologies, Knowledge management and technology transfer and Improved nutritional status of households;

2) Supporting Agrobusiness Development,

- a) Sub-component 1, Access to advisory services, financing and markets;
- b) Sub-component 2, Supporting Development of Entrepreneurship; and
- c) Sub-component 3, Promoting Domestic Bio-digesters and Solar Energy

3) Strengthening Adaptive capacity to Climate Change

- a) Sub-component 1, Development of Climate Services
- b) Sub-component 2, Building capacity of main stakeholders in the agro-pastoral sectors in the drought prone areas for mainstreaming and monitoring Climate Change and
- b) Sub-component 3, strengthening the Operational Capacity for resilience.

1.4 RATIONALE OF THE STUDY PROGRAM

South Sudan has largely missed out on the first IDDRSI projects; because it has been largely unstable since the war that broke out in December 2013 and again energized in July 2016. However, it is envisaged that disaster preparedness is of paramount importance. Up to half of the population were displaced to neighbouring countries of Uganda, Kenya, Ethiopia and the Sudan and countless others

were internally displaced. Additionally, South Sudan is currently ravaged by perennial inter-communal conflicts: 1) over cattle rustling; 2) over grazing lands and water resources; and 3) between farming communities whose crops are often destroyed by livestock belonging to pastoral and agro-pastoral communities that migrate and settle in lands traditionally owned by the farming communities. Donors, UN Systems, INGOs and NNGOs have been extending and providing lifesaving services and assistance in the various sectors ever since.

South Sudan has immense agricultural potential with abundant fertile lands, but it produces only of cereal requirements. Capacity building actors include government extension services, UN Systems, NGOs and programmes/projects; in addition to Research and Development (R&D) Agencies.

1.4.1 Observed climate variability

Climate data are scarce for South Sudan because of the long period of civil war and the historic focus of many studies and data sets on northern Sudan. However, based on regional trends and meteorological data from the mid 1970's to late 2000's, it has been shown that:

- i. Summer rainfall has decreased by 15–20% across parts of South Sudan; particularly the northeast; and
- ii. Temperature has increased by more than 0.4°C per decade over the past 30 years. In addition to this, observed trends and anecdotal evidence indicate that:
- iii. The duration and timing of rain has become erratic with the rainy season being delayed and shorter;
- iv. Some areas are receiving less rain and consequently the water tables are dropping;
- v. The region that receives 500 mm or more of rain has contracted, increasingly exposing populations in northern areas to increased rainfall deficits; and
- vi. The desert is creeping/ expanding southwards.

Further to the above trends, as the country does receive enormous amount of external renewable water resources, with its flatness to a greater extent, when these coincide with the occurrence of its internal renewable water resources flooding occurs. As such, the frequency of floods has increased over the last eight decades, with floods having occurred in 1946, 1962-1965, 1978-1979, 1988, 1999, 2006, 2011, 2012, 2013 and 2014. Droughts are also becoming more frequent. Approximately 56% of the rural population surveyed in the National Baseline Household Survey in 2009 identified droughts and floods as the top source of vulnerability in South Sudan. The other top sources of household vulnerability include the death or loss of cattle, and crop diseases and pests – all of which are attributable to some extent on changing climate conditions.

1.4.2 Expected climate change impacts

Because of the limited availability of climate data, no specific climate change scenario models have been found for South Sudan. However, if present rainfall trends continue, by 2025 the decreasing rainfall currently experienced mainly in the north-eastern parts of the country will spread south-westward. In addition, rainfall is likely to become increasingly erratic causing an increase in both floods and droughts. Temperatures are also likely to continue increasing, which will exacerbate the effects of droughts.

Future climate change trends will have an adverse effect on the availability and occurrence of water resources and consequently agricultural productivity. 97.5% of South Sudan is covered by the White Nile and its main tributaries of the Bahr el-Jebel, Bahr el Ghazal and River Sobat catchments. In contrast to the Bahr el-Jebel and the White Nile, the Sobat River and the Bahr el Ghazal river catchments have a strong seasonal character. Research on these two catchments suggests that an increase of 2°C in

temperature might cause the natural flow to fall to 50% of the current average. Rising temperatures and uncertain rainfall could also impact on the Sudd wetland, which is not only an important source of fish and products, but also a wetland of global biodiversity importance. In addition to reducing water availability, future climate change will also accelerate environmental degradation and desertification. The increased frequency and severity of extreme climate events will have widespread negative socio-economic impacts on people in terms of food security, health and safety.

1.4.3 NAPA/NCCAP and its relationship to South Sudan's development frameworks

As a new country, South Sudan's policy and legislative framework continues to develop. The current basis of this framework is the Transitional Constitution of the Republic of South Sudan (2011). In the preamble of the Transitional Constitution, it states that the people of South Sudan are 'conscious of the need to manage our natural resources sustainably and efficiently for the benefit of the present and future generations and to eradicate poverty and attain the Millennium Development Goals'. Since the signing of the Comprehensive Peace Agreement in 2005, policies and legislation, which were developed during the pre-independent period, were gradually replaced and renewed. Currently, the majorities of these policies are in the final consultation and approval phase and have draft status. Moving forward, the finalization of these policies will support South Sudan to achieve the Sustainable Development Goals.

In general, the draft South Sudan National Environment Policy calls for the development of a national strategy for climate change adaptation and mitigation; the formulation of a climate change policy for South Sudan; and support to efforts to reduce community vulnerability to climate variability and change. South Sudan has not yet developed its climate change policy and strategies; however, adaptation strategies or plans have been incorporated in its development plans.

It is important that South Sudan's existing goals, strategies, institutions, policies, plans and treaties/agreements form the framework to support the Implementation of the NAPA. Indeed, potential synergies between identified Adaptation Project Options and national policies and MEAs were included as a project prioritization criterion. The following important frameworks offer opportunities to assure integrated resource and environmental management, disaster risk preparedness and climate change adaptation, and were considered in the design and prioritization of Adaptation Project Options.

The South Sudan Development Plan (SSDP) 2011–2016 is the main guiding document for the development of the country, which addresses conflict management, poverty reduction and economic development. The SSDP contributes towards achieving the vision for the country as set out in the South Sudan Vision 2040. The objectives of the SSDP include: -

- i. Ensuring sustainable development through enforcing social and environmental impact assessments for all development programmes and projects;
- ii. Acceding to and ratifying applicable and beneficial multilateral environmental treaties, conventions and agreements;
- iii. Ensuring economic development is environmentally sustainable; and
- iv. Developing a national early warning system and enhancing environmental awareness to reduce risks of disasters.

The South Sudan National Environmental Policy has been drafted on the premise of protecting and managing the environment. The draft policy recognizes that without adaptation and mitigation measures, climate change will likely have adverse effects on the environment and livelihoods of South Sudanese. In addition, the policy highlights the potential for climate change to "exacerbate food

insecurity, biodiversity loss, water shortages and conflicts due to scarcity of water resources”. In response to the challenges posed by climate change, the policy proposes the development of a climate change policy and mechanisms for adaptation and mitigation.

With the current trends of increased frequency of weather events in the country, which is a direct result of Greenhouse gases (GHGs) and global warming: There is need to leverage on awareness creation on the concepts of climate change and to make available weather-related capacity of the country so as to build and fill the gap between the productions of weather-related information and consumers of weather information. This will enable the ease of handling adaptation process and bridge climate knowledge management options across communities.

1.4.4 Potentials and constraints of Natural Resource Management (NRM) in the country

In general terms, climate and soils in a particular area are primary determinants of the type of agricultural occupation that can be undertaken where they occur. South Sudan has diverse topographic features, ranging from hills and mountains to flat lowlands and swamp areas. In RSS, rainfall varies greatly by ecological zones, from around 1,500 mm of rain in the green belt, which covers the south-western part of the country through pastoralist (around 500 mm in the south-eastern and north-eastern; and <1, 000 mm in most areas of the country in central, eastern and western parts. Irrigation could improve livelihoods in the areas of < 500 mm in the south-eastern and north-eastern part of the country. In the other areas of central, eastern and western rainfall is still highly variable and irrigation could secure and increase food productivity and improve rural livelihoods.

The White Nile and its tributaries crisscross South Sudan. However, availability of water remains a major issue, especially amongst pastoralists and agro-pastoralists, particularly in the dry season.

1.4.5 Soil suitability for cultivation

The soil is an important medium for crop production and its status in both macro and micro elemental balances greatly influences crop production. It is estimated that about 70 to 80% of the country’s total area of 658,800 km² of land is suitable for agriculture (MOAF, 2013; ASPF, 2012). It is worth noting that agricultural land refers to the share of land area that is arable, under permanent crops, and under permanent pastures. Arable land includes land defined by the FAO as land under temporary crops, temporary meadows for mowing or for pasture, land under market or kitchen gardens, and land temporarily fallow. In terms of Soil fertility, structure and texture, South Sudan has the following characteristic soil types, namely:

- (i) Vertisols (also known as black cotton soils), which are highly productive soils occupying the eastern part of the country, but equally prone to soil erosion;
- (ii) Fluvisols, which are lowland soils (moderate-to-highly fertile) mostly found in semi-arid zones along rivers, lakes and alluvial plains (FAO, 1993);
- (iii) Leptosols, which are very shallow highly calcareous materials that lie on top of hard bedrock (subject to drought, runoff and desertification) and it is mostly found in the southwest of the country;
- (iv) Lixisols, which have an unstable soil structure (underlain by clay washed down from the surface) found in the western part of the country;
- (v) Regosols, which have no significant profile development and are found in the northwest to the centre of the country;
- (vi) Cambisols, which are prominently medium-to-fine textured mostly found in the hilly parts of the south and central areas (RSS, 2015); and
- (vii) the ironstone plateau, which is a thin soil underlain by a hard bedrock and comprised of hard red lateritic soils found mostly in central western region.

1.4.6 Sustainable Land and Water Resource Management

Water is a natural resource that has immense benefits if properly harnessed. The potential of a country to develop water resources infrastructure is dependent on the availability of water either from rainfall, river discharge or groundwater. The major waters of South Sudan are the White Nile, its tributaries and aquifers (African Development Bank, 2019). South Sudan has four main river basins namely: 1) Bahr el Jebel, 2) Bahr el Ghazal, 3) River Sobat and 4) White Nile Main Stem basins, flowing down mainly from the highlands of the Central African Republic, DRC, Uganda and Ethiopia into the low clay basin, to form the world's largest contiguous swamp (FAO, 2011, UN Environment, 2018). These basins are comprised of 23 sub-basins; and numerous catchments and sub-catchments. An estimated 28 billion cubic metres of water passes through South Sudan to Sudan and Egypt. This represents 30% of the flow of the Nile water. This huge volume of water has potential of being harnessed for hydropower, irrigation or damming for livestock or drinking water use.

The River Nile and its tributaries carry large amounts of water through the green belt, which extends along the foot of the mountain and plateau region and the gentle plains. According to Fernando and Garvey (2013) this rapid water sector is deemed to have a very high potential for gravity flow irrigation schemes. However, currently in practice irrigated agriculture plays a very insignificant role in South Sudan except for isolated use of simple low technology practices by individual farmers like water lifting hand pumps, storage ponds and drains in the flood plains to irrigate small plots of crops and gardens.

The irrigation potential in South Sudan though enormous is currently underutilized as elucidated in the Nile Basin Initiative (NBI) platform, which was established in 1999 to purposely achieve and benefit from the sustainable socio-economic development through equitable utilization of the Nile Basin water resources. The NBI in a multi-sectorial investment opportunity reported thousands to hundreds of thousands of hectares of lands suitable for irrigation purposes within the Bahr el-Jebel, the Bahr el-Ghazal, River Sobat and the White Nile areas, which if developed could benefit the people of South Sudan and the Nile Basin. Geographically, 98% of the landmass of South Sudan falls within the Nile Basin, which comes with enormous potential for water resources infrastructure development (African Studies Centre, 2014).

Livestock in South Sudan depend on natural water bodies as their main sources of water. Due to seasonality, these sources of water normally trigger migration and inter-communal conflict over their scarcity during long dry seasons and droughts. There is strong relationship between migration and water needs, revealed by an extensive mapping of grazing areas in Central Equatoria, Eastern Equatoria and Jonglei States. Livestock herders tend to move towards permanent water resources or to areas where temporary wells can be easily dug. Development of water infrastructure was common in the past, such as manmade lake/reservoirs, also referred to as haffirs (Government of Sudan, 1955). Normally, haffirs were hand dug by pastoral communities, but these were often too small and shallow, which end up drying during the dry season.

In parallel with investing in improved domestic water sources, "Water for Productive Use" is coming to focus as well. Water harvesting and storage reservoirs, including haffirs mainly for animals have been planned across the country and some of them have been implemented under MDTF in Jonglei, Eastern Equatoria and Western Equatoria States; through UNDP in Eastern Equatoria, Lakes and Warrap States executed by UNOPS and PACT; and under water for Eastern Equatoria (W4EE) Project implemented by NIRAS with support of the Netherlands. Also, before the eruption of the December 2013 crisis, some were under implementation in Jonglei State in Nyirol and Uror Counties with the assistance of CIDA through FAO. Reservoirs were also planned in Akobo, Ayod, Duk and Pibor Counties of Jonglei State under SSRF fund in 2010. These areas are most prone to conflicts related to water. The appropriate locations of water points were determined through consultations with communities and Crisis Recovery Mapping Analysis. In Annexe 2, water resources and their potentiality in South Sudan are detailed.

The Comprehensive Agriculture Master Plan (CAMP) was formulated in 2015 and details the Government of South Sudan's plan for expanding the agricultural sector. In line with the national vision, the South Sudan's "Vision 2040", CAMP set strategic goals and defined/aligned development themes as depicted below.

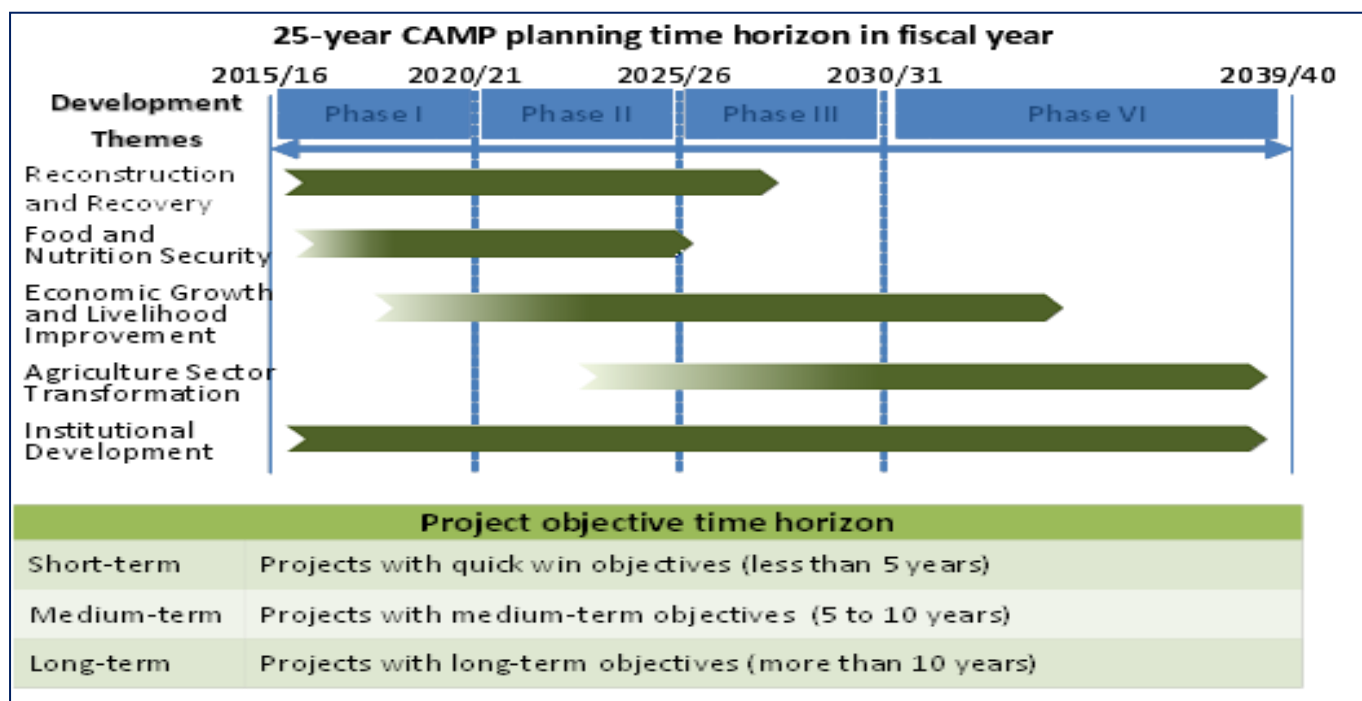


Figure 3: Development Themes, Planning Horizon & Programmes'/Projects' Objectives (Adopted from CAMP TT)

CAMP was developed to: -

- Address hunger; and food and nutrition insecurity;
- Improve rural livelihoods and generate income"; and
- Diversify the economy through an innovative and competitive agricultural sector.

Within the CAMP, over 110 indicative sub-sector project profiles have been developed to guide decision-makers in the crop, forestry, livestock and fisheries sub-sectors. The actions required to increase agricultural production across all sub-sectors are detailed in these project profiles. In addition, the project profiles address various barriers to development in the relevant sub-sector including climate variability and change.

To achieve South Sudan's agricultural development objectives, it is necessary to make provision for and manage water resources. The Irrigation Development Master Plan (IDMP) has therefore been developed in support of CAMP, to achieve sustainable irrigated agriculture and other productive uses. In line with CAMP development themes and time horizons, IDMP set and defined its strategic goals.

Table 1: DMP Goals

IDMP Overarching Goal	To achieve sustainable irrigated agriculture and the other productive uses of water, thereby improving food and nutrition security; enhancing resilience; reducing poverty; and contributing to economic growth and sustainable development		
	Short-term	Medium-term	Long-term

IDMP Strategic Goals	(2016/17-2021/22)	(2022/23-2027/28)	(2028/29-2039/40)
	To promote irrigated agriculture & the other productive uses of water	To expand irrigated areas and improve productivity	To Ensure efficient and sustainable irrigation management

Source: RSS' IDMP

Implementation of the IDMP would improve food security, reduce poverty and contribute to economic growth and development. The IDMP recognizes the threat of climate change – and erratic rainfall in particular – on agriculture and consequently identifies opportunities for assessing, allocating, developing and managing water resources in support of agricultural production and productivity. Irrigation scheme development programmes will identify means of reducing the risk and vulnerability of crops to seasonal and climate variability. These schemes will assist in planning and implementing adaption and mitigation measures to reduce the vulnerability of agriculture to the negative effects of climate change. Simultaneously, these schemes will also contribute to the national objectives of food security, job creation, poverty reduction, income growth and economic development.

The UNDAF 2014-2016 sets out the substantive contributions of the UN agencies funds and programmes to achieving the development goals set out in the SSDP. With reference to the specific objectives of the NAPA process and reducing the vulnerability of communities, the UN's focus – amongst others – on fostering inclusive and pro-poor growth and reducing food insecurity is of particular relevance. This will be achieved through supporting the following: -

- i. Sustainable agriculture and livelihood diversification of small landholders;
- ii. Sustainable land management, natural resources and environment;
- iii. The reduction of risks from natural disasters;
- iv. Sustainable energy sources;
- v. Enhanced private sector development; and
- vi. The expansion of basic social infrastructure.

Rationale for development of the NAPA

At the Seventh Session of the Conference of the Parties (COP) to the UNFCCC, it was decided that the least-developed countries (LDCs) would be provided support to address urgent and immediate needs and concerns to adapt to the adverse effects of climate change. The rationale for South Sudan's NAPA rests on the low adaptive capacity of the population, which renders them in need of immediate and urgent support to start adapting to current and projected adverse effects of climate change. Furthermore, through both the NAPA development and implementation process with the associated technical and institutional capacity development, the NAPA will lay the foundation for climate change adaptation in the medium to long term.

Objective of the NAPA

The overarching objective of the NAPA document is to communicate to the international community priority activities that will address South Sudan's urgent and immediate needs for adapting to the adverse impacts of climate change. Specifically, the NAPA process aimed to:

- i. Identify a list of potential adaptation activities;
- ii. Formulate priority adaptation project profiles;
- iii. Build capacity for adapting to longer term climate change and variability; and
- iv. Raise public awareness on the urgency to adapt to the adverse effects of climate change.

1.4.7 Potential barriers to NAPA implementation

A number of barriers may affect the implementation of urgent and immediate adaptation activities identified by the NAPA process. These include the following.

- Internal conflict and security concerns.
- Lack of a clear and transparent institutional framework for climate change adaptation. This leads to overlapping mandates and responsibilities, which can create conflicts of interests among stakeholders. In addition, there is a lack of environmental regulatory mechanisms.
- Limited coordination between newly formed ministries and line departments at both national and state level to maximize climate change adaptation gains from national initiatives – including action plans, policies, programmes and projects.
- Insufficient capacity – institutional and technical – at both national and state level to implement the proposed activities. There is a shortage of human resources and skills for the implementation of potential adaptation initiatives.
- Poor infrastructure, especially roads, making it difficult to access rural areas. • Economic challenges and limited budget for implementation of proposed activities to address environmental problems.
- Low level of environmental awareness among the general public.
- Low level of literacy.
- High level of poverty.

These barriers must be considered and addressed in the design of the projects identified through the NAPA process.

1.5 STUDY PHASES

The Multinational Drought Resilience and Sustainable Livelihoods Program (DRSLP) in the Horn of Africa was designed to be implemented in three phases of five years each. The first phase of the program, which was to last from 2013 to 2017, is co-financed by the AfDB. The program aims to contribute to poverty reduction, food security and accelerated sustainable economic growth in the Horn of Africa through improved rural incomes. Specifically, it aims to improve the drought resilience of arid and semi-arid land communities. Project interventions cover water supply for humans, livestock, irrigation and sanitation; improving plant and animal production, marketing and disease management.

The new and upcoming second phase of the DRSLP titled; Program for Building Resilience for Food and Nutrition Security in the Horn of Africa, herein referred as the HoA Program, follows the decision of the African Development Bank at the February 2019 roundtable on financing the Climate Investment Plan for the Sahel region (PIC-RS 2018 -2030). The objective was to support the implementation of the “Priority program to catalyze climate investments in the Sahel (PPCI 2020-2025)”. This was made operational by the AfDB's commitment to support a regional program for CILSS countries (Western Sahel) and a regional program for IGAD countries (Eastern Sahel).

During the HOA Program identification mission carried out by the AfDB in June 2019, IGAD and its main partners stressed the importance of ensuring better synergy with the strategies and actions underway at the regional and national levels; as well as the need to build on the lessons and impacts of ongoing AfDB-supported programs. Some of these initiatives include; IGAD Drought Resilience and Sustainability Initiative (IDDRSI) and the Multinational Drought Resilience and Sustainable Livelihoods Program (DRSLP) in the Horn of Africa.

1.6 OBJECTIVES OF PHASE II

The general objective of the currently envisaged assignment is to assess the viability of the HoA Program through feasibility studies; institutional, social and environmental analyzes across the entire value chain; programming of investments and presentation of projects; constraints and opportunities for implementing program components; proposal for improvements, including recommendations on the roles of regional, national and subnational government agencies and prepare a sector investment program to address constraints.

2 ANCHORING WITH EXISTING POLICIES AND STRATEGIES

The commitment of South Sudan to environment protection and sustainable development started in 2005 when the comprehensive peace agreement (CPA) and its independence in 2011 due to awareness about earlier environmental threatening issues such as the desertification and drought in African Sahel states of 1968 – 1973 when it was still part of the Old Sudan.

As it only became an independent country in July 2011, and due to the political crises of 2013, South Sudan has had limited active participation in multilateral environmental agreements (MEAs). However, since independence, the country has joined global efforts to address environmental issues and contribute to SDGs achievement by becoming a signatory to the Montreal Protocol to the Vienna Convention on Substances that Deplete the Ozone Layer; the United Nations Framework Convention on Climate Change (UNFCCC); the Kyoto Protocol; the Convention on Biological Diversity (CBD); the UN Convention to Combat Desertification (UNCCD) and Ramsar Convention (John, 2015). The country had begun working on a number of commitments to international environmental agreements prior to the resumption of conflict in 2013, including its First National Communication to the UNFCCC, a National Adaptation Program of Action, the National Adaptation Plan, and the National Biodiversity Strategy and Action Plan (UNEP, 2016). In 2015, South Sudan submitted its Intended Nationally Determined Contributions (INDCs) to the UNFCCC and its Fifth National Report to the Convention on Biological Diversity.

2.1.1 Contribution to Sustainable Development Goals

Sustainable Development goals as an approach are to eradicate poverty in South Sudan and unimpeded humanitarian assistance is to mitigate its effects in the short term. Sustainable Development contributes in poverty reduction and builds resilience to many vulnerable, particular in conflict affected areas. This includes improving access to education, better access to clean water and Sanitation, improved health outcomes. Another scenario is long term poverty reduction focus requires a growing and diversified economy with a decreasing reliance on oil revenues. South Sudan is endowed with an abundance of natural resources wealth, opportunities for sustainable livelihoods and a young and resilient population that has withstood the most difficult of times. It is this very resilience that must be harnessed to withstand the stresses and shocks associated with violence and conflict. Other countries, including Rwanda, Uganda, Sierra Leone and Liberia, have managed to do so and are, in spite of many obstacles, meeting important SDG targets.

South Sudan is today embarking on a mission to achieve Agenda 2030 and its 17 Sustainable Development Goals (SDGs), the global and universal goals to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The country is starting this process from a very low base in a context of an active conflict and humanitarian emergency. This report aims to examine the state of affairs in each SDG area, but also offer ideas and guidance on achieving the SDGs in this challenging environment. At the time of writing, the scale of the multiple crises affecting the country is immense. Armed conflict is affecting nearly all parts of the country, four million people have been displaced from their homes and some six million are severely food insecure. Humanitarian agencies are, rightly, at the forefront of the response efforts, and are undertaking essential life-saving activities. Despite the urgency of humanitarian challenges, there is also a need to balance relief with responses that address the needs of South Sudanese over the long term. The SDGs are not intended to be applied only once conflict has ended but are integral to early recovery efforts and can help build a future based on common aspirations and equal opportunities for all people. Therefore, this report stresses the importance of shared objectives, strategies and approaches between humanitarian and development actors.

Today, nearly all available data on the SDGs paint a grim picture, and the main underlying factor is the ongoing armed conflict. Finding a lasting political resolution to the conflict and building a peaceful, just and inclusive society, as expressed in SDG 16, was the most urgent and widely expressed priority of stakeholders consulted for this report. SDG 16 is also seen as an ‘enabler’ that can unlock pathways in most other SDG areas and build the foundations for longer-term development. Restoring security among communities is the single quickest way to increase school attendance, boost agricultural productivity, facilitate access to markets, and achieve more inclusive economic growth. Similarly, addressing the conditions of and finding solutions for the country’s displaced people, and enabling them to make informed and positive choices, is needed to make progress on the SDG framework as a whole. Long-term progress on the SDGs will require more inclusion of marginalized groups and increased accountability in the political and governance spheres (alongside technical and capacity building approaches) and establishing what an equitable and representative South Sudanese state and society can and should look like. It will require addressing the very real justice and reconciliation needs of the people, as well as the historical (and more recent) grievances that underpin many inter-communal tensions and violence.

Additional findings reflect the need for unimpeded delivery of food aid and concrete steps to revive the agricultural sector and reduce food insecurity (SDG 2), which is increasingly widespread, and to improve access to quality education for all (SDG 4). They also call for eliminating all forms of violence against women and girls and making concrete advances on gender equality (SDG 5), and addressing years of economic stagnation and high inflations (SDG 8).

Approaches to addressing SDGs and other priority areas were deliberated as ‘critical pathways. They require applying SDG principles, accounting for the impact of the conflict, and defining desired and lasting outcomes. For instance, by applying the principle of ‘leave no one behind,’ SDG strategies can be advanced across the entire spectrum of South Sudanese society, irrespective of gender, ethnic or political affiliation, or socio-economic status. Similarly, recognizing how all the SDGs are ‘interlinked’ means that while some goals need to be prioritized, other (less recognized) goals neither can nor should be excluded. For example, gender equality (SDG 5) is overlooked in South Sudan, even though women and girls are disadvantaged in most aspects of public and private life. As such, strategies to promote the advancement of women and girls in society are needed, not only as part of SDG 5 but as part of all SDG efforts.

Delivering on the SDGs will require strategic, long-term efforts to alter the status quo and reverse harmful trends. Financing them will entail a structural shift from security-related spending to increased social expenditure. This must occur alongside an expansion of the tax base, and a diversification of the economy away from its dependency on oil. In addition to mobilizing domestic resources, revitalizing the global partnership for development (SDG 17) will also be part and parcel of bringing the SDGs to life in South Sudan. The process will be long and hard but the SDGs are integral to this young country’s development as a safe, thriving and cohesive society, with all citizens and the institutions that represent them working towards the wellbeing of the country.

The efforts and recommendations made throughout Regional and National Conferences (June, 2019 to November 2020) organized by South Sudan National Dialogue have provided a national framework for transformation and strategy reorganizations. The major issues highlighted are:

Commitments to take actions

- The R-TGONU is committed to implement Agenda 2030 and the SDGs, unite, repatriate and rehabilitate all the South Sudanese people in the improvement of their lives. An institutional structure has been established at high level to oversee the implementation of Agenda 2030 and the SDGs in the country.

- Harmonization of the national development plans and strategies with Agenda 2030 and the SDGs is a continuous process that needs to be implemented in all sectors of all levels of Governments.
- The technical capacity and knowledge levels on the Agenda 2030 and the SDGs needs to be developed amongst all the stakeholders: government, private sector, NGOs, CBOs and FBOs.

Peace and stability shares

- Peace and stability are prevailing through justice and the rule of law. This will support implementation of Agenda 2030 and the SDGs, and to harness the potentials of leaving no one behind in peace and leaving no one behind in development.
- Peace and stability will create opportunities for communities affected by the war to recover and develop, and to transform from relief and humanitarian assistance to rehabilitation and development.

Governance

- Adopt federal system of Government as has been the popular demand of the South Sudanese people since 1956.
- Formation of a unified national army characterized by equal number of individuals or percentages recruited based on the three greater regions (Bahr el Ghazal, Equatoria and Upper Nile).

Economics

- The current account deficit widened to 6.4% of GDP in 2019 from 4.5% in 2018. Exports of crude oil accounts for more than 95% which is expected to fund the current account deficit and boost foreign reserves. Private investments in the nonoil sector reached an estimated \$22 million in 2019. (AfDB, 2017). Economic growth is the major focus of the R-TGONU to derive other sectors development in South Sudan.

Agriculture transformation

- Transformation of the agriculture sector currently depend majorly food imports and food Aids given by Humanitarian agencies, through increasing productivity, adding value to agriculture production and targeting investment in agriculture industries and exportable agriculture goods, will accelerate the implementation of the SDGs.
- The national strategy for renovating the agriculture sector by increasing the allocated Government budgets to agriculture sector to bolster productivity.

Infrastructures

- Development and rehabilitation of infrastructures such as roads, bridges, airports, electricity and water facilities remain a major focus of R-TGONU of South Sudan.

Social transformation

- The social systems are changing from social affairs to social development, and the people and communities are changing from recipients of charities and humanitarian assistance to participants in development and producers of goods and services in their local communities
- The Multidimensional Poverty and Vulnerability Index for 2019/2020 was high estimated at 42%.

-
- South Sudan is experiencing high unemployment, gender inequality and food insecurity which must be harnessed through investments in education, especially girl child education program, jobs creation and employment opportunities.

Gender Mainstreaming

- The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) moves beyond statements guaranteeing equality and sets out measures aimed at achieving substantive equality in all fields and across all sectors. Gender equality and non-discrimination on the basis of sex are fundamental human rights, recognized by a number of international legal bodies and declarations and enshrined in most national constitutions. However, South Sudan national laws, customary laws or societal structures result in differential treatment of women and men remain at infant level while men dominate in most economic sectors compared to women.

Means of implementation

- Invest in Research to use of information and data to generate new knowledge for the SDGs, especially through engaging researchers in universities and the centers of excellence in the country.

2.1.2 Implementing Institutions, Support Agencies and challenges

The implementing institutions and support agencies are Ministry of Agriculture and Food Security (MAFS), Ministry of Environment and Forestry (MEF), Ministry of Water, Irrigation and Dams (MWID), Ministry of Livestock and Fisheries (MLF) IGAD and AfDB. The project implementation could be hampered by perennial insecurity in some of these countries and the impact of the COVID-19 pandemic.

3 MAIN LESSONS FROM PREVIOUS PROJECTS AND PHASE 1

South Sudan did not participate in phase 1.

4 CONTEXT AND GENERALITIES

4.1 LOCATION OF THE PROJECT AREA

Aweil Rice Irrigation scheme sits on a very virgin land and the farm's operations are not consistent over the years. This makes the land to regain its values once it starts to degrade. However, Land degradation due to cattle-rearing has also been widely observed in South Sudan. Though it is difficult to distinguish between bare earth caused by overgrazing and bare earth associated with tilled and empty fields for crops, the UNEP-ICRAF fieldwork and analysis made that observation in 2006 around the Aweil Rice Irrigation Scheme. Some of the abandoned cultivated land has reverted to bushland and could potentially be used for grazing. While land degradation is generally limited to strips alongside watercourses of the Lol river. It is severe in the drier land which is away from the wetlands. The primary cause of this degradation is overgrazing of pastures that are naturally vulnerable to erosion due to poor soil quality and low rainfall.

On the other hand, Kapoeta is a territory that exists in Eastern Equatoria state. It comprises of three counties as follows; Kapoeta East, Kapoeta North and Kapoeta South. Kapoeta Area was identified as intervention areas in South Sudan due to its location within semi-arid lands and its huge dependence on livestock resources though it is re-enforced with a few other agricultural activities. The area is faced with severe drought particularly in the eastern part as witnessed by the Team of Experts during the visits and therefore, it needs water reservoirs / hafirs (dams) and boreholes to reduce the runoff and store that water for agro-pastoral activities during the dry/harsh seasons. The water reservoirs/hafirs (dams) can store water for irrigation, domestic use and livestock. The area also experiences floods and inter-communal conflict (insecurity) associated with pasture and water sources.

4.2 PHYSICAL SETTING

4.2.1 Aweil Rice Irrigation Scheme (ARIS), Aweil Centre County, NBG State

Northern Bahr el-Ghazal (NBG) State is frequently affected by seasonal floods that usually happen due to heavy rains and excess river inflows from the catchments of River Lol, one of the primary tributaries of the White Nile.

Aweil Rice Irrigation Scheme in Northern Bahr El Ghazal has been in operation for years. This site has been chosen for evaluations with intend to expand its current irrigated area (Government of South Sudan, 2016). The maps below show characteristics of the project area. The scheme is located on the floodplain of Lol River.

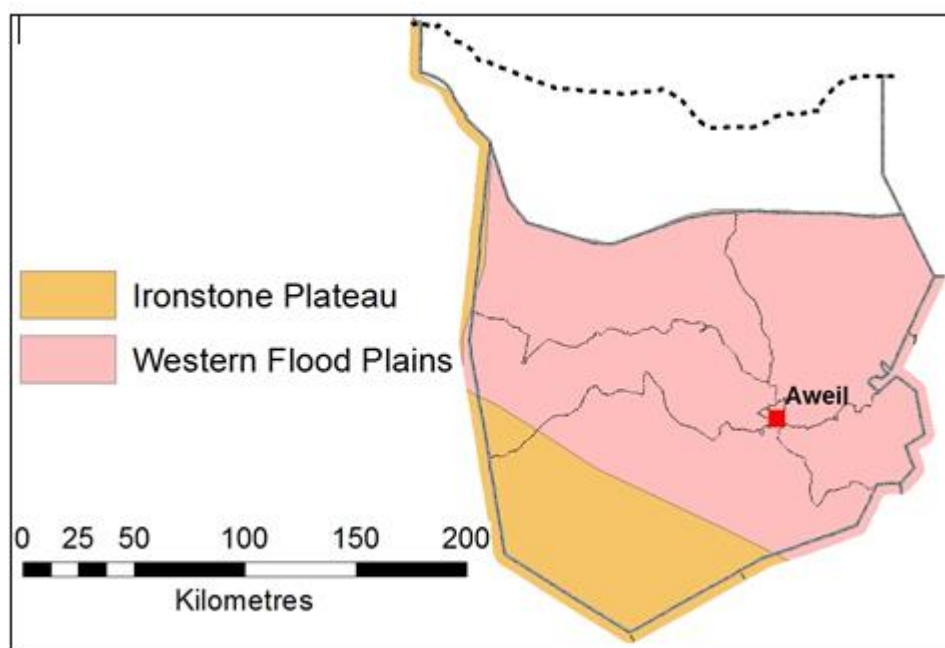


Figure 4: Agro-Ecological/Livelihood Zones across NBS

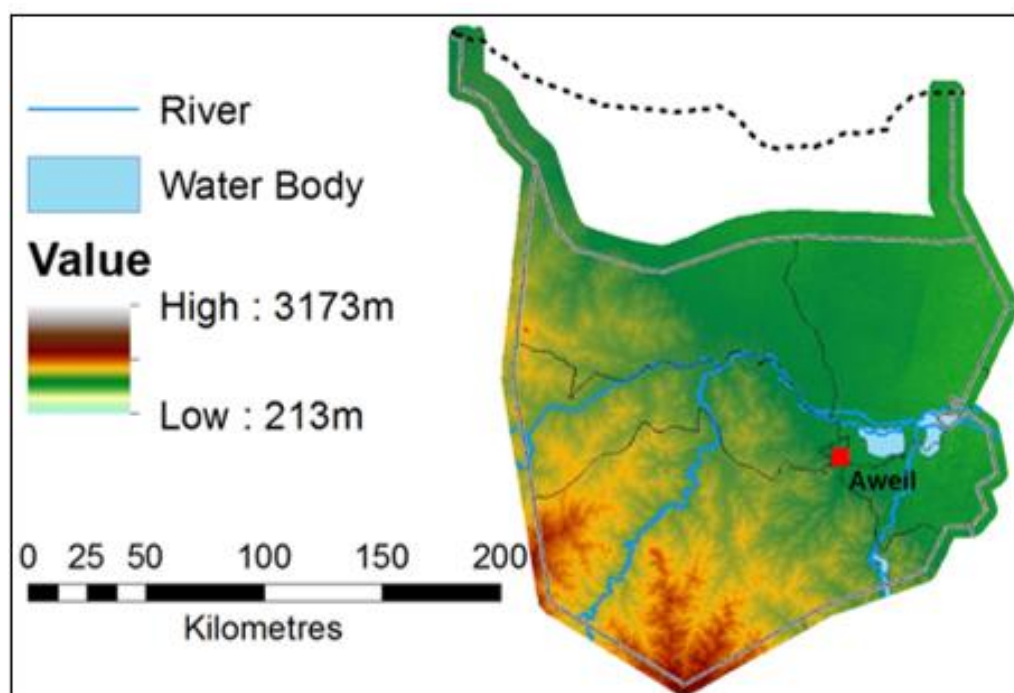


Figure 5: Topography of Northern Bahr el-Ghazal (NBS)

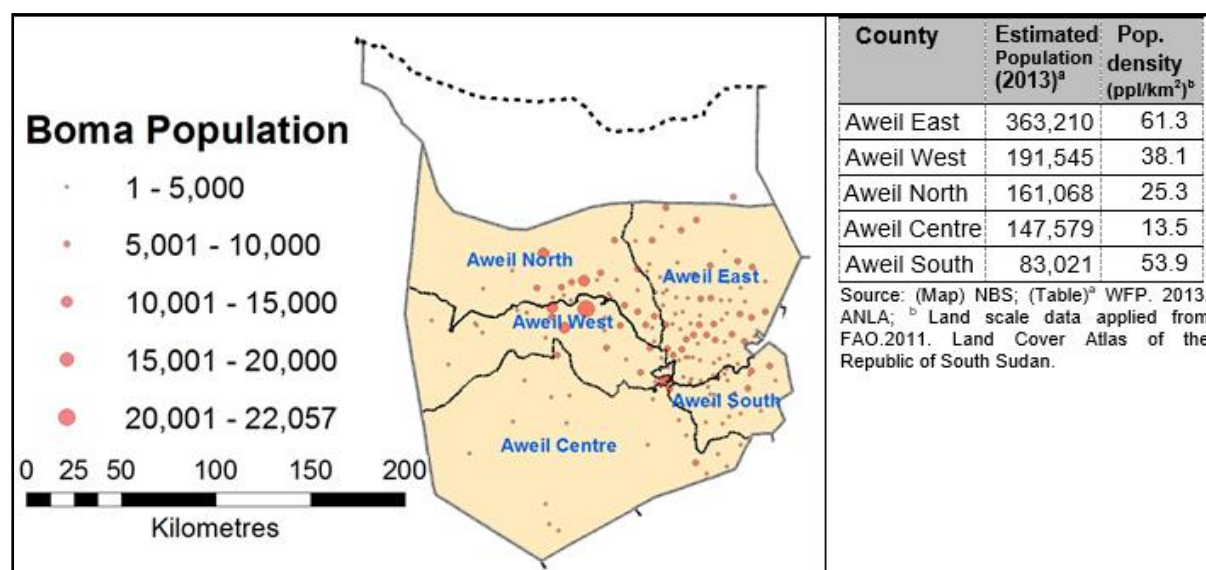


Figure 6: Northern Bahr el-Ghazal State Population Distribution by Counties

Aweil rice irrigation scheme sits on a very virgin land and the farm's operations are not consistent over the years. This makes the land to regain its values once it starts to degrade. However, Land degradation due to cattle-rearing has also been widely observed in South Sudan. Though it is difficult to distinguish between bare earth caused by overgrazing and bare earth associated with tilled and empty fields for crops. The UNEP-ICRAF fieldwork and analysis made that observation in 2006 around the Aweil Rice Irrigation Scheme. Some of the abandoned cultivated land has reverted to bush land and could potentially be used for grazing. While land degradation is generally limited to strips alongside watercourses of the Lol River, it is severe in the drier land which is away from the wetlands. The primary cause of this degradation is overgrazing of pastures that are naturally vulnerable to erosion due to poor soil quality and low rainfall.

In the period 2008-2012, the scheme was partially rehabilitated through the Aweil Irrigation Rehabilitation Project implemented by GIZ-IS under the Sudan Productive Capacity Recovery Programme (SPCRP), funded by the EU. During the project period, demining, dike and canal maintenance were carried out and agricultural machinery (e.g., large scale rice mill and heavy equipment) and technical assistance provided. However, after completion, the scheme has not operated effectively due to limited funds for operating costs and limited human resources. The Nile Basin Initiative recommended 3,000 ha expansion from existing land (Diao, You, Alpuerto & Filledo 2012). Both the community and technical workers inhabit the land around the scheme. The land, according to the government is basically in the hands of community leaders. The national government selected land for irrigation in which some parts of the land is not yet irrigated. The figures below present further information about Aweil.

As came in the RSS' IDMP (2015), in October 2012, GIZ-IS handed over the Scheme formally to the then MAFCRD, as the scheme is owned by the National Government and managed through the ARIS office in Aweil. The role of State Ministry of Agriculture and Forestry (State MAF) is to coordinate, advice and assist what the national Ministry requests them to do. The Scheme is run under the tenancy system. The Scheme's role is land preparation, providing seeds, sowing, water management, providing empty sacks, and transporting produce. Tenant farmers are to weed, manage water and harvest. In March 2013, Aweil Rice Farmers Cooperative Society Limited was officially established. The cooperation

between the Scheme management and the Cooperative will be expected to improve the rice production and marketing.

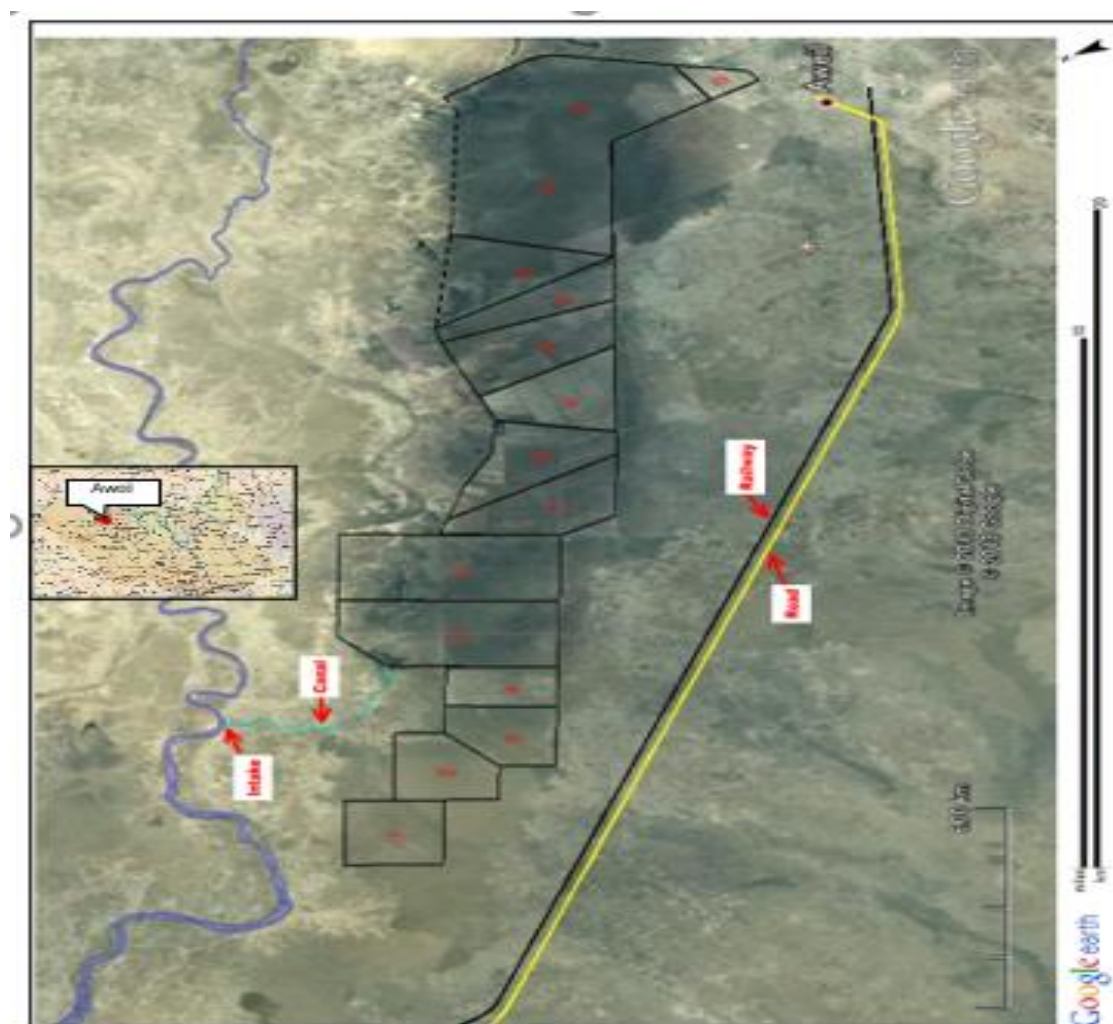


Figure 7: Map of Aweil Irrigation Rice Scheme (RSS' IDMP, 2015)

Also, in 2010 MWRI-RSS carried out assessments, surveys and designs to modify water delivery and control infrastructure configuration. Besides, preliminary management structure worked out then by the scheme rehabilitation taskforce, before demobilising, GIZ-IS facilitated management arrangement process between MAF, MWRI and NBG State Ministries responsible for Agriculture and Water/Infrastructure. With support of GIZ-IS, in December 2011, a study tour was organised to Kenya, to learn from the irrigated agriculture organisational structure, before an organisation is enacted for the scheme.

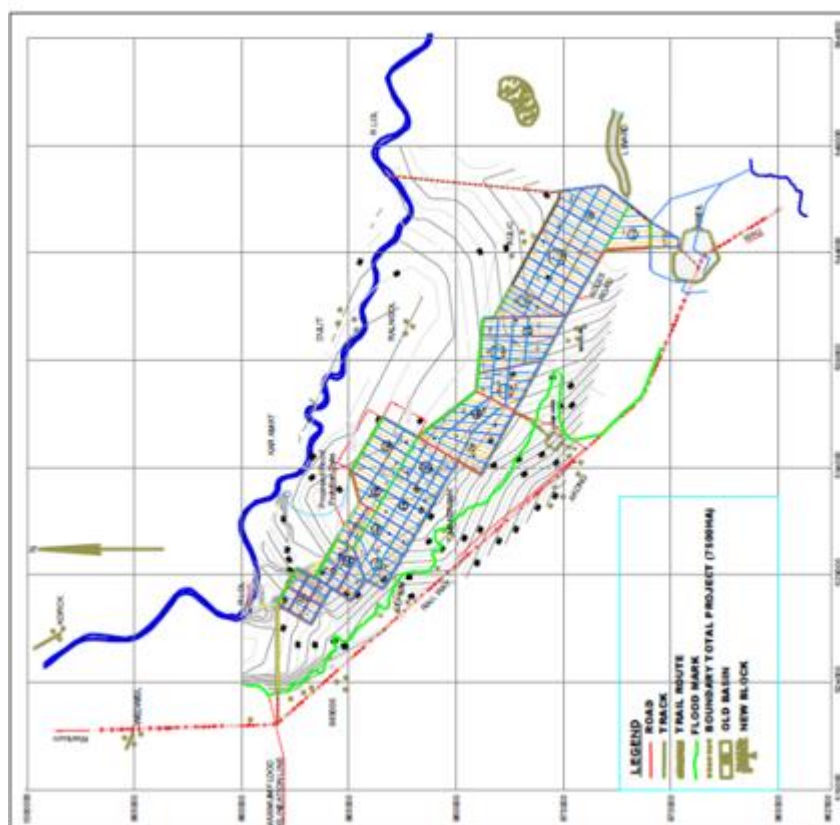


Figure 8: Preliminary System Layout for Aweil Rice Farm (7,500 ha) & Aweil Town Extended Drainage System (Amare & Families Consulting Engineers (ABCE) PLC for MWRI-RSS, Addis Ababa, Ethiopia, 2013)

4.2.2 Water Harvesting Interventions, Kapoeta Counties, Eastern Equatoria State

The second intervention site for South Sudan is Kapoeta. This is a territory that exists in Eastern Equatoria State. It comprises of three counties as follows of Kapoeta East, Kapoeta North and Kapoeta South. The geographical locations and populations of the counties in the state are as shown below.

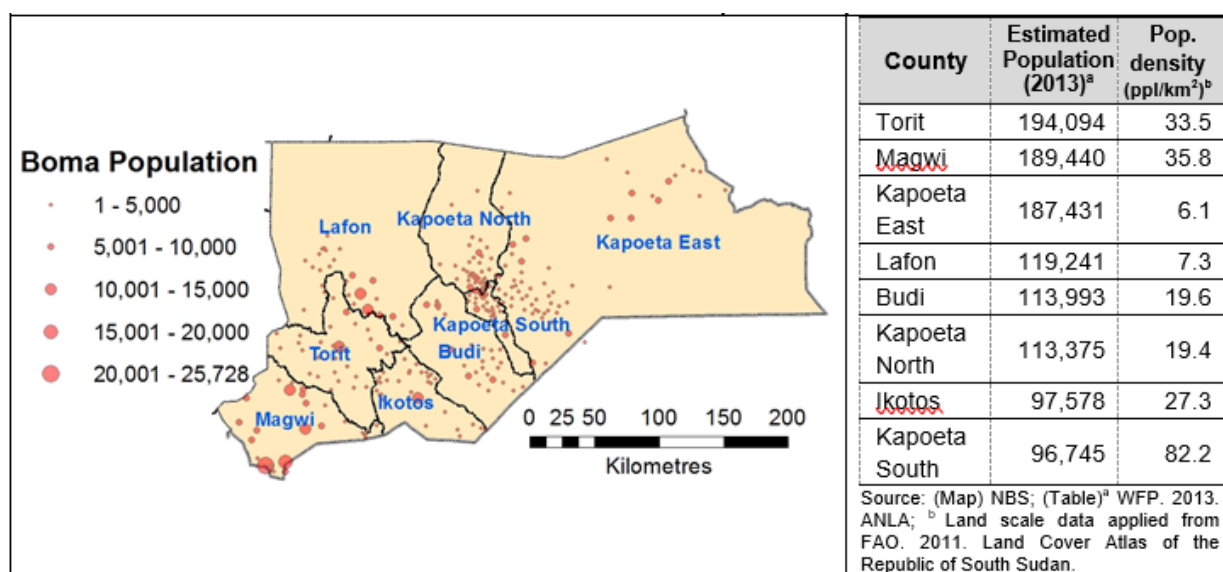


Figure 9: Eastern Equatoria State Counties and their Populations

The livelihood/agro-ecological divisions of Eastern Equatoria are presented as shown in Figure Kapoeta area forms the lowest part of Eastern Equatoria State. This makes it ideal for cattle keeping. The state land terrain is shown in Figure 17

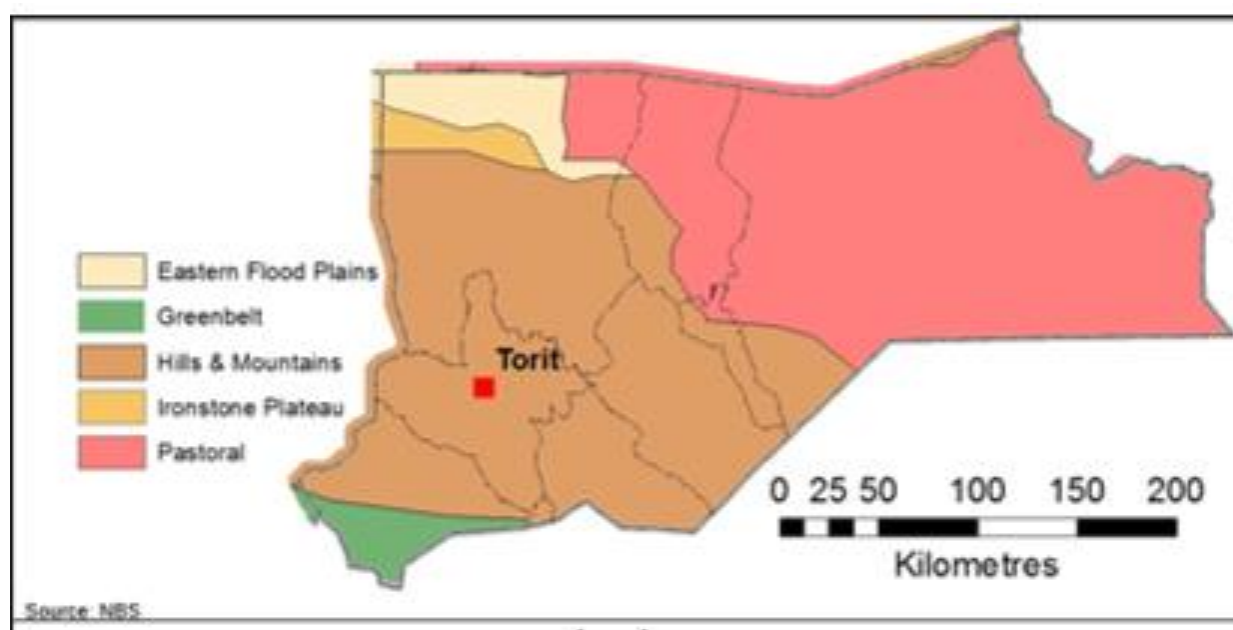


Figure 10: Livelihood/Agro-Ecological Divisions of Eastern Equatoria State

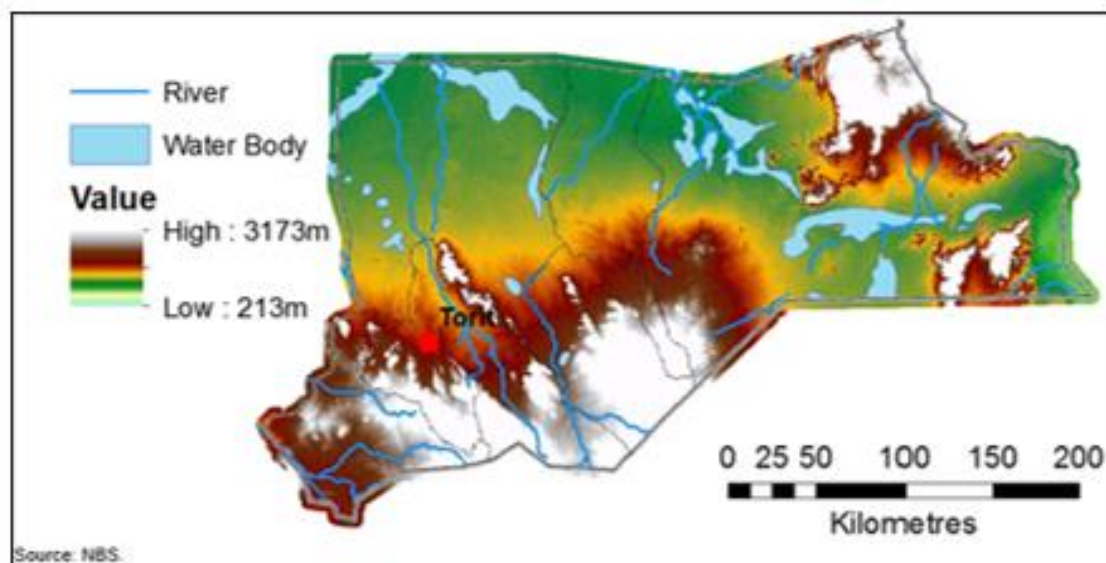


Figure 11: Topography of Kapoeta

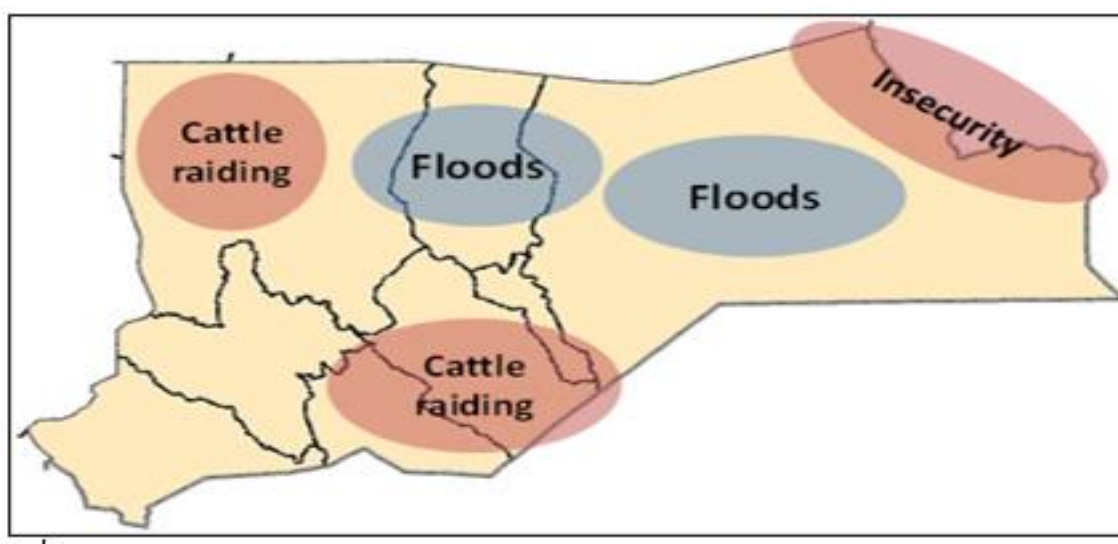


Figure 12: Insecurity and Natural Disasters (CAMP Survey Team, 2013)

It is evidenced that the entire Kapoeta area depends on animal produce though it is reinforced with a few other agricultural activities. Hence, there is a sizeable livestock population in the area. The area experiences drought, flood and insecurity associated with pastures and water sources.

Mobility in search of water has increased cattle rustling in the area. The proposed intervention is the construction of water harvesting structures, to store wet season water for cattle, small-scale irrigation (horticulture), domestic use and other livestock during the dry the seasons.

UNDP through the South Sudan Recovery Fund (SSRF) constructed a 30 million cubic-meter water reservoir (haffir) in Kapoeta East County. This water reservoir reduced the frequent migration of the Toposa in the area, which drastically deflected tensions and violent conflicts often associated with migration (FAO/WFP, 2013). Through MDTF & SSRF, more other reservoirs were also constructed in the Greater Kapoeta Area. This kind of infrastructure is costly and also leads to the degradation of rangelands in the long run (Musinga *et al.*, 2010). Therefore, a cheaper rangeland-friendly and more localized infrastructure suitable for community management is needed. Improvement of the design and

construction of water harvesting and storage structures/facilities, to address principles of integrated water resources management (IWRM) has been initiated by the Republic of South Sudan (RSS) Ministry of Water Resources and Irrigation (MWRI), with the emphasis being: Establishment of combined water facilities for safe and integrated utilization and management of seasonal waters, for multiple use, including horticultural and vegetation plantations. The Netherlands then supported piloting of the concept in Lakes and Eastern Equatoria States. Under water for Eastern Equatoria (W4EE) Project, implemented by NIRAS with the support of the Netherlands, Water for Productive Uses (WPU) Component possible community managed¹ WPU infrastructures were established. These included haffirs, pans, charco dams and subsurface dams for which the communities are enlightened and trained on key concepts in community Participation to maintained and sustained water infrastructures.

These structures are made up of the key system components, namely: 1) Catchment Area/Source, which is an area above the source where rain falls and the runoff comes from; 2) Inlet channel, which is a channel that conveys water from the source and puts it into the structure; 3) Dam Embankment, which is a wall of excavated material; 4) Storage area/reservoir, which is the volume that is filled with water; 5) Spillway banks, which are the walls of the spillway to control top water level; 6) Spillway channel (a channel to safely discharge excess water to water course or away from the storage structure; 7) Pump house and elevated tank (storage); 8) Outlet/draw-off Pipe/pump, which works to take water out of the dam to the elevated tank; and 9) Perimeter fence (Constructed to prevent livestock, wild animals and children from entering the structure/reservoir area and contaminating the water.



Figure 13: Community Participation sessions on ownership, empowerment, coordination, sustainability measures, maintenance procedures and management

¹ Managed by the community water management committee, in coordination with County and State Authorities for technical and other resources backstopping.

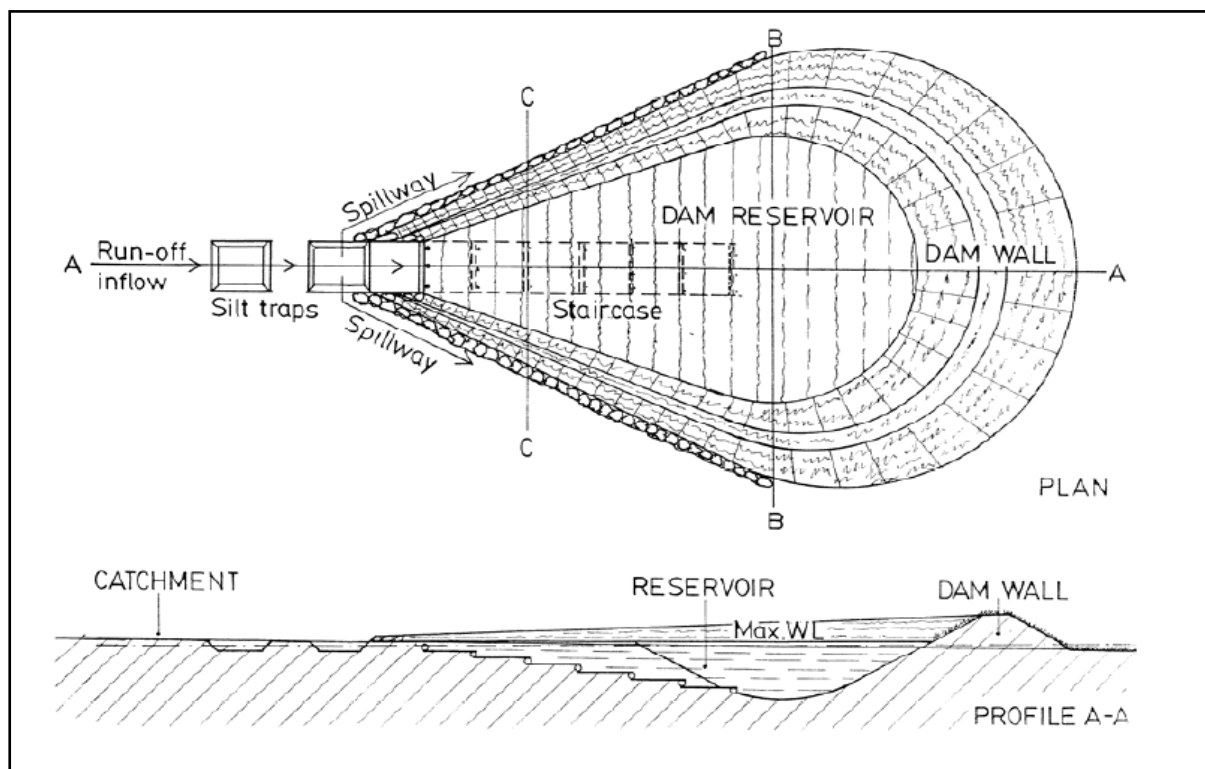


Figure 14: Some Water Harvesting Structure System Components

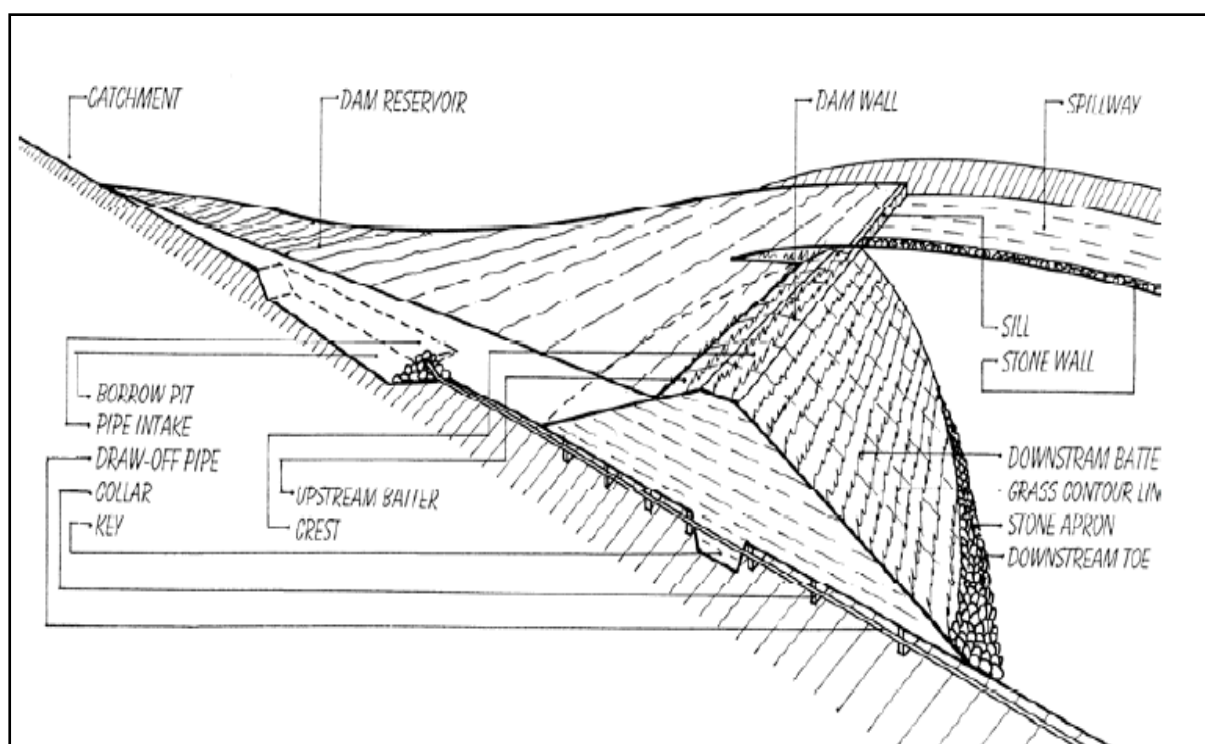


Figure 15: Typical Dam Facilities



Figure 16: a Hafir



Figure 17: Lotiyan Subsurface dam under construction

4.3 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE STUDY AREA

Gender Focal point of projects in South Sudan is to master gender mainstreaming and guiding project profiles. For example, the ‘subsistence farmer sorghum production project’ recognizes women’s role as the major producer of sorghum as well as their role in the home and local society, recommending: -

- 1) Consideration of gender balance in participants’ selection;
- 2) Collection of gender disaggregated data in baseline and end-line surveys;
- 3) Attention to the risk of gender disparity;
- 4) Gender training for extension workers; and
- 5) Involvement and consultation of gender experts.

The master plan also has a gender specific project for institutional development, ‘gender capacity development project’, aiming at gender mainstreaming of programmes and policies of the ministry. By contrast, policy development project, such as ‘establishment of a firm legislative framework project’ does not have gender analysis. The project tried to incorporate gender perspectives, producing positive results. However, there is room for improvement, requiring a review of how activities can be gender mainstreamed. For example, only ‘giving gender consideration’ for participating farmer selection may not lead to the intended outcome. Because most crop producers are women, it may be better to set the minimum level of women’s participation to at least 50%.

For women participants to garner family support, projects must inform family members of project activities and the role of family members as supporters of the women participants.

Women’s have limited access to technology, and lacks of understanding of women’s rights to land are identified as barriers for agricultural development. Therefore, all projects must raise awareness of gender and regular gender training of government staff and agriculturalists.

Gender relations in South Sudan are shaped by social and economic realities. However, since independence there has been a real change in national policies and laws on gender equality. The Transitional Constitution of 2011 Bill of Rights provides equal access to education by both male and female. There are more women than men due to the effect of the war. Educational rate is low in South Sudan, about 27% of the young adults’ population is illiterate, and 40 % are male at the age of 15 – 40 compared to 60 % female at the age 15 – 40. UNICEF estimates that 70 % of children enrolled to school age ranging from 6 – 17 years. Alternative Education System was formed to cater to those who missed educational opportunities. Originally created to target ex-combatants, this system serves many men and women out of school.

South Sudan population is young and has youth unemployment pressure. Vocational centres are mostly not functional. Those that are functional offer mostly similar courses that may not meet the needs of the market. Furthermore, multiple institutions offer vocational training under different government agencies, but lack of coordination results in the duplication of courses. Male children use small imitations of the adult gear, and also use pole and line as a recreational and food gathering activity after school (or instead of school). Female children accompany their mothers and assist as far as they can in any fishing operations.

The National Gender Policy (NGP), 2013 affirms that, South Sudan is a “highly unequal society” in terms of access, control, and ownership of resources between men and women. Despite the provisions in the Land which accords equal rights to women and men, women’s land rights are still insecure, and even widows’ land rights are often not respected. Land is generally owned and controlled by men. The

Comprehensive Country Gender Assessment 2012 shows that, women in general have access to land but limited ownership and control over the key productive assets. This results in their marginalization from decision making in key socioeconomic processes and activities.

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) moves beyond statements guaranteeing equality and sets out measures aimed at achieving substantive equality in all fields and across all sectors. Gender equality and non-discrimination on the basis of sex are fundamental human rights, recognized by a number of international legal bodies and declarations and enshrined in most national constitutions. However, South Sudan national laws, customary laws or societal structures remain at infant level, resulting in differential treatment of women and men, as such men dominate in most economic sectors compared to women.

4.3.1 Customary laws, norms, values and gender in natural resource management

Several Researches have been conducted on customary laws, norms and values in South Sudan. As any other African countries, Customary laws has been the primary sources of social order that cement, holding together South Sudan communities, tribes linking various tribes' groups population of the region (chief Thiik a symbolic affirmation of South Sudan culture, tradition and indigenous identity). However, each tribe group in South Sudan has its own discrete part of customary law and effectively there are fifty separate bodies of customary laws. Decentralized customary legal systems include the Dinka, Nuer, Bari and Fertit tribes. Central authority systems include Zande, Shilluk, and Anyuak kingdoms, which tend to be based around powerful, centralized hierarchical structures. Although South Sudan is relatively egalitarian, traditional and religious perception about women and gender socializations is in balanced in terms of power status for women and girls and management of resources. The most problematic issue for women empowerment in customary law is women property ownership. Even though the land Act and other Laws ensure women rights to own property, yet there are no permanent regulations operating to protect women. Women from Dinka a pastoralist ethnic group do not own cattle.

4.3.2 Cross-community conflict management arrangements (local conventions, Protocols, Treaties, etc.)

South Sudan achieved its independence in 2011 after two civil wars; politically unstable leading to political clashes in 2013 and July 2016. The conflict has affected South Sudan population socially, economically, physically and psychologically. South Sudanese women were mobilised as soldiers or supporters during the war; and women groups struggled to play a big role in peace negotiations successfully, from grass roots level to top management level. In 2016, South Sudan launched the National Action Plan to implement UNSCR 1325 on peace security; and ratification of the convention of elimination of all forms of discrimination against women (CEDAW) is still in progress.

4.3.3 Survey on women role in macroeconomic framework and natural resources exploitation

83% of the South Sudan populations are living in rural areas, with subsistence agriculture, forest, pastoralism and fisheries as source of live hood. Women play a vital role (up to 60.2% of agricultural labour), but with limited access to production due to their low literacy and the lack of female agricultural extension workers. The country cereal is 48% for all total consumption, livestock 30%, fish 4%. Sorghum, maize and casaba are the main crops cultivated with a greater role taken on by female farmers. UN women with partners supported women farmers in management of farmers' cooperatives in several counties in South Sudan. South Sudan oil is 97.8 % of the national revenue; agriculture is not much

active with low contribution to Gross Domestic Product (GDP). Annex 3 provides excerpts of the South Sudan macroeconomic framework.

A Technical Assistance (TA) by UN Women supported Bureau of Statistics to conduct a baseline study on gender, to develop a National Plan on Gender and extractive industry policies and laws that were passed. Unfortunately, gender perspective is not balanced, the role of women in managing resources is not effective as documented with UN women support in the Government of the Republic of South Sudan (GRSS) Petroleum Policy; Mining Regulations (2013); and Mining and policy framework for the minerals and mining sector (2013).

4.3.4 Gender strategy and policy

Gender strategy and policy study in South Sudan has been collecting data (both quantitative and qualitative) from the strategies in the ten states (Oxfam, 2017). The study conceptualised on filling the gender gaps in policy making. More than half of the respondents are affected by gender-based violence, almost 60% gender disparities, high rate of illiteracy about 85%. However, Gender needs to be institutionalised in public institutions, Gender mainstreaming in policy to address practical and gender needs, such as improving women's conditions in decision making positions to influence change in the society, promotion and protection of the dignity of women and men, poverty eradication projects collateral. International, regional, national instruments including the convention on the elimination of all forms of discrimination against women (CEDAW).

National Action Plan (NAP) requires women's specific needs to be met in conflict and post conflict. The Comprehensive Peace Agreement (CPA) provides 25% women's representation in private and government institutions as Gender main streaming strategy. This was increased to 35% during Transitional Government of National Unity (TGoNU) of the Agreement for the Resolution of Conflict in South Sudan (ARCSS) peace process. UNSCR 1325 on women peace and security (2000); AU and IGAD Gender Policies; Maputo protocol; East Africa Gender Policy and the national government of South Sudan developed and integrated women and child rights into the bill of rights under the Transitional Constitution of South Sudan (TCoSS), SSDP (2014-2016), National Gender Policy (2013) and the 2015-2020 National Action Plan (NAP) with four pillars of prevention; participation; protection; and relief and recovery. United Nations Secretary General UNSCR 1820 as member of United Nations, South Sudan is obliged to confirm to international and regional legal instruments in respect to women's rights.

4.3.5 South Sudan National women's strategy and action plans

Appropriate gender awareness by focusing on short-term, mid-term and long-term projects income generate opportunities (collateral). All reviewed projects to build the capacity of the community understand the importance of the incorporation of gender perspectives. However, the level of understanding of gender and gender mainstreaming varies, which may result from the nature of the project and the general level of understanding held by the experts. Each project has appropriate entry points to further promote gender mainstreaming. Development assistance for South Sudan needs both short-term works to bring immediate benefits and medium-term or long-term work to address structural issues.

UN Women South Sudan (2016) supporting Government/NGOs to build capacity of women (women empowerment skills); equal access to land and other resources for both women and men; and civil society organizations raising the awareness to families about the value of girl child education; changing stereotype, attitudes cultures, girls considered as property of the family, etc. As the issues of economic empowerment and gender-based violence are intertwined, women's economic empowerment cannot be achieved without addressing the issue of violence. Social and psychological benefits brought by participation in economic activities must receive due attention.

National Action plan promotes programmes on taking into account the dimensions of vulnerable groups, girls and women; maintain human dignity and human rights. Moreover, protect and support women, girls in rural areas and disabilities. Restore and implement National Action Plan with evidence data for planning and policies. South Sudan Nation Action plan (2015 – 2020) promotes girls and women needs as a priority in plans initiated by government in programmes from grassroots at sub-national level management system to national level. Government and stakeholders should respond and adjust programmes to changing environment, vulnerable groups, widows and conflict affected areas in terms of shelter in IDP's camps; responses to GBV due to inadequate shelter; and enforcement of laws to promote girls' education, address early marriage and lack of sanitary pads for girls. Government promotes basic education for all because a great number of boys and girls lack resources.

4.3.6 Mapping of the ongoing or planned projects to promote women, men, boys and girls & vulnerable

The government is supporting long-term strategic needs, focusing on education as foundation for better national building. Gender needs to be institutionalised together with National Gender policy in constitution and live hood to improve resilience and reduce dependence on aid assistance. Women rights organizations delivering programs on Gender mainstreaming and Gender Based violence (GBV); and at government level (the Ministries of Labour, public service and human resource development) are balancing equal representation on Human Resources recruitment. Professional associations (Trade Unions) establishments to work on welfare of vulnerable (boys, girls, men and women) and building strong political network to advocate for women.

The Ministry of Gender, Child and Social Welfare ensures implementation of Gender mainstreaming in private and public sector, to improve the socio-economic status of vulnerable women thorough support to: 1) women's economic empowerment (resources mobilization strategy); 2) increase women in leadership and decision-making positions; and 3) increase women's participation in technical positions. The Ministry of Justice and Constitutional Development supports women participation in peace talks, especially in peace building initiators and conflict resolution.

Annex 8 provides envisaged gender mainstreaming aspects of projects in South Sudan, in guiding programmes/project profiles.

4.3.7 Trade, marketing network, goods and services

The recent civil war was a major setback in the development of local markets and marketing channels; and the undeveloped transport network will constrain its recovery. As such South Sudan remained as a host Country of Aid Assistance with a lot of challenges including refugees, internal displacement, communal violence and border tensions.

4.3.8 Cooperatives, credit unions and markets

NGOs play important role in delivering basic services to the community, strengthening the capacity of the locals by empowering the community economically with support of credits (FAO). Currently there are three primary types of markets existing, namely: 1) rural primary markets located in villages and often held on a periodic basis; 2) rural assembly markets located in agricultural surplus areas; and 3) urban retail markets, serving consumers in main towns and cities. 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 produces directly off the back of their trucks instead of operating shops or warehouses (Henderson, 2015).

Most market places are now concentrated near Juba; and there are markets in other urban and rural areas, but supply channels are not organized.

4.3.9 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. 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 to enhance growth in the financial sector of the country.

4.3.10 Trade in agriculture, livestock and fisheries

South Sudan is located in the Horn of Africa (HoA) region with the greatest concentration of livestock resources in Africa. Moreover, the HoA region is a gateway to the Middle East and northern Africa, which are home to the largest live animal trade in the world (FAO, 2014). The trade is composed of both an informal and formal market that finds livestock moving through South Sudan into the surrounding countries. But, South Sudan's agro-industry is at infant stage; with dominant currently is a crude oil and gum Arabic industry. Trade in crops and livestock products are done mostly in raw or unprocessed, which is traditionally unorganized in nature.

A large number of wholesale markets operate across South Sudan for crops, livestock and fish trade. However, the situations of these markets remain inadequate with lack of basic hygiene and structure for key connected activities of handling, storage, packaging and trade. The scaled commercial processing is limited to select commodities, leaving important unexploited chance for growth in revenues and jobs from value addition.

4.3.11 Transport networks

South Sudan's transport network is extremely underdeveloped. Most respondents to a 2013 household survey in 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). The country's road density is the lowest in Africa with 15 km of road per 1000 square km² of arable land. Of the estimated 12,642 km.sq of roads in South Sudan in 2013, about two percent were paved and only about 4,000 km.sq 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, with renting of a 25-ton truck from the Uganda border to Juba, costing about US\$2,000, which contributes to high food prices.

4.3.12 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, namely: 1) government run (concrete); 2) commercial facilities, such as concrete warehouses; and 3) 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.

4.3.13 Marketing and trade capacity building support

The R-TGONU formed in February 2020 is determined to build the capacities for trade policy and improve the South Sudan's private sector with one of its goals focused on rapid expansion of the country's production capacities. In order to speed up these efforts, the R-TGONU intend to improve ITC to support setting up of an inter-ministerial trade-policy working group and assist in organizing national consultations. Both institutions were also asked to help facilitate the development of policy frameworks for trade, industry and agriculture to support the building of a dynamic and competitive private sector in South Sudan.

4.4 MACROECONOMIC FRAMEWORK

The recent civil war was a major setback in the development of local markets and marketing channels; and the undeveloped transport network will constrain its recovery. As such South Sudan remained as a host Country of Aid Assistance with a lot of challenges including refugees, internal displacement, communal violence and border tensions.

4.4.1 Cooperatives, credit unions and markets

NGOs play important role in delivering basic services to the community, strengthening the capacity of the locals by empowering the community economically with support of credits (FAO). Currently there are three primary types of markets existing, namely: 1) rural primary markets located in villages and often held on a periodic basis; 2) rural assembly markets located in agricultural surplus areas; and 3) urban retail markets, serving consumers in main towns and cities. 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 produces directly off the back of their trucks instead of operating shops or warehouses (Henderson, 2015).

Most market places are now concentrated near Juba; and there are markets in other urban and rural areas, but supply channels are not organized.

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4.5 BENEFICIARIES OF THE PROJECT

- The local communities in Aweil and Kapoeta areas
- The Government of South Sudan
- The private sector
- Researchers/academia

5 POLITICAL AND INSTITUTIONAL FRAMEWORKS FOR NATURAL RESOURCE MANAGEMENT

Political will to implement government programs is needed to ensure sustained economic growth and development, which is led by a vibrant private sector will be crucial for South Sudan's future prosperity and for mitigating the potential for future conflict as proposed in South Sudan Development (SSDP) during the post-CPA era (2011-2013). For growth to be pro-poor, it must be both diversified and equitable. The initial emphasis was supposed to be on using oil wealth to drive economic recovery and development in the country. This would have enabled the poor to participate in and to benefit from the growth process. It is vital that the economy is diversified to create the much needed employment and livelihood opportunities. Employment generation and improved livelihoods (especially for ex-combatants and youth and women) is not only important for poverty reduction, but is central to maintaining peace and security. South Sudan is endowed with abundant natural resources including a large amount of fertile cultivable land, land that is potentially irrigable, aquatic and forest resources as well as mineral resources. Given these natural resources; a youthful but low capacity labor force, and the current low productivity and investment levels, the greatest potential for initial new growth is likely to be from the small-scale private, predominantly family, agriculture and livestock sectors. A core target for economic development is to sharply increase food security by lifting cereal production from 0.7 million MT per year to 1.0 million MT and meat, milk and fish production similarly (SSDP, 2011).

An integrated set of mutually reinforcing initiatives was planned and implemented to remove impediments and achieve the economic development objective by initially focusing on renewed rural development and diversifying into broader private sector development which were however brought to a standstill by the 2013 conflict. These are:

- **Extending and upgrading transport infrastructure, especially roads.** This is critical to connect farmers to markets and includes plans to asphalt 700km of trunk roads and 1000km linking major towns; expand the feeder road network, and strengthen maintenance for all roads.
- **Clarifying issues pertaining to land to ensure access and tenure.** A revised Land Act is being prepared to create an appropriate policy environment for peace, successful conflict resolution and private investment especially in agriculture and natural resources but also in urbanization. Access to land for returnees is to be secured to lessen related pressure for conflict and help rural growth. Returnees and former combatants, and women and young people, must have access to land in order to participate in this renewed rural growth.
- **Improving access to extension and veterinary services, basic farming tools and inputs, and markets.** An integrated extension system is being jointly developed by GoSS and states, together with the continued provision of basic agricultural tools and access to input for all, including women, returnees and former combatants.
- **Ensuring that there is a stable, transparent and supportive policy and regulatory environment for private sector development.** *Doing Business in Juba 2012* provides a baseline for several business environment indicators. The Ministry of Investment (MoI) and the Ministry of Commerce and Industry (MCI) are leading the development and implementation of actions to address key constraints to rapid private sector development. A one-stop investment shop is being established and key laws are already drafted (e.g. Companies Bill, Insolvency Bill, Insurance Bill, Microfinance Institutions Bill, Competition Bill and Import and Export Regulation Bill), will be enacted and implementation systems established.

- **Deepening and broadening financial services.** Strengthening governance and the rule of law, establishing new laws regarding the business environment and land, and resolving key issues regarding securitization will all facilitate the extension of financial services.

The roles of public sector organizations will be a critical factor for natural resource management. It is important to understand how national and state ministries function and their relationships with lower levels of government, such as counties, payams and bomas. The Ministry of Agriculture and Food Security, Ministry of Environment and Forestry, Ministry of Livestock and Fisheries, Ministry of Wildlife Conservation and Tourism, Ministry of Gender and Social Welfare, Ministry Cooperatives and Rural Development, Ministry of Finance and Economic Planning, Ministry of Petroleum and Mining, Ministry of Trade and Commerce, and Ministry of Water Resources and Irrigation are responsible for exploitation and management of the natural resources at the national level while the lower levels of government are the actual implementers of programs.

5.1 ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

Since Independence of South Sudan 2011, the government has adopted series of policies as guidance in response to the emerging environmental problems to managing challenges in resources of the Country. The goal of the South Sudan National Environment Policy (SSNE) is to ensure protection and conservation of the environment and Sustainable management of renewable resources in order to meet the present population and future. Moreover, Transitional Constitution of the Republic of South Sudan have a right to clean and healthy environment, every person is obligated to protect the environment for the benefit of the present without comprising the future generation.

South Sudan experiences a wide variety of environmental problems, including soil degradation due to the widespread deforestation with consequent loss of arable land, biodiversity and wildlife habitats, pollution of rivers and the environmental due to oil drilling in the wetlands, over-exploitation of fisheries and conflicts over diminishing resources such as rangelands and water sources for livestock (WHO, 2021). The other most striking impacts relating to climate change and environmental degradation on water, soil, forests, biodiversity, agriculture and fisheries, observed and recorded thus far in the country include the drying up of permanent rivers resulting in seasonal rivers, the reduction of water tables in boreholes, and the delay and shortening of rainy seasons; increased soil degradation due to water erosion, wind erosion and fire; accelerating deforestation due to wood being collected for fuel, charcoal production, livestock, agriculture, bricks, and collection of construction materials; reduced wildlife populations due to war-related hunting with a limited possibility of recovery in many areas; lowered agricultural revenues per hectare due to unpredictable rains and soil degradation; competition for drinking water between people and livestock and habitat degradation for livestock and wildlife due to vegetation degradation and desertification, especially in the north and south-east of South Sudan; and loss of fish species and reduction of fish size as a result of rivers becoming increasingly seasonal (UNEP, 2016). The ongoing conflict and insecurity and recurring climate related disasters such as floods and droughts have a serious impact on livelihoods, particularly on sources of food, which leads to food insecurity and poor nutrition.

To solve these problems of environmental degradation and create sustainable economic development, there is a need for new policies to manage and protect the environment more effectively on a sustainable basis and improve living standards of those in need. The worldwide environmental and development issues were addressed by United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro, Brazil, 1992. South Sudan ratified the two international environmental conventions; UNFCCC and UNCBD. Sustainable development is defined as the development which meets the needs of the present without compromising the ability of future generations to meet their own need (Brundtland Report, 1987). Sustainable development encompasses the interlinkages of the three dimensions of economic growth, social development and environmental sustainability (ECA, 2015). The environment is considered the source of life and gives rise to economic activities, which in turn

sustain social development. Without growth, there will be no social development. This, however, is not necessarily a linear relationship as the environment also directly influences social development. The challenge of sustainable development is to achieve a balance in interrelationships among the three dimensions. Economic growth therefore has to be environment-friendly and socially responsible. For economic growth to be sustainable, efforts need to be directed to an efficient and sustainable use of natural resources; agricultural practices that are environment-friendly; renewable energy development; less-carbon intensive production of goods and services, including efficient transportation; and less intensive production and consumption of resources, goods and services, among others. These promote efficient and resilient production systems, and minimize resource depletion, degradation and greenhouse gas emissions, thus leading to stronger and more resilient economies. The three dimensions of sustainable development are cast in the overarching role of governance and institutions. For the nation and region, governance and institutions in particular are fundamental to sustainable development, as they provide the foundation on which economic growth, and socially responsible and environment-friendly development rests. Enabling governance environment and functional institutions provide constitutional, accountable, regulatory and legal frameworks for productive activities to thrive under, which in turn will enhance sustainable development. In addition to common cross-cutting issues such as governance and institutions, peace and security, financing, capacity development and technology transfer, the following issues were identified as key sub-regional sustainable development priorities in Eastern African where South Sudan lies, and include high and sustained economic growth to translate into jobs and human development; improvements in education and skills development; increased agricultural productivity and value addition; sustainable energy development; improvements in access to affordable health care; tackling environmental and climate related challenges; and infrastructural development (ECA, 2015).

5.2 AGRICULTURAL DEVELOPMENT AND VALUATION OF NATURAL RESOURCES

The government of South Sudan has put in place various measures that address impacts of the country's agricultural sector; however, the different levels of insecurity in the country has delimited the advances in this area. Accordingly, UN Environment (2018) stipulated that the following strategies and plans or policies have been embraced by the government and put in place to guide the development of agriculture and fisheries in the country, namely:

- 1. The South Sudan Development plan (SSDP) – this strives to (a) prioritize the agricultural sector and various infrastructures for economic development and (b) prioritises the fisheries sector for economic development.
- 2. The Ministry of Animal Resources and Fisheries (MARF) Framework and Strategic Plan 2012-2016. This Framework to be implemented by the Department of Range Management in collaboration with relevant agencies, in range and livestock research, and wildlife activities. They are tasked to promote best animal husbandry, range management practices and will promote the criminalization of cattle rustling and to create awareness amongst livestock rearing communities on the risks associated with cattle rustling (MOE, 2015).
- 3. The agricultural sector policy Framework for 2012-2017. With the few examples below this framework aims to: -
 - Enhance mitigative measures to the adverse effects of climate change in the long term and to collaborate with the Ministry of Environment and Forestry in developing a National adaptation action plans to pinpoint priority areas for response to the effect of climate change.
 - A green agricultural policy that minimises environmental pollution and promoting practices of agroforestry.
 - Mainstream gender in all agricultural practices and prepare dryland agricultural initiatives.

- Promote and support research in germplasm utilisation and enhance information exchange.
- Formulate and adopt a Plant Protection Policy and a seed policy to serve as the backbone of the conservation and protection strategy (MOE, 2015).
- 4. The Fisheries policy for South Sudan 2012-2016. This policy provides for a Framework to manage Fisheries resources and to: -
 - Maximise fishing while avoid overfishing.
 - Control diseases in aquaculture; control the introduction of aquaculture species.
 - Enhance aquaculture in areas where irrigation schemes and dams are created.
 - Address environmental concerns in aquaculture (MARF, 2012; UN Environment, 2018).
- 5. Comprehensive Agricultural Development: this area is cross cutting and covers the areas of: the agricultural, fisheries and livestock sub-sectors in accordance with CAMP which was formulated under the following principles.
 - CAMP is a government-led
 - Capacity development during the formulation process.
 - Coordination with other stake holders (RSS, 2015).
 - Formulation of an implementation plan.
- 6. Irrigation development Masterplan (IDMP), this is to be implemented by the Ministry of Energy and Dams and the Ministry of irrigation and Water resources and they will: -
 - Formulate master plans for Agriculture and irrigation that will be aligned to achieve economic growth (MEDWR, 2015).
- 7. National Agriculture and Livestock Extension Policy.
 - This provides for leadership in the management and organisation of the extension system in the public and private sectors and key features will be to include: - (a) Privatisation of extension services (b) Adoption of a pluralistic participatory extension services (c) Research priorities and messages that meet farmer needs (d) develop human recourse needs to meet emerging needs (e) Financing the Extension services (ALETF, 2011).

5.3 LAND MANAGEMENT (LAND-USE PATTERN AND TENURE)

The 2009, South Sudan Land Commission (SSLC) is charged with development of land policies and draft legislation to clarify and strengthen land administrative systems and the rights of landholders (USAID, 2013). The Transitional Constitution of 2011 states that all land in South Sudan is owned by the people of South Sudan, and charges the government with regulating land tenure, land use and exercise of rights to land. The constitution classifies land as public, community or private land, and requires the Government of South Sudan to recognize customary land rights when exercising the government's rights to land and other natural resources. The constitution does not clarify the extent to which customary rights can limit government's rights, but does require that all levels of government incorporate customary rights and practices into their policies and strategies. Furthermore, the Land Act, 2009, the Local Government Act, 2009, and the Investment Promotion Act (2009) were also developed to establish the institutions and mechanisms of governance that would address pressure points and fill vacuums created by conflict, uneven development and lack of transparency and accountability in land and its resource governance (GoSS 2011f; GoSS 2011g). The three laws establish the fundamental framework for the fair and transparent administration of land rights in South Sudan. The Land Act regulates land tenure and equally recognizes rights to customary, public and private tenure. The Local Government Act defines primary responsibilities of local government and traditional government authorities in the regulation and management of land, which includes charging customary institutions with particular responsibilities for administering community land rights. The Investment Promotion Act establishes procedures for facilitating access to land for private investment, including by foreign investors, in ways that balance the interests of both current right holders and investors. Although a

framework has been developed, government officials have a poor understanding of the laws and lack the capacity to interpret and carry them out. There is also a lack of awareness by the population as a whole, which further impedes progress (GoSS 2011e; GoSS 2011g). The SSLC also developed a draft Land Policy that strengthens the rights of land holders, communities and citizens within the new framework and guidelines established by the Land Act (2009). It emphasizes the importance of access to land as a “social right,” a feature of many customary land tenure systems that allows community members to access land irrespective of wealth or economic status (Deng and Mittal 2011). Customary law has governed the use of land in South Sudan for centuries, with each ethnic group applying its own laws relating to land and land rights within its own territory. Although they vary from community to community, customary institutions and traditional mechanisms continue to govern the access, use and allocation of land (USAID 2010b).

Under the Transitional Constitution of the Republic of South Sudan, 2011, the people of South Sudan own all the country’s land and its usage is regulated by the government in accordance with the constitution and law. The applicable law in this case as indicated above is the Land Act, 2009. Both the Transitional Constitution and the 2009 Land Act prescribe a three-category land tenure system divided into public land, community land and private land. Public land means all lands owned, held or otherwise acquired by any level of government from the National to State, County, Payam and Boma levels. Any unclaimed land by an individual or a community belongs to the government by a default. Community land includes all lands traditionally and historically held or used by local communities or their members. This category could include communal grazing lands for animals, hunting grounds or locations of traditional sacrifices and worship. Private land includes registered land held by any person under leasehold tenure, investment land acquired under lease from the government, and any other land designated as private land in accordance with the law. The implicit assumption in this framework is that all investment land or land for business is acquired from the government through the leasehold tenure. However, the government does not own enough public land to lease it for investment, and here comes the paradox of the law act saying the land belongs to the people. The reality as the Transitional Constitution dictates is that the government owns the land and all the people hold leasehold titles over their plots.

As the citizens of the country who were IDPS, and refugees in the neighboring countries are now coming back home to settle in their ancestral lands and livestock population growth has brought about increased tensions as cultivation expands into livestock routes and crops get destroyed in the process, more conflicts over land use are cropping up. The livelihood and mobility related tensions predominantly concern access to water and grazing land between pastoralists and agricultural groups but also among pastoralist groups themselves are not uncommon. As land is a basic asset for South Sudanese and any families without secure rights to land for a home or a plot to cultivate face significant obstacles overcoming poverty. Because of all these problems, land and other natural resources are being unwisely used thereby resulting into varied spatial and temporal degrees of land degradation, including deforestation, erosion, soil infertility and productivity decline.

The land tenure system in South Sudan

The 2009 Land Act states that the people of southern Sudan own all land, and the state is responsible for regulating use of the land (Deng (2014). However, the Land Act classifies all land in South Sudan as public, private, or community land. Public land includes various forms of government property, including:

- Land for government facilities;
- Transport corridors;
- Urban parks and recreational areas;
- Forest reserves, wildlife reserves and national parks;
- Certain wetlands and waterways; and
- A number of pre-war agricultural schemes and agro-industrial complexes.

Private land includes land held by individuals in freehold or leasehold. In other words, the Land Act recognizes three private land tenure types: customary, freehold and leasehold. Land used for residences, agriculture, and forestry and grazing can be held under customary tenure. Although the Land Act recognizes freehold as a valid form of ownership, there is currently no land held in freehold anywhere in South Sudan. As a result, private land consists entirely of leaseholds in which primary ownership rests with state governments. Most of these leaseholds are situated in urban areas for residential or commercial purposes. Community land refers to land held under customary land tenure. There is no *terra nullius*, or ‘no man’s land’, in South Sudan. Communities, defined mainly in terms of ethnic groupings or subgroupings, own virtually all land in the country in the sense that they retain the right to regulate its usage according to their own particular customary land tenure system (Rolandsen 2009). South Sudan is home to about 65 ethnic groups whose territories span the entire country. Customary land tenure systems vary across the country. Some groups, such as the Shilluk, incorporate more centralized systems of land governance. The Shilluk are led by the *Reth* (Shilluk King), who has a greater deal of authority over decision-making on land issues than many other traditional authorities in South Sudan. Other customary land tenure systems adopt more decentralized structures, in which authority is distributed among several institutions of traditional authority in the community. Another line of distinction can be broadly drawn between groups that practice different livelihood approaches, such as groups that adhere to primarily agriculturalist or pastoralist lifestyles. Under customary tenure, access to land is seen as a ‘social right’ and serves an important safety net for populations residing in rural areas. Land is typically assigned to families and their descendants in perpetuity. In that sense, identity plays a role in determining one’s land rights. People belonging to a certain ethnic group have a right to access land within that group’s territory. However, the fact that peoples’ land rights depend so heavily on their identity can also restrict individuals and groups from outside the community from settling on community land. There is a long history of identity politics revolving around land issues being used as a tool of divide-and-rule in South Sudan (SIHA, 2013).

The role of identity in determining land rights also has implications for internally displaced persons (IDPs) and refugees (SIHA 2013). IDPs and refugees are commonly permitted to settle temporarily on community lands if they have a good reason for leaving their homelands, but there is usually an explicit condition that once the cause of their displacement subsides, they will return to their home areas. Another concern with customary land tenure relates to the manner in which it treats women’s rights. The Transitional Constitution and the Land Act include provisions that purport to protect women’s land rights. Nonetheless, many customary systems continue to restrict women’s ability to own land independently of their husbands or male relatives (Oystein, 2009). The risks of landlessness are particularly acute for divorced women. Upon divorce, women are often denied a share of family wealth and property, even if that property was obtained after marriage. If the husband’s family has paid the full bride’s wealth (typically in the form of cattle) to his wife’s family, a divorced woman may also be denied custody over her children. When divorced women’s birth families decline to accept them back into the family home, the women may be left with nowhere to go. This insecure tenure status may also make it difficult for women to flee abusive relationships, since if they divorce their husbands they often stand to lose all their property and can even be denied custody of their children. Most customary law systems include mechanisms to provide for widows, but in practice, the families of their deceased husbands often dispossess widows of their lands, even when doing so is not in accordance with customary law (SIHA 2013).

Land-use pattern and tenure or status of land use / land tenure system policy in South Sudan

The principal aim of Southern Sudan’s land policy is to ensure that the greatest numbers of citizens are secure in their rights to land as defined by law (SSLC, 2011). The government shall facilitate access to land at reasonable cost for all citizens, regardless of their socio-economic status. All Southern Sudanese who hold land under legally recognized forms of tenure would be protected from the capricious or arbitrary loss of land rights. Where land is taken for public purposes, landholders will receive fair and just compensation. The 2011 draft Land Policy, currently under review, clarifies some ambiguities in the Land Act by endorsing in general terms the existing patterns of land tenure as they relate to land

use, as follows: (1) community tenure will be the principal form of tenure in areas that are predominantly rural; (2) public and freehold tenure will be the principal forms of tenure in areas that are officially gazetted as urban areas under the Town and Country Planning Act; (3) public land also includes land over which no private ownership (including customary ownership) is established, roads and other public transportation thoroughfares, water courses over which community ownership cannot be established and forest and wildlife areas formally gazetted as national reserves or parks; and 4) peri-urban areas may be held under community, public or private tenure (GoSS 2011f, LANDac, 2012).

The Land Act indicates the importance of customary authority and mandates the establishment of County Land Authorities and district-level Payam Land Councils. Land Authorities and Councils are local land institutions comprised of county and district level representatives entrusted to act as civic authorities and administrators over community land. The composition of the county level bodies is as follows: one representative from each town and municipal council; one representative from the Ministry of Housing, Physical Planning and Environment appointed by the Minister; a representative of traditional authority; one representative of civil society; and, one-woman representative recommended by the County Women Association. State Governors will appoint individuals to the Land Authorities based on recommendations from County Commissioners. Land Authorities' responsibilities include: holding and allocating public lands on behalf of local government; making recommendations on gazetted land planning; advising on resettlement of IDPs; facilitating the registration and transfer of land; supporting cadastral operations and surveys; advising local communities on land tenure, usage and exercise of rights; and coordinating with the SSLC and other government bodies. The Payam Land Councils are responsible for the management and administration of land at the district level. Districts are comprised of subsections called bomas. Members of each Payam Land Council will be appointed by the State Minister based on recommendations from County Commissioners and in consultation with the traditional authority in the payams. Payam Land Councils are composed of: the executive chief of each boma and a representative from the Farmers and Herders Association, representatives of a civil society group and one woman recommended by the payam Women's Association (GoSS, 2011f; GoSS, 2009a).

Although the Land Act mandates the establishment of local land institutions, there are no clear procedures for establishing land authorities or councils and, as a result, very few have been created. Furthermore, although, the draft Land Policy does not provide additional guidance, but recommends the development of a Community Land Act that would establish guiding principles and a legal framework for the governance of community lands by traditional and formal governing institutions (GoSS, 2011f; GoSS, 2009a).

Further, although, customary land rights are inheritable and can be subject to usufruct rights and sharecropper agreements, but they cannot be permanently alienated. Traditional authorities may allocate lifetime tenure rights to customary land (Deng, 2014). However, if a parcel is non-residential and exceeds 250 feddans (about 105 hectares), traditional authorities must notify local government and secure their approval in advance of making any transfer. Freehold rights are held in perpetuity and include the right to transfer the land temporarily or permanently. The Land Law does not state how freehold rights are acquired. Leaseholds can be obtained for customary and freehold land, and can be granted for up to 99 years. Two local government bodies must approve leases of more than 105 hectares of customary land. Foreigners cannot own land in South Sudan, but can lease land for periods up to 99 years (GoSS 2009a; Rolandsen 2009).

The Land Act and draft Land Policy recognize the importance of, and aim to facilitate, the resettlement and reintegration of IDPs, refugees and other categories of persons whose rights to land were affected by the civil war. Moreover, the Land Act grants a right of restitution if a landholder lost his or her land rights (formal or customary) after being involuntarily displaced as a result of the 1983 civil war. The right of restitution exists regardless of whether the land was taken over by an individual or by the government, and extends to family members, legal heirs and any other person who had an interest in the land at the time it was lost. According to the Land Act, claims for restitution must have been filed

to traditional authorities or the South Sudan Land Commission (SSLC) within three years of the enactment of the Land Act (i.e., by January 2012). The Land Act provides for monetary compensation to the claimant in the event that the government cannot provide land. It is not clear how many claims have been filed with either traditional authorities or the SSLC, and the current status of such claims is unknown; however, once adopted, the draft Land Policy would extend the restitution period in acknowledgment of the fact that people are unaware of their restitution rights and the associated timeline (GoSS 2011f; USAID 2010b; GoSS 2009a).

Under the Land Act and draft Land Policy, the GoSS cannot force IDPs and returnees to return to their ancestral homes. And both the law and the draft policy lack formalized rules to resettle or compensate returnees. Despite the absence of a structured framework, in some areas local management systems have been flexible and have absorbed returning community members. Many repatriated South Sudanese choose to stay in Juba and other commercial towns, where their presence puts increased pressure on resources and assets such as land, and formal land administration systems are failing to cope with the influx of people. The lack of a clear policy and legal framework, and limited institutional capacity in both rural and urban areas compounds the challenge of resettling returnees and IDPs in South Sudan (USAID 2010b; USAID 2010c).

The Transitional Constitution, Land Act and draft Land Policy recognize that the right to land shall not be denied to any citizen by the GoSS, State Government or community on the basis of sex, ethnicity or religion. In addition, the Constitution stipulates that women have the right to own and inherit land, together with any surviving legal heir or heirs of the deceased. However, despite the legal framework's incorporation of language that protects women and other vulnerable groups, the key legislation governing statutory land tenure still contains openings for discrimination. For example, the Land Act provides for one slot in each Land Country Authority and payam Land Authority to be allocated to a woman. But these provisions do not meet the threshold envisaged in the constitution that 25% of seats in government bodies be filled by women. When it comes to the issue of succession and inheritance, there is currently no legislation to help operationalize those sections in the Constitution that provide for women's right to own property and share in the estate of deceased husbands (together with any surviving heir of the deceased). The provision is ambiguous and does not explicitly provide for daughters' rights in the estate of a deceased father (GoSS 2011f; GoSS 2009a; USAID 2012a).

The customary land tenure system in South Sudan limits women's access, control and ownership of land. Knowledge, recognition and protection of women's rights remain limited throughout South Sudan because most men and women are not aware of the rights of women in accessing land. But when men and women are aware, they often claim that cultural and traditional norms should override any legal provisions. Women generally do not own or inherit land in South Sudan. They typically access land only through their husbands, and may lose this access if widowed. Even where traditional institutions are willing to allocate land to women, most customary laws do not consider women equal to men, and this limits how women can hold rights to land. Thus, women's land rights remain largely conditional, derived through their marital or childbearing status, or guaranteed through other male relatives. It is also common for widows, daughters and divorced women to be dispossessed of their land rights. For example, in some communities, a widow can be forced to leave her marital land following the death of her husband, or, male relatives can deny daughters inheritance of family lands. While some argue that customary rules and practices should adapt to changing social circumstances, others resist change, fearing its impact on tradition and cultural identity. These competing notions lead to a significant gap between the law and practice, particularly in rural areas (GoSS 2011f; USAID 2010b; GoSS 2009a; USAID 2012a).

Historically, customary systems for land and property rights incorporated important safeguards for women's access to land, and family and marriage customs generally protected the access rights of older women and widows. With the conclusion of the civil war, however, a large number of women (mostly younger) are returning to their ancestral homes. An estimated 45–50% of these women are returning as heads of their households, since many men died during the conflict with Sudan. Rights for younger

women are traditionally weaker, and customary institutions are ill-equipped to deal with the fact that younger women have increasingly become heads of households. Issues of women's access to land and property rights have thus become more contentious in both rural and urban communities (USAID 2010b).

The issue of women's access to land and property rights needs to be addressed in the context of prevailing customary tenure practices as well as within the context of provisions in the South Sudan Transitional Constitution that establish women's equal rights to land and property. Generally, there seems to be a consensus among government authorities that women's rights to access, inherit and own land is a significant issue that should be addressed. But efforts to strengthen women's land and property rights remain a challenge due to difficulties in bridging the gap between traditional authorities, who prefer to govern women's access to land within a customary framework that restricts these rights, and proponents of the new legal framework that puts women on equal footing with men (USAID 2010b).

To secure the land rights for all citizens, both the Land Act and draft Land Policy provide for the registration of land in South Sudan. The Land Act states that all land, whether held individually or collectively, shall be registered and granted a title. Systematic registration shall take place at the request of the state and be carried out by the Ministry of Housing, Physical Planning and Environment. Communities can register their land in the name of the community, in the name of a traditional leader as trustee for the community or in the name of a clan, family or community association. Once community land is registered, individual members of the community may be entitled to register individual rights to land within the community land area (GoSS, 2011f; GoSS, 2009a).

Status of Physical Land Degradation / Reclamation

Land degradation is defined as the deterioration of the quality of land because of it being subjected to use and abuse such as the uses which lead to deforestation, overgrazing and unregulated agricultural practices (Dima, 2006).

6 EXPLOITATION OF NATURAL RESOURCES

Local NRM enterprises including tourism and ecotourism

Customary Laws, Norms and Values in Natural Resource Management

Traditionally, local authorities were responsible for local problems affecting their communities, such as land ownerships and the usage, water and natural resources, agricultural practices, conflict resolutions and law enforcements. South Sudan Land Act 2009, give rights and owners to the local communities and the National and States governments regulates and revitalizes policies suitable for development. The tenure rights for land and other natural resources such as land, water, trees, pastures and mountains which are driven from the customary laws policy and the tribal structural setup. In South Sudan, Customary laws plays a vital role in the communities local resources management particularly focused on the land tenure system, agriculture, natural resources exploitation, ownerships and management.

All tribes in South Sudan have historic rights of natural resources exploitation and management according to traditional regulatory rules that are communally considered and respected within their constituencies. A number of customary laws were implemented by local farmers and pastoralists' in South Sudan throughout the generations, including controlling the use of tribal territories, time of using water wells and cropping organization.

Actions

- Incorporation of land tenure system and customary laws into local government acts and formal administrative systems.
- Conflicts mitigations, interaction and mutual co-operation establishments and communally accommodating relationship between farmers and pastoralists.
- Local authorities, tribal kings and chief's capacity building will enhance and strengthened good management practices of local natural resources.

Local NRM enterprises including tourism and ecotourism

Republic of South Sudan is the 18th largest country in Africa with an estimated population of 12 million people in 2013 based on the South Sudan Statistics report in January 2014. There are about 64 tribes and indigenous languages in South Sudan. English is the official language and Arabic is widely spoken amongst the majority. Oil is the main resources of the Country's revenue (98%) in South Sudan in the oil sector and the other natural resources such as minerals, wild lives, livestock, fisheries, forestry etc.

South Sudan has the potentials in Wildlife and Tourism Industry but the sector remained under developed due to the recurring and long standing armed conflicts in the former Sudan and in South Sudan after independency. University of Juba and Bahr El Gazal University offer basic decrees courses in Wildlife to contribute to its sector management and sustainable development. South Sudan lacks the desired infrastructures in Wildlife and Tourism sectors to attract clients compared to its neighboring states. The Revitalised Transitional National Ministry of Tourism and Wildlife Conservation has developed a strategic framework to predominantly envision the legal protection and management of wildlife to strengthen its sustainable development to earn foreign currency from the tourists.

Tourism development has been destructively affected by the long-standing conflicts and communal violence in South Sudan and the country remains one of the less important visited journey's end in the

African Continent hence, tourism industry needs more investments to bolster its development. Recently, the Revitalized Transitional Government of National Unity (R-TGONU) of South Sudan in one its Economic and Infrastructural development agenda focused and prioritized Wildlife sector development and to identify the potential sites suitable for tourism and museums structural development country wide to set the foundation.

Contributions to Sustainable Development Goals (SDGs)

South Sudan is endowed with an abundance of natural resources wealth, opportunities for sustainable livelihoods and a young and resilient population that has withstood the most difficult of times. It is this very resilience that must be harnessed to withstand the stresses and shocks associated with violence and conflict. Other countries, including Rwanda, Uganda, Sierra Leone and Liberia, have managed to do so and are, in spite of many obstacles, meeting important SDG targets.

South Sudan is today embarking on a mission to achieve Agenda 2030 and its 17 Sustainable Development Goals (SDGs), the global and universal goals to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The country is starting this process from a very low base in a context of an active conflict and humanitarian emergency. This report aims to examine the state of affairs in each SDG area, but also offer ideas and guidance on achieving the SDGs in this challenging environment. At the time of writing, the scale of the multiple crises affecting the country is immense. Armed conflict is affecting nearly all parts of the country, four million people have been displaced from their homes and some six million are severely food insecure. Humanitarian agencies are, rightly, at the forefront of the response efforts, and are undertaking essential life-saving activities. Despite the urgency of humanitarian challenges, there is also a need to balance relief with responses that address the needs of South Sudanese over the long term. The SDGs are not intended to be applied only once conflict has ended but are integral to early recovery efforts and can help build a future based on common aspirations and equal opportunities for all people. Therefore, this report stresses the importance of shared objectives, strategies and approaches between humanitarian and development actors.

Today, nearly all available data on the SDGs paint a grim picture, and the main underlying factor is the ongoing armed conflict. Finding a lasting political resolution to the conflict and building a peaceful, just and inclusive society, as expressed in SDG 16, was the most urgent and widely expressed priority of stakeholders consulted for this report. SDG 16 is also seen as an ‘enabler’ that can unlock pathways in most other SDG areas and build the foundations for longer-term development. Restoring security among communities is the single quickest way to increase school attendance, boost agricultural productivity, facilitate access to markets, and achieve more inclusive economic growth. Similarly, addressing the conditions of and finding solutions for the country’s displaced people, and enabling them to make informed and positive choices, is needed to make progress on the SDG framework as a whole. Long-term progress on the SDGs will require more inclusion of marginalized groups and increased accountability in the political and governance spheres (alongside technical and capacity building approaches) and establishing what an equitable and representative South Sudanese state and society can and should look like. It will require addressing the very real justice and reconciliation needs of the people, as well as the historical (and more recent) grievances that underpin many inter-communal tensions and violence.

Additional findings reflect the need for unimpeded delivery of food aid and concrete steps to revive the agricultural sector and reduce food insecurity (SDG 2), which is increasingly widespread, and to improve access to quality education for all (SDG 4). They also call for eliminating all forms of violence

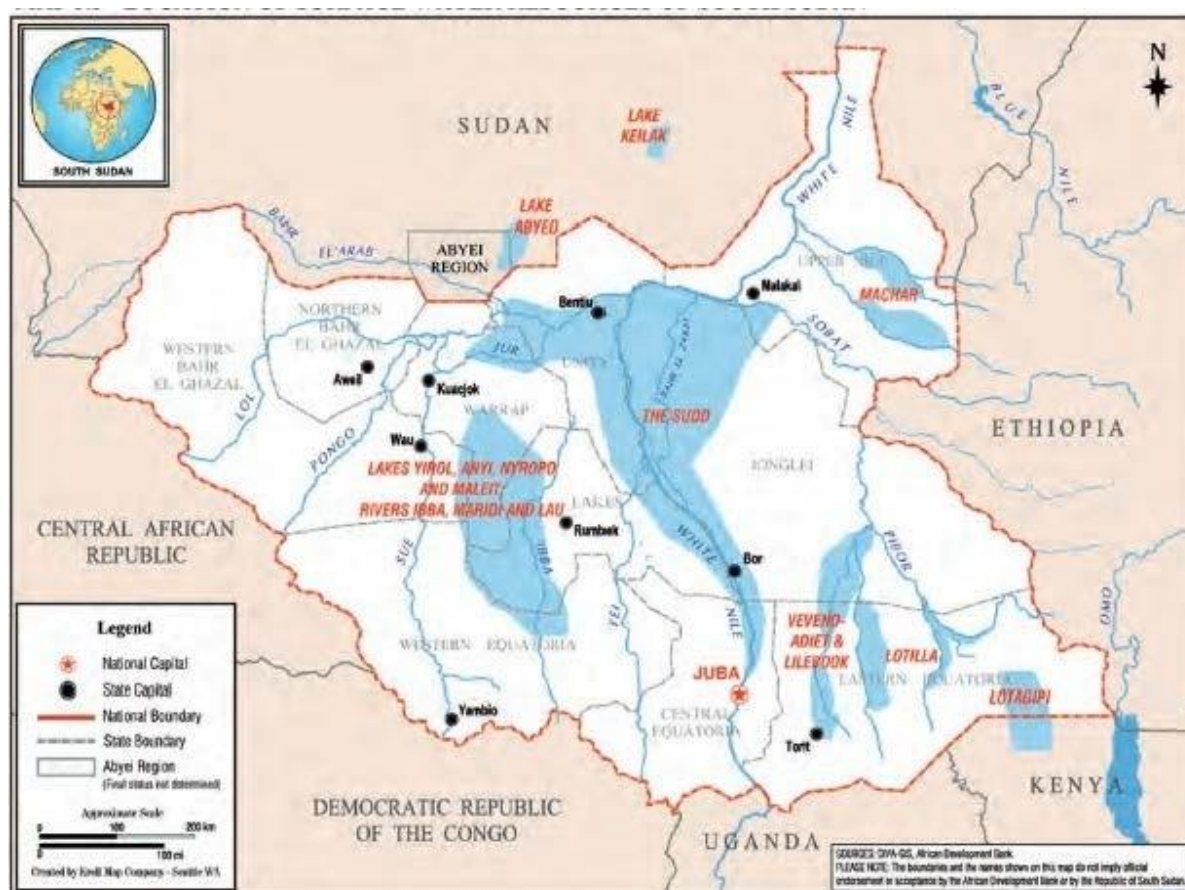
against women and girls and making concrete advances on gender equality (SDG 5), and addressing years of economic stagnation and high inflations (SDG 8).

Approaches to addressing SDGs and other priority areas were deliberated as ‘critical pathways’. They require applying SDG principles, accounting for the impact of the conflict, and defining desired and lasting outcomes. For instance, by applying the principle of ‘leave no one behind,’ SDG strategies can be advanced across the entire spectrum of South Sudanese society, irrespective of gender, ethnic or political affiliation, or socio-economic status. Similarly, recognizing how all the SDGs are ‘interlinked’ means that while some goals need to be prioritized, other (less recognized) goals neither can nor should be excluded. For example, gender equality (SDG 5) is overlooked in South Sudan, even though women and girls are disadvantaged in most aspects of public and private life. As such, strategies to promote the advancement of women and girls in society are needed, not only as part of SDG 5 but as part of all SDG efforts.

Delivering on the SDGs will require strategic, long-term efforts to alter the status quo and reverse harmful trends. Financing them will entail a structural shift from security-related spending to increased social expenditure. This must occur alongside an expansion of the tax base, and a diversification of the economy away from its dependency on oil. In addition to mobilizing domestic resources, revitalizing the global partnership for development (SDG 17) will also be part and parcel of bringing the SDGs to life in South Sudan. The process will be long and hard but the SDGs are integral to this young country’s development as a safe, thriving and cohesive society, with all citizens and the institutions that represent them working towards the wellbeing of the country.

6.1 WATER RESOURCES POTENTIAL IN SOUTH SUDAN

South Sudan is drained by one of the main tributaries of the Nile, the White Nile (Bahr al Abyad), flowing north from Lake Victoria through highland regions of Uganda where it is known as Victoria Nile: It then descends into the East African Rift System until it reaches northern shores of Lake Albert (on the border of Uganda with DR Congo) and flows out as Albert Nile. Albert Nile enters South Sudan, just south of Nimule and then it becomes the Bahr el-Jebel. At Bor, below Mangalla on the Bahr el-Jebel, the great swamp of the Nile, the Sudd begins. The river has no well-defined channel here; the water flows slowly through a network of spillways and lakes choked with papyrus and reeds (Africa Development Bank, 2019). About 50% of the Bahr el-Jebel flow into the White Nile is lost in the Sudd wetlands (African Studies Centre, 2014), primarily due to evaporation and transpiration. The White Nile has several substantial tributaries that traverse South Sudan. In the southwest, the Bahr al Ghazal drains a sizeable basin area. Although the drainage area is extensive, evaporation takes most of the water from the slow-moving streams in this region; and the discharge of the Bahr al Ghazal into the White Nile is minimal. In southeast Sudan, the Sobat River, which is formed by the Baro and Pibor rivers, drains an area of western Ethiopia and the hills near South Sudan - Uganda border. The Sobat's discharge is considerable. The figure below shows the locations of the main surface water resources of South Sudan.

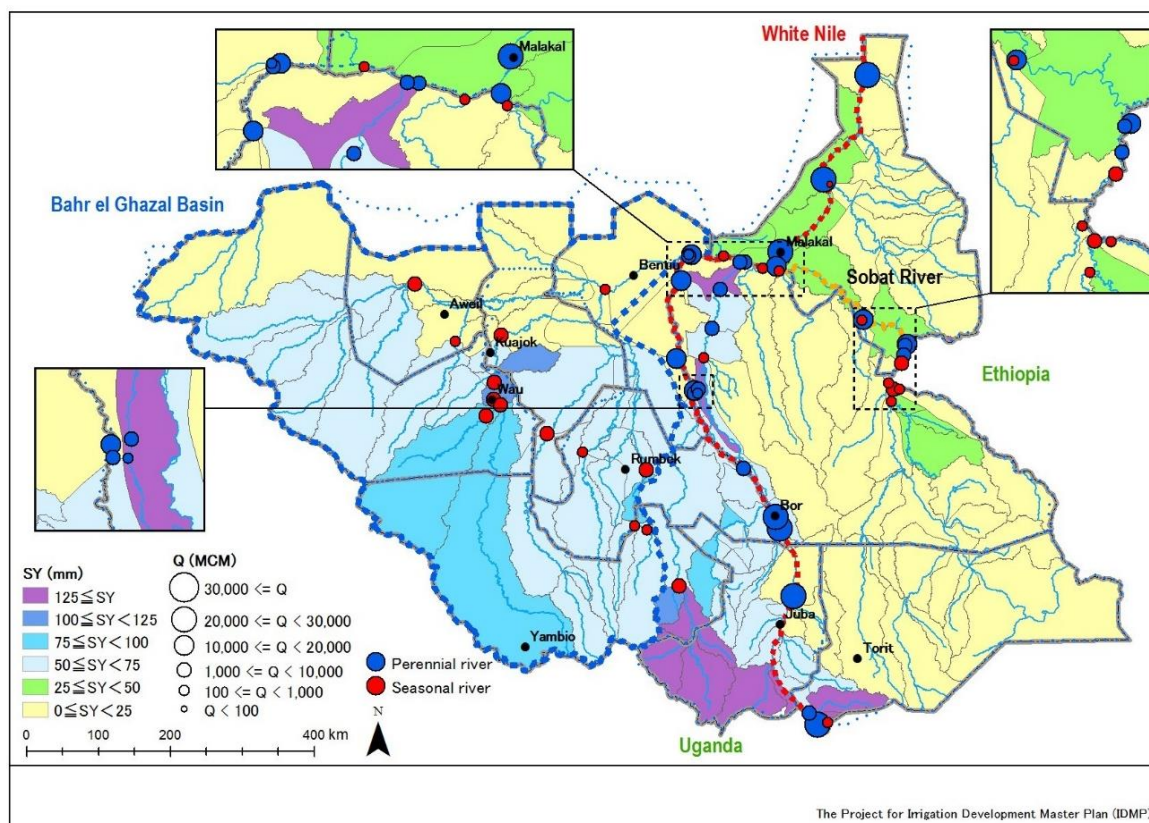


Rivers and surface water bodies distribution (African Studies Centre, 2014)

South Sudan's major water resources are the White Nile, its tributaries and aquifers. According to the National Environmental Action Plan (NEAP), South Sudan is located entirely within the Nile River Basin; and accounts for approximately 20% of the total area of the Basin, which is estimated to be about 3.1 million km². An estimated 28 billion cubic meters, representing 30% of the flow of Nile water, passes through South Sudan to Sudan and onto Egypt. River Sobat, at its confluence with the White Nile just south of Malakal, discharges about 14 billion m³ per annum into the White Nile. The Bahr el Jebel basin discharges about 30 billion m³ per annum, but only 14 billion m³ per annum passes into Lake No, where it meets Bahr el-Ghazal to form the White Nile. The Bahr el Ghazal basin, which discharges about 12 billion m³ per annum loses 11.4 billion m³ per annum of its flow in the swamps, marshes and wetlands leaving only 0.6 billion m³ to flow into Lake No.

A large part of South Sudan is covered by wetlands as well, the most important of which is the Sudd. The Sudd is an inland delta of the White Nile and is made up of lakes, swamps, marshes and extensive flood plains. It is also one of the largest wetlands in the world, averages in size at about 30,000 square kilometers and covers about 5% of the area of South Sudan. The Sudd has been declared a Ramsar site, which confers global recognition and importance to this wetland. There are many other wetland systems throughout South Sudan, some of which are quite extensive. However, wetlands in South Sudan are only protected if they are part of national parks, game reserves or forest reserves. As a result, many of the wetlands in South Sudan are at risk from exploitation. Some estimates show that all wetlands comprise 7% of the total area of South Sudan.

The figure below illustrates the distribution of surface water potential of South Sudan.



South Sudan surface water resource distribution and potential (IDMP, 2015)

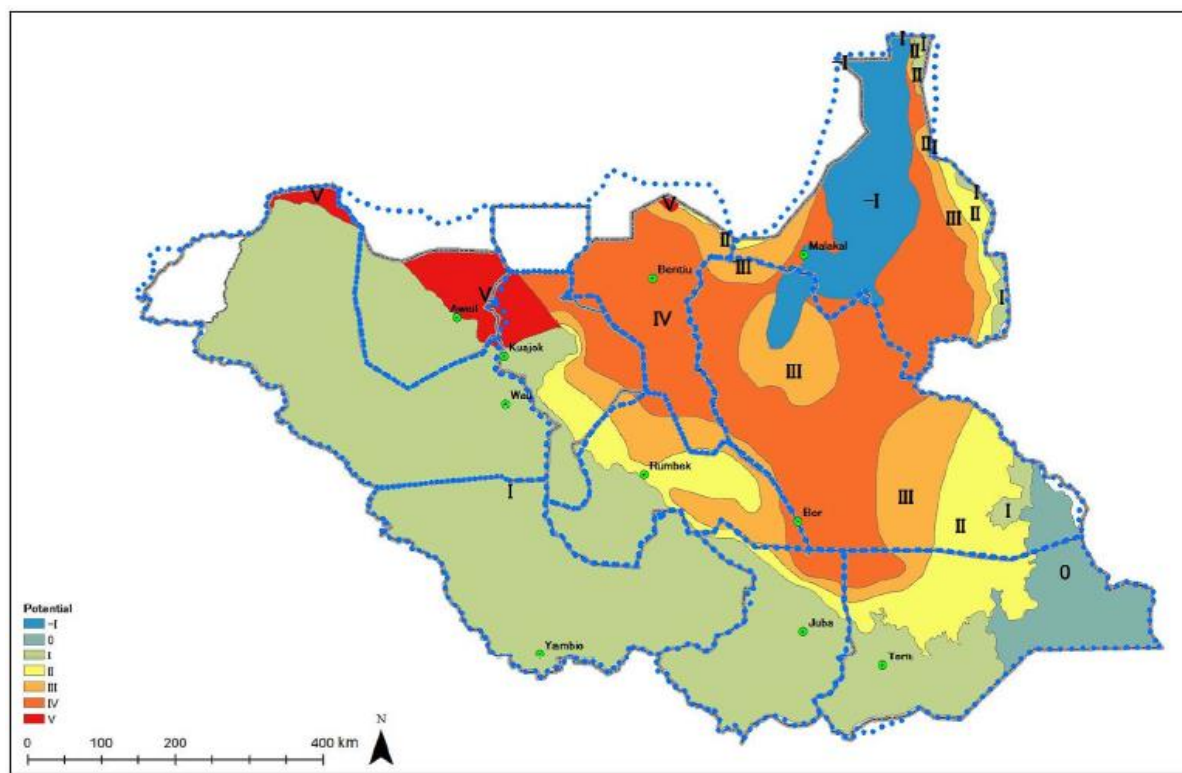
Overgrazing and deforestation has also affected water resources quality increasing turbidity and siltation in water structures in other states.

Groundwater

South Sudan has only one major groundwater basin called the Sudd basin with a total area of 433,000 km² (RSS' IDMP, 2015). The Sudd basin consists of four main aquifers, namely: 1) Alluvium, 2) Umm Ruwaba formation, 3) Nubian sandstone and 4) basement complex (GOSS, 2015). South Sudan huge groundwater resources are found in the Um Ruwaba Formation and basement complex. The Um-Ruwaba is characterized by unconsolidated clays and gravels with low to high permeability; and it is recharged by the seasonal rainfall and river flooding. The basement complex prevails in parts of Western Equatoria, Eastern Equatoria, and Central Equatoria as well as in Western Bahr el-Ghazal states and is characterized by poor water bearing formation. However, fractures and weathered zones provide water of good quality and quantity. Currently, groundwater in South Sudan, is the principal source of drinking water, but very little work has been undertaken to determine the distribution and extraction levels of these resources. Hence, the full extent of the aquifers and related characteristics is unknown at this time.

A few studies carried out on groundwater quality standards in some states show that salinity levels exceeding allowable limits have been observed in Upper Nile, Jonglei and Unity states making groundwater unsafe in some areas of these states. While higher concentrations of fluoride, sulphate and nitrates have been observed in other few states. Other issues include the need to monitor ground water quality around oil exploration sites in Unity and Upper Nile States and undertake assessments of the impact of the effluent from the waste stabilization and oxidation ponds around Juba. MWRI-RSS has developed a national water quality guideline, but the major concern will continue to be undertaking

periodic monitoring and enforcement of regulations related to water use. A map of the hydrogeological zones and groundwater potential of South Sudan is shown in Figure ..., blow.



Groundwater Potential Map (IDMP, 2015)

The economy of South Sudan is highly dependent on agriculture, with about 60% of the total labor engaged either directly or indirectly in agriculture. The agricultural sector remains underdeveloped due to the political instability of the country and the primitive method of farming systems. Food insecurity is a major problem due to low agricultural production connected with weather conditions and lack of water infrastructure and knowledge. The availability and quality of water, besides representing a fundamental resource as drinking water, is necessary for a good development of agricultural and breeding activities; and consequently for a sustainable development of the local economy. RSS' IDMP, Chapter 6 (Strategic Programmes) inventoried existing irrigation projects; and identified and enlisted new Irrigation Schemes to be developed, as captured in Table 6.2.8 (List of Proposed Irrigation Schemes).

Challenges in Land and Water Resource Management

As noted earlier in the section on land classification, most rural residents in the country rely on customary land tenure systems, but these are under pressure from violence, insecurity, refugees and IDPs resettlement. According to the IS Academie (2011), implementation of the Land Act of 2009 is going on, while large-scale land acquisitions that lack transparency are ongoing, and may lead to more conflict over water and land. There is a detailed agenda of concerns about the status of land tenure arrangements for the country. These are clearly articulated in a series of reports prepared under the auspices of the USAID-funded Sudan Property Rights Program, especially, in regards to Conflicts among rural communities over access to resources such as water and grazing lands.

6.2 AGRICULTURE, LIVESTOCK, FISHERIES AND RELATED VALUE-CHAINS

Agriculture presents the backbone of the economy of the country however, this is generally untapped thus, production is generally low and realized potential is about US\$600 million from crops (less than US\$300 per hectare). This is however much lower than production figures in neighbouring countries. Nevertheless, UNDP (2012) annotated that agriculture contributed to one third of the country's GDP. In general, the agricultural sector is characterised by small hand cultivating units belonging to large extended family groupings that practice combinations of different enterprises namely: Rain-fed agriculture; livestock grazing; pastoralism and wild fruit harvesting; and fishing (UNDP, 2018).

Table 2: The importance of Agriculture to the Economy of South Sudan

Indicator	Estimate	
GDP	15% of GDP	
Employment	63% of working population aged 15 and above	
	78% of total population	
Trade (percent of GDP)	Imports 12%	Exports less than 1%
	Trade deficit 11-12%	
Rural population	83% of total population	
Households	Percent of total households	Percent of rural households
Engaged in cultivation	81	89
Engaged in Fisheries	22	24
Owning livestock	74	80
Main source of livelihood	Percent of total population	Percent of rural population
Crop farming	69	78
Animal husbandry	7	8

Source: (RSS, 2015)

6.2.1 Crop

In South Sudan agriculture is largely subsistence where about 80% of the population depend on shifting agriculture, which is 90% rain fed. This is high risk agriculture since even very slight climatic upheavals such as droughts and floods would have a marked impact on the agricultural production system which supports 33% of the rural population. The pastoralists and fisheries communities constitute 45% and 12%, respectively (CIAT, 1991; CIAT et al., 2011). The main source of livelihood in the country is thus, crop farming and animal husbandry in which 76% of the population are involved. 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 and technicians working in the public and private sectors; and the civil society.

6.2.2 Livestock

The livestock subsector in South Sudan is predominantly comprised of pastoral and agro-pastoral production systems, whose contribution to the economy is significant but challenging to measure since it contributes both socially and economically. However, according to FAO/WFP (2013), South Sudan's livestock herd was estimated at 11.7 million cattle, 12.4 million goats and 12.1 million sheep respectively, making it a leader in Africa in terms of animal wealth per capita due to low human population. With these estimates, the country was ranked number seven in Africa with an expected 28 billion SSP (South Sudanese Pounds) worth of wealth, which is approximately 15% of the country's GDP (GOSS, 2010; CAMP, 2013; and South Sudan CPP, 2014). Most of the livestock in South Sudan are managed under extensive production system and are fed entirely on rangeland resources found mostly in ASALs where agro-pastoralists and pastoralists dominate. About 47% and 43% of South Sudan's livestock wealth is in the hands of agro-pastoralists and pastoralists respectively (South Sudan CPP, 2014). Smallholder livestock keepers who are mostly found in urban and peri-urban areas hold the remaining 10%.

The livestock subsector is largely underdeveloped in terms of modern production technologies. Also, the country's livestock *are predominantly composed of local breeds with low levels of milk and meat production*. However, there is great potential for the subsector to improve food security, livelihoods and income generation, economic transformation with industrial growth, exports and job creation leading to significant increases in GDP (CAMP, 2013).

Currently, most hides and skins are not collected and are treated as a waste product; with minimal intervention the value can be obtained and revenue generated. In poultry production, due to the short generation intervals, simple interventions can lead to improved nutrition status and fast income generation. Conversely, the adoption of new technology in the honey industry can significantly improve production leading to immediate income gains. Furthermore, research into social and economic value of the large and small ruminant industry can greatly improve production leading to increased incomes and nutrition. All four of these value chains have both immediate and long-term potential.

As the subsector matures, various constraints must be addressed and new technologies adopted so that the pace of growth can increase in the medium and long term. Moreover, as production increases and disease problems are addressed, products can flow locally, nationally, regionally and eventually internationally creating livelihoods and jobs and increasing incomes. The diversity of products and potential is large and enormous.

Table 3: Estimated Livestock population in South Sudan

	Species								
	Cattle	Sheep	Goats	Poultry	Pigs	Camels	Donkeys	Horses	Rabbits
Total	11,749,245	12,087,020	12,449,624	10,590,900	49,047	11,050	8,465	3,000	1,350

Sources: FAOStat, 2011; CAMP, 2013; and FAO/WFP 2013

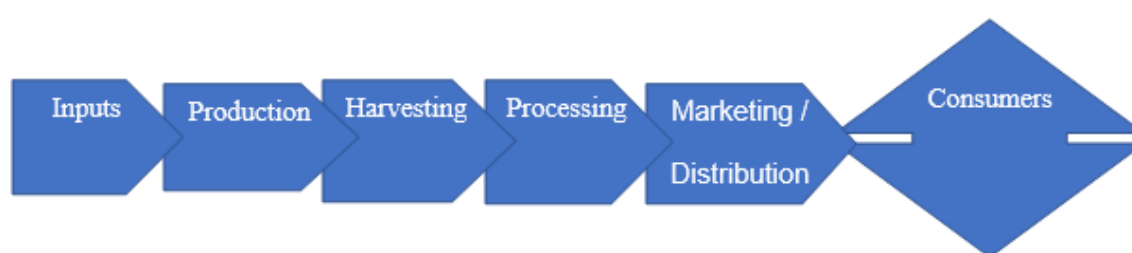
Annex 1 gives an elaboration of the carrying capacity and status of land/environment under different agro-silvo-pastoral and transhumance activities.

6.2.3 Fisheries

In South Sudan, about 1.7 million people (14% of households) living in the Sudd area along the Nile River basin and its tributaries engage in fishery production as a means of livelihood (FAO, 2014; CAMP, 2013). However, there are no reliable statistical data for the fisheries subsector, but its production potential is estimated to range from 100,000 to 300,000 metric tons per annum, worth 800 million USD (CAMP, 2013). Also, an FAO (2008) report indicates that there is a huge potential for aquaculture development in the Central, Eastern and Western Equatoria States, in Northern and Western Bahr el Ghazal States, as well as Warrap State. The main challenges facing fisheries and aquaculture development in the country include lack of legal, policy and regulatory framework, lack of storage facilities compounded by poor power supply and lack of effective processing technologies. Additionally, there is inadequate transport infrastructure to link high production areas to market centers across the country.

6.2.4 5.1.4 Related Value Chain

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 raw state to the time it reaches the buyer. As the product moves along a value chain, its value increases as does the potential for profit or (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 18: Functional node of a value chain cycle*

Under the potential production, cattle herds can be expected to increase by 1.4 to 1.9% in the first 5 years based on improved nutrition from secured access to natural resources (higher calving rates, lower calf and adult mortalities) and decreases related to losses of animals due to conflict and insecurity. Higher herd growth rates of 2.4 to 3.8% can be expected in the 5-15 years due to nutrition and mortality interventions to improve production and productivity (CAMP, 2013). Analysis shows that, over the next 25 years, there will be an average 1.21 million cattle annually available for sale over and above the core-breeding herd and for calves, of which only 27%, an average of 329,548 cattle annually will be slaughtered for red meat.

Also, average daily milk production per lactating cow is expected to rise from the current 0.7 litres to 1 litre, and total milk production to approximately double within five years from 177,850 MT to 302,465 MT, with improved access to water and grazing, and to basic animal health care. In the mid-term, measures to improve production and productivity with organized collective marketing to attract better prices, is expected to further double milk production. Milk markets are expected to double during the short term from 10% to 20%, and increase faster (50%) in the mid-term with a further increase to 70% in the long-term. Milk pasteurization and packaging is expected to grow at a slower rate, with the informal sector expected to play a stronger role in marketing. Based on analysis of the trajectories of other countries in the region, it can be expected that South Sudan, which will have more than quadrupled its milk supply by 2027, will be capable of competitive substitution of part of its imports and engagement in export of selected products. Annex 6 gives detailed diagnosis of the production sector and value chains.

6.3 FORESTS RESOURCES AND FUTURE TRENDS

“A forest is technically defined as a land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees that are able to reach these thresholds in situ...”. And, “... Wooded lands on the other hand are lands not covered with forests they span more than 0.5 hectares, with tree also higher than 5 meters and have canopy covers of 5-10 percent, or trees able to reach these thresholds; or combined cover of shrubs, bushes and trees above 10 percent...”.

There are no reliable data on the extent of forests in South Sudan due to the fact that there has not been any detailed forest survey inventory carried out in the country. Nevertheless, according to RSS (2015) forests and woodlands cover a large proportion of South Sudan’s vast territories, which stands at 40,562,900 ha of land, which represented about 62.5 percent of total national land area. However, depending on other sources, estimates on the proportion of forest covered land area in South Sudan vary from 11.1 percent to 35 percent, if other wooded area is added to this then the proportion can rise up to as high as 90 percent. Further, according to FAO (2014) about 7,157,000 ha of land in South Sudan qualify as forests and an additional 32,582,000 ha are considered woodland of varying degrees thus, totalling to almost 40,000,000 ha (39,737,000 ha) representing effectively about 11.3 percent (forests) and 51.6 percent (woodlands) of the total land area, respectively. These figures are close to those reported by RSS (2015).

These natural forests have high levels of biodiversity and wild life habitats. That generates important ecosystem goods and services namely, the provision of food, timber, shelter, fuel, medicines and carbon sequestration, hydrological cycling soil stabilization, and other cultural services. In general terms the government defines forests lands as any land containing a vegetation association dominated by trees of any size including woodlands, whether exploitable or not that is capable of producing wood or other products including food that are potentially capable of influencing climate, soil, and water regime and provide habitat for wildlife.

In South Sudan about 214,776 square kilometers of the land is covered with forests. The country has a wide range of forests from arid to semi-arid trees and shrubs and riverine forests are found in the northern region of the country, with woodland savanna in the central and southern regions. The country has also some tropical forests as well as teak and pine plantations surviving from colonial times. Most of the country’s forests are open or semi-open habitat (Gafaar 2011; GoSS 2011c; GoSS 2010; TerrAfrica 2010; Clingendael, 2009), reflecting regional variations in climate and soil. The combination of forest reserves, protected areas, national parks and game reserves together cover approximately 19,500 Km².

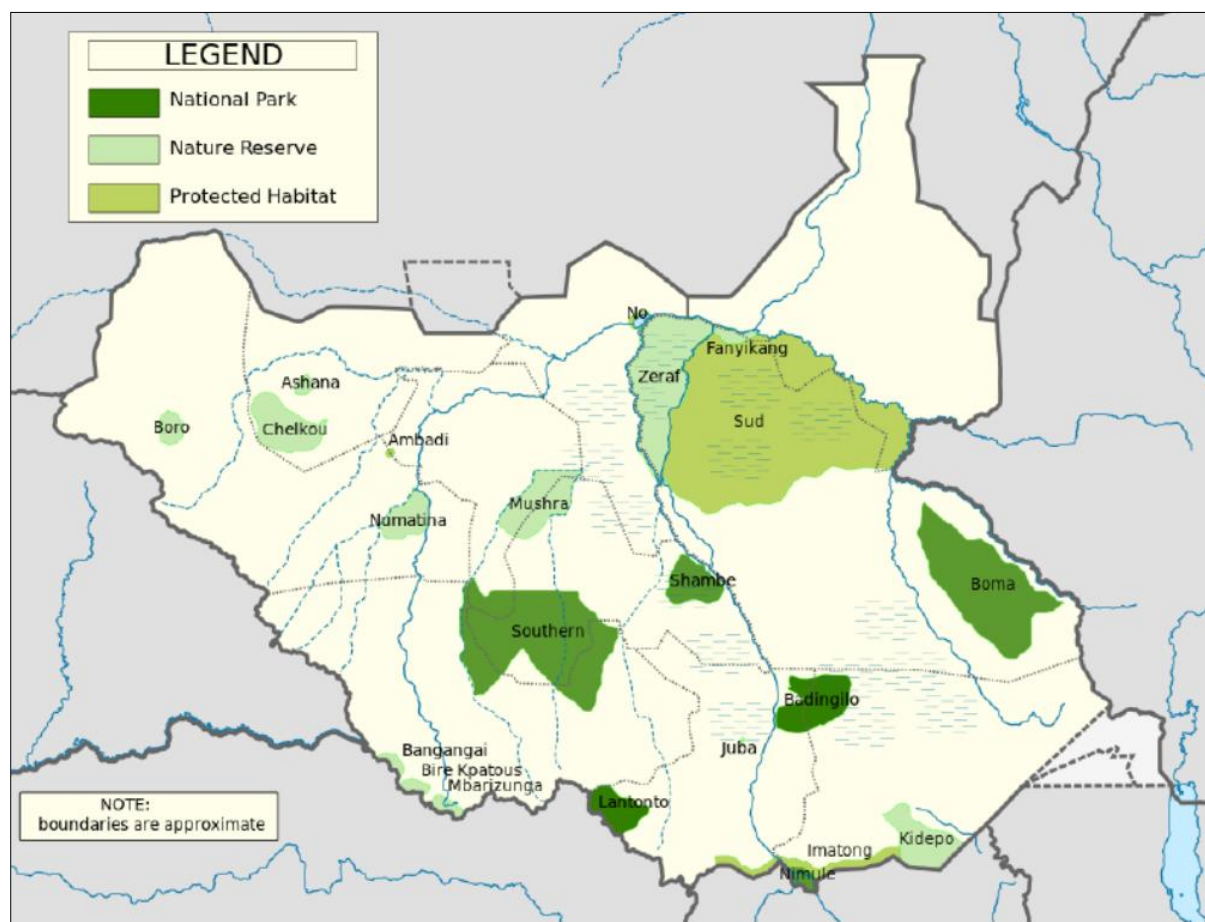


Figure 19: Map of conservation/protected areas in South Sudan (Keitsist, September 13, 2013)

About 90 percent of South Sudan's population directly depends on forests for fuel wood, and charcoal production, timber for construction and non-timber forest products for food and nutrition security. FAO (2016) indicated that these products are however fast disappearing due to unregulated and uncontrolled cutting of trees, burning charcoal, etc.

Table 4: Comparison of Forestland estimates for Republic of South Sudan from varied sources

	Forest		Other wooded lands (OWL)		Total forest and (OWL)		Ref year	Comments
	Area	%	Area ha	%	Area ha	%		
USAID, 2014; AFDB, 2013	20742,000	32.2	-	-	-	-	-	AfDB for trees
Usaid, 2014; MOE; UNDP, 2012	20,742,000	67.5	14,518,339	22.5	35,260,339	90.0	-	
FAO, 2015b	7,157,000	11.1	32,582,000	50.6	39,739,000	61.7	2013	Based on remote sensing

IRG, 2007	22,870,000	35.5	-	-	-	-	2007	Africover
Doki, 2012	-	-	-	-	19,166,700	29.7	2009	MAF
Verje, 2013	20,000,000	31.0	-	-	-	-	-	MAF
MOE, 2015; Diao, You, Apuerto & Folledo, 2012	-	-	-	-	40,526,900	62.9	-	

Protected Forests

According to Badi et. al., (1999) 68 percent of Sudan's forestry biomass resources were found in South Sudan; accordingly, South Sudan then was supplying 85% of Sudan's total sawn timber. The present Forest reserves were in South Sudan originated from wood stations that were primarily intended to supply the steam paddleboats with wood fuel and telegraph poles this later became forest reserves where forest resources were sustainably exploited using regeneration to perpetuate production as of current. The Forest bill of 2009 has set aside some forest reserves to conserve, protect and manage natural forests entities. Usually, in these areas the unregulated cutting of trees is prohibited. The protected areas include forest reserves, and according to USAID (2014) and MOE (2014) protected areas cover the country land surface of about 640,000 ha as shown in the figure below.

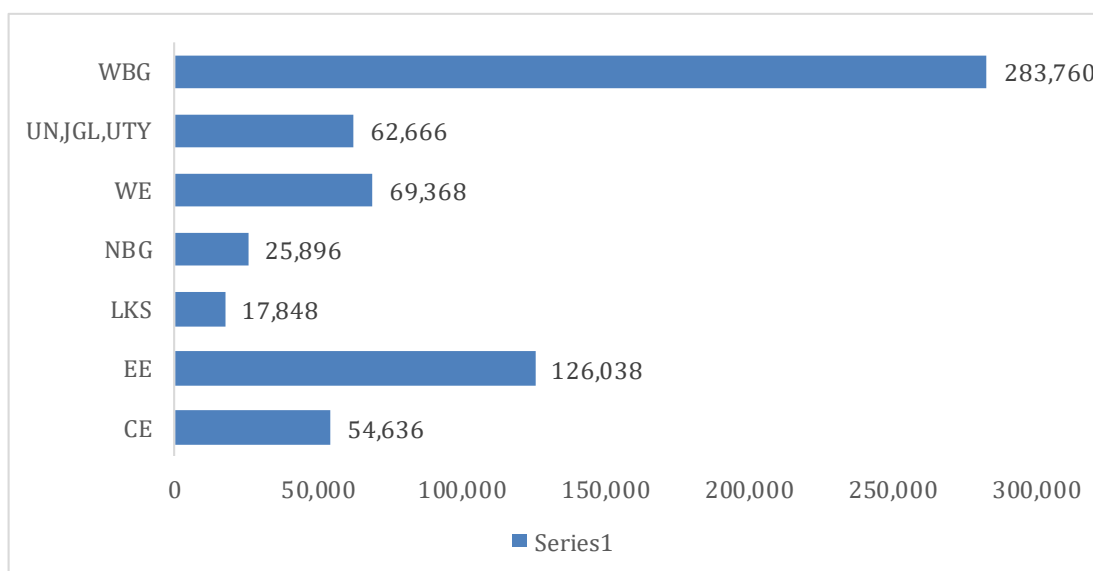


Figure 20: Estimated Forest cover in hectares (ha.) of South Sudan according to states

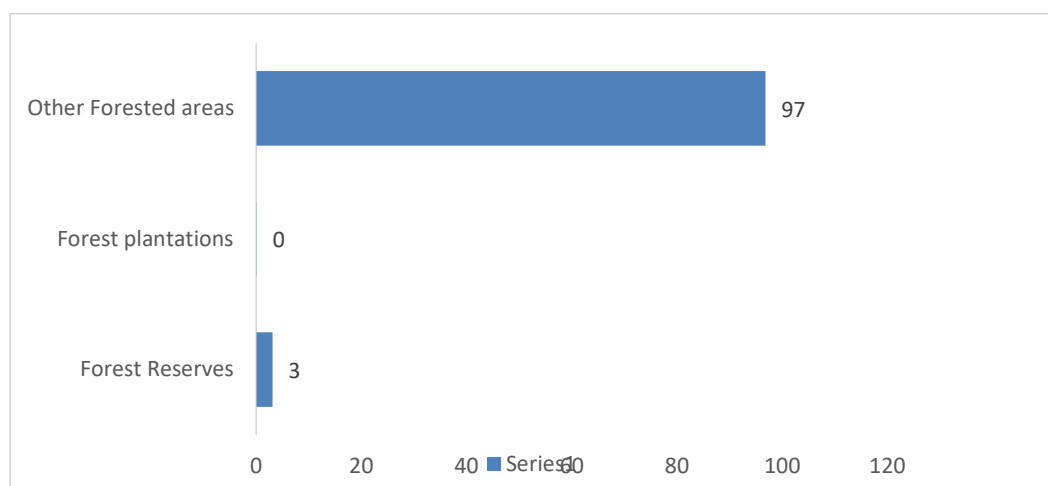


Figure 21: Types of forest land use in South Sudan Source: USAID, 2014

6.4 BIODIVERSITY

The Natural environment of South Sudan is enormously rich in biological resources. These include a rich variety of ecosystems, a vast array of important species of flora and fauna worldwide and an unknown load of genetic diversity. South Sudan is home to the Sudd swamps, which is one of the largest tropical wetlands in the world and is home to one of the greatest circular wild life migrations on the planet. According to the MOE (2014) most of the populations live close to the natural environment and directly depend on the forests, woodlands for fuel and food products.

The Sudd is one of the largest flood plains in Africa, and one of the largest tropical wetlands in the world. The Sudd is a vast swamp in South Sudan, formed by the White Nile and extends 650 kilometers and 10 to 40 kilometers wide. The Sudd is part of the Bahr el Jebel river system i.e. the upper reach of the White Nile in South Sudan, which originates in the African Lakes Plateau. The Sudd stretches from Mongalla to just outside the Sobat confluence with the White Nile just upstream of Malakal as well as westwards along the Bahr el Ghazal. The shallow and flat inland delta lies between 5.5- and 9.5-degrees latitude north and covers an area of 500 kilometers south to north and 200 kilometers east to west between Mongalla in the south and Malakal in the north. Annex 7 provides details of forest resources.

6.5 POTENTIALS AND CONSTRAINTS OF NATURAL RESOURCE MANAGEMENT

South Sudan lies within the tropical zone between latitudes 3°N and 13°N and longitudes 24°E and 36°E. The climate is seasonal in general with distinct dry and wet seasons; and considerable annual variations from one part to the other. Mean temperatures are in the range of 25o to 40o C, depending on different locations, hence generally a warm thermal zone². It ranges from Tropical Semi-Humid with a short rainy season in the north, to Tropical Wet-Dry with longer rainy season in the south (UNEP, NAPA to climatic change, 2016). It is characterised by single rainfall season during which the rains are brought on by the annual migration of the Inter-Tropical Convergence Zone.

Rain falls unevenly across the country, with some parts in the north bordering the Sudan and central areas of the country stretching up to the border with Kenya experiencing much drier spells. The southwest area bordering Uganda, DR Congo and Central Africa; and south-eastern area towards Ethiopian border, receive a much higher or increased rate of precipitation. On average, the country

² Harry van Velthuizen, Luc Verelst and Paolo Santacroce, Crop Production System Zones of the IGADD Sub-region, FAO Agrometeorology Working Paper Series 10, 1995.

receives 900 mm of rain annually (FAO, 2015), which can be classified into two major rainfall regimes, namely unimodal and bimodal. The unimodal rainfall regime occurs in the northern, central and south-central areas with a six-month wet season from May to October, which ranges from 500-600 mm annually to 850 mm annually. The south-western and south-eastern parts of the country have a bimodal rainfall regime with high rainfall for 7-8 months a year, which ranges from 500-600 mm annually to 1500 mm annually. The rainy season is generally from April to October with the wettest period between August and October.

Rainy seasons are influenced by the annual shift of the Inter-Tropical Convergence Zone and the shift to southerly and south-westerly winds, which leads to higher temperatures and humidity as well as increased cloud cover. There are prominent variations in rainfall and the length of the dry season. However, there is little temperature variation over the country or within season. The growing season is generally between 100 to 250 days, depending on the agro-ecological zone (MOE, 2015).

6.5.1 Vegetation

Most of the country is covered with natural and semi-natural vegetation with variable tree density. The northern parts fall under Sudano-Sahelian Region, within its predominantly dry sub-humid and semiarid, with extensive grazing. Annual rainfall of this zone has declined and it is now characterised by occurrence of dry spells, especially in the first months of the rainy season. In the 2nd half of the season, the zone is characterised by heavy and stormy rains of short duration, for which the rate of precipitation greatly exceeds infiltration. Heavy rains coincide with high river inflows, resulting in an extensive flooding for long periods. The southwest and western areas with good drainage conditions; fall under the Humid Central Africa, within its predominantly moist sub-humid and humid of wide range of perennial tropical crops and extensive areas under forest. The southeast and eastern parts; fall under dry sub-humid and semiarid mountainous East Africa.

Vegetation cover with thick tropical forests is therefore mostly high in the southwest; and low in the southeast, where semi-arid savannah dominates. Grasslands, aquatic vegetation and open water occupy the floodplains and marshy/swampy north central areas for which a large part is covered by the Sudd that is a conglomeration of smaller wetlands.

Table 5: The climatic regions elevation, dominant soil types and vegetation of South Sudan

Climatic region	Average length of growing season (LGP)	Elevation above seas level (m)	Dominant soil type	Dominant vegetation
Flood plains	121	415 (374-500)	Chromic vertisols	Deciduous scrubland and sparse trees
Ironstone	178	581 (432-999)	Pinthic ferralsols	Deciduous woodland
Green belt	214	723 (531-1,000)	Pinthic ferralsols	Mosaic forest/savannah
Hyper arid	0	536 (366-1,000)	Chromic vertisols	Croplands (>50%)
Arid	43	552 (383-1,000)	Chromic vertisols	Croplands (<50%)
High altitude areas	146	1,293 (1,001-3,055)	Eutric nitosols	Mosaic forest/savannah

Colluvial	131	448 (404-511)	Dystric Regosols	Deciduous scrublands and sparse trees
North western plateau	133	614 (483-1,000)	Dystric Regosols	Deciduous woodland
Lower hills and mountains slopes	143	661 (501-1,000)	Ferric luvisols	Deciduous scrubland and sparse trees

6.5.2 Climate risks/ hazards to which resources are exposed

The climate of South Sudan is characterized by extremes and it regularly experiences drought, torrential rains and seasonal flooding (IMPACT, 2016). As previously mentioned, global climate change is exacerbating these natural hazards. Erratic rainfall has become more frequent, leading to unpredictable and more severe flooding. Seasonal patterns have been disrupted, and floods and droughts can now occur in the same season. The northern regions of the country, already subject to prolonged dry periods, were affected by a severe drought in 2011 (BRACED, 2016). Human activities and industrialization, greenhouse gas emissions (GHG) mainly in the developing world and the phenomenal global warming is the driver behind the climate change scenario. According to the IPCC (2014b) South Sudan as country contributes very little to global greenhouse gas emissions but, is very vulnerable to the impacts of rising temperatures and increasing rainfall variability due to climate change. FAO (2016) indicated that South Sudan emitted 1,448 kilo tonnes of CO₂ and per capita emissions were 0.1 metric tonnes. This is because both farmers and pastoralists rely heavily on seasonal rainfall and South Sudan was ranked as the world's most vulnerable with Climate Change vulnerability index of five (5) worst affected countries. According to UNEP (2018) the key resources exposed to the impacts of climate change are: 1) agriculture, the results of which is increased crop losses or crop failure; 2) loss of pasture lands and water resources for livestock; 3) ecosystems, e.g., reduction of critical habitats for biodiversity, wetlands and forests; and 4) Water Resources, e.g., reduced river flows, reduction of key habitats in wetland ecosystems.

The climate risks and potential impacts in the agricultural sector for crop production, livestock and fisheries are summarized as follows:

- i) Increased temperatures and reduced rainfall events could lead to loss of agricultural produce, agricultural lands and the decline in fish diversity and size.
- ii) The seasonal patterns in the country have become erratic and rain-fed agricultural areas have declined very significantly, especially in the northern and eastern parts of the country, as a direct consequence of climate change.
- iii) Reduced rainfall in combination with increasing temperatures could make reliance on rain fed agriculture no longer feasible and this will in turn have significant impacts on food security.
- iv) The increased sequence of rainfall variability equated by both the onset and length of the rain season have led to delayed plantings and earlier harvests, leading to a shortened growing season and reduced yields and or crop failures.
- v) The increased incidence of drought and flood events have led to the loss of pasturelands and reduced access to water resources for livestock.
- vi) The phenomena of climate change are therefore likely going to increase local conflicts over land use and resources between and amongst pastoralists and farmers.
- vii) The unusually prolonged dry seasons can lead to reduced water quality in stagnating water ponds.
- viii) It is also evident that the multiple stresses faced by livestock will interact with climate change and variability to amplify the vulnerability of livestock keeping communities, pests

- and diseases pressures on livestock is therefore expected to increase as a result of climate change.
- ix) Also, the rapid population growth and the expansion of farming and pastoralism under a more variable climate imbalance could increase the numbered at-risk number of peoples in the country which is expected to fuel tensions and conflicts.
 - x) Increased rainfall variability and rising temperatures is set to reduce water quantity, this will lead to reduced crop production and food availability for humans, livestock and fish alike.
 - xi) The combinations of reduced rainfall and rising temperatures will reduce river water flows and may lead to drying of seasonal rivers and a change from perennial to seasonal flows due to higher evaporation, a drop in the water table and reduction of wetland sizes.
 - xii) Decrease in water resources as a result of increased dry spells and low rainfall will have the potential to increase conflicts and access to water at a national and regional level.

6.5.3 Droughts

Droughts are also regular events in South Sudan, but now the country is generally experiencing substantially warmer and drier weather. Warmer temperatures due to climate change decreases evapotranspiration, which can lead to more frequent droughts (USAID, 2011). In the dry season, shallow or other- wise accessible groundwater may provide crucial water reserves in times of drought, enabling the growth of a dry season crop. The availability of groundwater reserves may also help to defend against or resolve the frequent conflicts that arise during the dry season between migrating herdsman and existing communities (Fernando & Garvey, 2013).

6.5.4 Floods

Flooding occurs naturally during every rainy season from May to October. Severe floods can destroy homes, schools, crops and livestock, and disrupt transportation and the provision of basic services, threatening the lives and livelihoods of local communities (SINA, 2016). Extensive seasonal flooding, which can cover between 10 km² and 30,000 km², occurs in the Sudd wetlands and along the rivers that flow into it. The floodwaters provide critical water and forage resources for livestock and they recharge groundwater reserves.

6.5.5 Impacts

Natural hazards such as floods and droughts are exacerbated by the impacts of the changing global climate as well as other drivers of environmental change, such as population growth and poverty, and by associated environmental stressors such as land degradation, wetland losses, livestock diseases and crop pests, amongst many others. Together, they have detrimental effects on livelihoods in South Sudan, which are so dependent on environmental assets and conditions.

7 DETAILED DESCRIPTION OF THE PROJECT COMPONENTS

7.1.1 Detailed description of the project components

The selected sites are in the areas with the lowest surface water potentials; and with water resource development and management as a connector, the envisaged interventions cut across the five (5) key adaptation needs thematic areas identified by the various stakeholders under the South Sudan national framework for adaptation programme. By following appropriate policy and institutional framework, the activities will cover sectors of: 1) Agriculture (increasing of crop production through water management for crop production and productivity at Aweil Irrigation Rice Scheme); 2) Disaster Risk Reduction (construction of water harvesting structures in Kapoeta Counties to improve livestock access to water, reduce conflict among the Pastoralists and to improve livestock production). Geographically, the selected project areas are scattered across the country to meet needs of the vulnerable communities in five key thematic areas in which immediate adaptation interventions are required in South Sudan. The interventions will reduce the major challenges facing South Sudan, namely: i) Internal conflicts; ii) food insecurity; and iii) environmental pollution.

7.1.2 Activities to be carried out

For Aweil

- Feasibility study, engineering agronomy, technical investigation/ fish farming studies
- Design of Aweil Rice Irrigation Scheme, type of the dam designed, design of the earthen dam, Hydrometric Stations installations including equipment and civil works at the point of the Canal of Lol River (one at Wedweil and another one at Peth) all on Lol River for water hydrometric purpose.
- Engineering Design works (Flood Protection/water reservoir Earth Dam and river abstraction point, irrigation design works, specifications and construction methods)
- Agronomic production processes (Crops varieties, fertilizers, Agrochemicals, Crops protection).
- Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season).
- Supply of improved rice seeds including fish fingerlings and locally formulated fish feeds.
- Supply of spare parts for rice mill for different grades of rice (One Spare parts, Switch separator)- Schule Germany made
- Operation and Maintenance (Fuel (80, 000 Litres of fuel/season -, Labour 99 staff, 10 new 90 HP tractors)
- Renovation of existing rice stores roofs
- Capacity building (training of technicians to maintain the tractors and irrigation structures)
- Six months contract for experts in Agronomy, Motor vehicle Mechanics, irrigations engineers, and agricultural engineers, aqua culturalists)
- Establishment of Research Centre for rice selection and varieties
- Renovations of scheme offices
- Solar power source for irrigation scheme headquarters
- Fencing of the rice irrigation scheme using chain link wire mesh
- Rehabilitation of boreholes within Aweil west and Aweil Centre
- Expansion of the existing animal health clinic and including supply of veterinary medicines for five counties and training of community animal workers,

- Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season).
- Supply of improved rice seeds including fish fingerlings and locally formulated fish feed.
- Deepening of existing hafirs in Aweil East, north and west Counties

For Kapoeta

- Construction and rehabilitation of dams (hafirs) (40,000 m3) in the three Kapoeta Counties
- Construction and rehabilitation of hand pump boreholes
- Construction and rehabilitation of boreholes with elevated tank
- Water quality and quantity monitoring
- Construct/rehabilitate animal stock routes
- Environmental and social impact assessment
- Construction/rehabilitation of veterinary hospitals
- Construction/rehabilitation of checkpoints
- Construction/rehabilitation slaughter houses
- Disease surveillances, quarterly livestock vaccination and treatment
- Capacity building or training for community animal health workers (CAHWs)
- Specific feasibility study (Topographic survey, geotechnical investigation, hydrological study)

7.1.3 Expected results by component, sub-component and focal area

Project Component 1: Rehabilitation of 1,260 ha of Aweil rice irrigation scheme including integration with fish farming, construction of animal health facilities, rehabilitation of existing boreholes and construction of new boreholes, and dredging of existing hafirs.

Sub Component 1: Water Resources Development and Management

Indicators for Sub component 1: Water Resources Development and management.

- 1 - Construction and rehabilitation of water reservoirs for storing water in dry seasons in Kapoeta area (semi-arid area) and livestock development infrastructures (stock routes, veterinary hospitals, slaughter houses, veterinary checkpoints and livestock quarantine centers).
- 2 - Rehabilitation of irrigation canals (canalization network) for the production of irrigated rice in Aweil area in Northern Bahr el Ghazal state from Lol River.
- 3- Build the capacity of local community members on the sustainable management of water resources by conserving and deploying mitigative measures of water resource depletion.

Sub Component 2: Securing Equitable access to Natural Resources

Indicators for Sub component 3: Securing Equitable access to Natural Resources

- 4- Sustainable rangeland management practices and technologies developed and promoted.

Sub Component 3: Environmental Management and including Biodiversity

Indicators for Sub component 5: Environmental Management and including Biodiversity

- 6 - Tree nursery beds of indigenous and exotic tree species namely, neem (*Azadirachta indica*); drumstick tree (*Moringa oleifera*); Laloob (*Balanites aegyptiaca*); dates (*Phoenix dactylifera*) established and sustainably managed.

- 7 - Afforestation of some water catchment areas with suitable tree species to benefit the environment and biodiversity established and running.
- 8 – Protection or gazettement of other wetlands in or around the Sudd region accomplished.
- 9 - Degraded wetlands and other fragile ecosystems successfully restored.
- 10- Local dry land plant species, small ruminant animal breeds, livestock and community wildlife thrusts conserved.
- 11 - Loss of biodiversity discouraged, protected, and conserved.

7.1.4 Reliance on rain-fed subsistence agriculture

Traditional subsistence agriculture is the dominant economic activity in South Sudan with approximately 78% of households reliant upon crop farming and animal husbandry as their main source of livelihood. Typically, such farmers rely upon rained agriculture and use traditional methods of farming. This combination renders them highly vulnerable to climate variability, particularly erratic rainfall. Unfavourable weather conditions – such as persistent droughts and annual flooding – also result in crop and livestock losses. Droughts are also causing encroachment of the desert southwards, while floods have destroyed forests in low-lying areas, particularly in areas close to the Sudd Wetlands within the Bahr el-Jebel, White Nile and Sobat River corridors.

7.1.5 Increased deforestation

Since gaining independence, immigration and natural population growth in South Sudan have resulted in an increased demand for charcoal and fuel wood, as well as land for agricultural and residential purposes. The rate of deforestation has consequently accelerated. Recent maps on land cover changes indicate a dramatic shift from woodland and forest to cultivated land and bare soil. Deforestation and habitat degradation has decreased the ability of woodland and forest ecosystems to provide important goods (such as non-timber forest products) and services (such as water provision) to rural communities. This increases the vulnerability of rural communities to climate variability, as the goods and service provided by these ecosystems buffer communities against the crop failures associated with erratic rainfall, floods and droughts. Deforestation is also having a negative impact on biodiversity and wildlife conservation in South Sudan.

7.1.6 Increased soil erosion

As a result of deforestation, overgrazing and bush fires, soil erosion in South Sudan is increasingly becoming a problem. Consequently, rivers; lakes; water harvesting and storage structures; and irrigation/drainage infrastructure are silting up, reducing the supply of water for various needs. Soil quality is also declining, which negatively affects agricultural productivity.

7.1.7 Reduced water quantity and quality

Although South Sudan has substantial water resources, but these are unevenly distributed across the territory and vary substantially between seasons and years. Within the last two decades, a number of previously perennial rivers, which extend to catchment areas: 1) southward up to the Equatorial Lakes Plateau; 2) southwest (up to the Nile-Congo watersheds divide); 3) westward (to the Nile watershed divide with Central African Republic); 4) northwest and northeast (into the Sudan); and 5) eastward to the south-western Ethiopian highlands and north-eastern Uganda, have become seasonal. This has had significant ecological impacts, as well as adverse effects on livelihoods within the country. The decreased water flow is causing drop in the groundwater table, siltation and growth of aquatic weeds. The silt and weeds cause blocking of rivers, navigation channels, irrigation canals and drains; and aggravate flooding. Some swamp and marsh areas are therefore decreasing and trees are dying because of the lack of water.

There has also been a change in the water quality, which has had adverse impacts on fisheries. Water quality is being adversely affected by the increasing concentration of people in urban areas and petroleum exploration/production. The sewage and pollution from the oil industry is a serious risk to wetlands, particularly in the Unity and Upper Nile states. A German human CSO, Sign of Hope, warned that “dangerous heavy metals used in oil production in South Sudan might seep into water sources. Anticipated also, is the application of chemicals, industrial effluents and other toxic products, including fertilizers and pesticides.



Figure 22: Oil Production Site & Access Roads in the Wetlands (Photograph: Stringer/AFP/Getty Images)



Figure 23: Oil exploration and production blocks in South Sudan and the Sudan (Mapsof.net, Sudan Map Oelgas – Maps Sudan)

7.1.8 Limited technical capacity to understand and predict climate change

The prolonged period of civil war in South Sudan caused, inter alia: i) insufficient investment in education, particularly at the tertiary level; and ii) skilled professionals to leave the country. These factors have contributed to a general lack of technical capacity within the country to understand and predict the effects of climate change. This situation is exacerbated by the limited availability of necessary technologies, such as weather stations and geographic information systems, to measure and monitor climate variability. The limited technical capacity to predict climate variability and change constrains efforts to reduce the vulnerability of poor communities.

7.1.9 Limited institutional capacity to cope with climate variability

There are several institutional capacity constraints in South Sudan that limits the ability of the government to reduce climate change vulnerability. Firstly, as a new country, many policies and strategies related to environmental management and agriculture are nascent and do not explicitly include climate variability and change. Secondly, there are inadequate institutional arrangements at the national, state and county levels for effective coordination, planning and implementation of climate change adaptation interventions. Finally, as a least developed country, South Sudan has limited financial resources available to implement programmes aimed at reducing vulnerability to climate change. These institutional capacity constraints limit the integration of climate change adaptation into national policies and development planning processes in South Sudan. This limits both short- and long-term planning for climate change adaptation.

7.2 IMPLEMENTATION STRATEGY

The main deliverables will be guided by the implementation strategy. The objective of the implementation strategy is to provide the IGAD with a plan that will guide the implementation of the DRSLP II. The implementation strategy will demonstrate institutional arrangements for management and supervision, procurement and contracting, financial management and reporting. The implementation strategy will include an explicit focus on the participation of youth, women and the poor and vulnerable communities in the planning, implementation and operation of the DRSLP II. It is envisaged that the strategy will include guidelines and principles along the lines of the following steps:

- a) General management and supervision (including contract awards, supervision arrangement, agreement on mobilization plan, agreement on work plan, agreement on quality assurance plan, implementation of critical path activities, completion reports and as design drawings, final acceptance and project handover, site inspections during defect liability period)
- b) General procurement principles (including cost effectiveness, quality output, eligible bidders, local contractor encouragement and transparency)
- c) For procurement of civil works and goods (preparation of bidding documents, bid invitations, evaluation reports, contract awards and contract management)
- d) For procurement of consulting services (ToR, EOI, RFP, invitation system, and technical evaluation form/report)

Table 6: Phase I: Implementation Arrangements for Aweil Rice Irrigation

Activities Stage	Activities	Duration and schedules
1	Feasibility Study, Engineering Agronomy, technical investigation/ fish farming studies	5 months
2	Design of Aweil Rice Irrigation Scheme, type of the dam designed, design of the earthen dam, Hydrometric Stations installations including equipment and civil works at the point of the canal of Lol River (one at Wedweil and another one at Peth) all on Lol river for water hydrometric purpose. Engineering Design works (Flood Protection/water reservoir Earth Dam and river abstraction point, irrigation design works, specifications and construction methods)	5 - 12 months
3	Agronomic production processes (Crops varieties, fertilizers, Agrochemicals, Crops protection).	12 months
4	Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season). Supply of improved rice seeds including fish fingerlings and locally formulated fish feeds.	5 – 12 months
5	Supply of spare parts for rice mill for different grades of rice (One Spare parts, Switch separator)- Schule Germany made	5 – 12 months

	<p>Operation and Maintenance (Fuel (80, 000 Litres of fuel/season -, Labour 99 staff, 10 new 90 HP tractors)</p> <p>Income: Output – 2 tonne of rice per hectare and revenue from sale of fish)</p> <p>Renovation of existing rice stores roofs</p> <p>Capacity building (training of technicians to maintain the tractors and irrigation structures)</p> <p>Six months contract for experts in Agronomy, Motor vehicle Mechanics, irrigations engineers, and agricultural engineers, aqua culturalists)</p>	
6	<p>Establishment of Research Centre for rice selection and varieties</p> <p>Nursery School for kids of the irrigation scheme staff</p> <p>Mobility Vehicles for the scheme</p> <p>5 Motor cycle for agriculture extension officers</p> <p>20 bicycles</p> <p>Office furniture</p> <p>Renovations of scheme offices</p> <p>Wireless internet</p> <p>Solar power source for irrigation scheme headquarters</p> <p>Fencing of the rice irrigation scheme using chain link wire mesh</p> <p>Others: Rehabilitation of boreholes within Aweil west and Aweil Centre</p>	1 – 3 years
7	<p>Expansion of the existing animal health clinic and including supply of veterinary medicines for five counties and training of community animal workers,</p> <p>Deepening of existing hafirs in Aweil East, north and west Counties</p>	5 – 12 months

Table 7: Phase II: Implementation Arrangements for Kapoeta South, East and North Counties, EES

Activities Stage	Activities	Duration and schedules
1	Dams (hafirs) (40,000 m3) Hand pump boreholes Boreholes with elevated tank Water quality and quantity monitoring	12 months
2	Rehabilitation of Dams (hafirs) (40,000 m3) Hand pump boreholes, Boreholes with elevated tank	5 - 12 months
3	Stock routes Construct/rehabilitate animal stock routes environmental and social impact assessment)	12 months
4	Veterinary services Construct/rehabilitate veterinary hospitals Construct/rehabilitate checkpoints Construct/rehabilitate slaughter houses Disease surveillances, quarterly livestock vaccination and treatment Capacity building or training for community animal health workers (CAHWs)	5 – 12 months
5	Specific feasibility study (Topographic survey, geotechnical investigation, hydrological study, Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season). Supply of improved rice seeds including fish fingerlings and locally formulated fish feed.	5 – 12 months

8 INTERVENTION APPROACH

Water resource within the republic of South Sudan is abundant but unevenly distributed spatially and seasonally across the country. Water related infrastructures developments relevant to South Sudan context are rainwater harvesting structures; irrigation infrastructure; hydropower dams; boreholes, which derive their water from ground (under the surface); and drinking water purification and wastewater treatment plants. For this particular project, the possible water related infrastructures that will be proposed are improvement of an existing irrigation scheme infrastructure; construction of Haffirs and Dams for rainwater runoff storage; and oil produced water treatment facilities.

During the national experts and stakeholders` meetings, intervention sites were proposed and deliberated until a consensus was reached. The major criteria for choosing the project areas were based on the areas that had the most need for intervention. The selected projects were derived from South Sudan National Adaptation programme to climate change document. This document has national priority projects from which these projects were selected. All the selected project areas of intervention fall within the most drought prone zones of the Semi-arid/Pastoral (Kapoeta South County, southeast of the country); the Western Flood Plains (Aweil Centre County, northwest of the country)

The predicted effects of climate change pose a serious challenge to food security and poverty reduction in South Sudan. Recent extreme weather events, exacerbated by ongoing conflict, have led to critical food shortages. Floods and other natural disasters have contributed to the displacement of people, a situation that is compounded by conflict; extreme poverty; and lack of a requisite knowledge, skills and technologies. The NAPA process seeks to identify key adaptation activities that will meet the needs of the vulnerable communities in South Sudan.

8.1.1 Identification of key adaptation needs

The identification of adaptation needs involved wide consultation with various stakeholders in the public and private sector, including line ministries, academics, non-governmental organizations (NGOs) and civil society. Through these consultations, national stakeholders identified five key thematic areas in which immediate adaptation interventions are required:

- Environment;
- Water Resources;
- Agriculture;
- Disaster Risk Reduction; and
- Policy and Institutional Framework.

The identification of these key thematic areas was discussed and validated at the multi-stakeholder inception workshop. Following the inception workshop, thematic working groups were formed to further discuss and identify key adaptation needs within each theme. Each thematic working group comprised of 8 – 15 theme-specific specialists from government, academia, NGOs and civil society.

8.1.2 Key adaptation needs

The key adaptation needs identified through stakeholder consultation and by each thematic working group are presented below.

1) Environment

Key adaptation needs identified for the environmental theme – including forestry, wildlife, biodiversity and renewable energy – during stakeholder consultations are as follows:

- Promote agro-forestry practices as a way of diversifying land production systems and promoting alternative livelihood options.
- Promote reforestation of degraded landscapes/watersheds using multi-use forest species to increase community safety nets and diversify livelihoods.
- Develop forest reserves and management plans to protect watersheds and improve future water availability.
- Promote alternative sources of energy to reduce deforestation and the consequent loss of livelihood options.
- Improve the enforcement of environmental regulations.
- Establish conservancies and protected areas to buffer local communities and biodiversity against climate change impacts.
- Establish water points for wildlife in protected areas to reduce the negative effects of droughts on animal populations.
- Introduce eco-tourism to protect wildlife and provide alternative livelihood options to communities surrounding protected areas.
- Increase awareness of local communities on climate change and environmental protection.
- Introduce fire management plans to prevent the spread of wildfires during periods of drought.
- Establish seed/gene banks to protect threatened species and identify climate resilient varieties.
- Introduce an integrated natural resource management approach.

2) Water Resource Management

Key adaptation needs identified for water resources management during stakeholder consultations are as follows:

- Undertake assessments to identify areas prone to shortages under climate change and inform integrated water resources management.
- Promote the development of floods control and water harvesting/storage structures; and water supply infrastructure, including dykes, intakes wells, dams, haffirs, canals and drains, to increase water management capacity and sustainability.
- Improve water and sanitation infrastructure in urban areas to improve safe water supply and liquid wastes management.
- Develop supplementary irrigation systems in rural areas to improve agricultural production and increase food security.
- Establish a regulatory framework for the allocation and monitoring of water quantities and quality, including pursuance of penalties for polluting freshwater sources/bodies.
- Develop a solid waste management plan to maintain quality of water catchments and their environs.

Promote the implementation of programmes, projects and activities identified in the Irrigation Development Master Plan (IDMP), with a focus on those interventions that benefit vulnerable communities.

3) Agriculture

Key adaptation needs identified for the agricultural theme – including crop and livestock production, as well as fisheries – during stakeholder consultations are as follows:

- Implement rangeland management plans to control overgrazing and ensure fodder availability under climate change conditions.
- Identify and promote the use of drought-resilient livestock varieties.
- Promote aquaculture as an alternative livelihood option.

- Protect and preserve wetlands and other freshwater bodies, including through establishment of targeted regulation pertaining to the management of such water bodies.
- Introduce supplementary irrigation technologies to improve agricultural production and increase food security.
- Undertake research on climate-resilient technologies and species, including drought- and disease-tolerant crop species.
- Strengthen agricultural and veterinary extension services to train farmers on climate-resilient agricultural techniques.
- Introduce conservation agriculture techniques to improve production.
- Promote the implementation of projects identified in the Comprehensive Agricultural Master Plan, with a focus on those projects that benefit vulnerable communities.

4) Disaster Risk Reduction

Key adaptation needs identified for disaster risk reduction during stakeholder consultations are as follows:

- Improve collection; analysis and dissemination of weather information to better predict extreme weather events.
- Strengthen/establish drought and flood early warning systems in South Sudan to reduce the impact of droughts and flood on rural communities.
- Improve water supply and sanitation systems to mitigate the negative impacts of floods.
- Promote alternative sources of energy to reduce deforestation and the consequent loss of important livelihoods.
- Develop regulatory framework for the management of the oil sector to reduce environmental degradation and flood-proof waste disposal facilities.

5) Policy and Institutional Framework

Key adaptation needs identified for policy and planning during stakeholder consultations are as follows:

- Increase awareness, education and training of staff regarding climate change adaptation.
- Mainstream climate change into sectorial policies and programs.
- Promote and enabling environment for climate change adaptation policies and plans.
- Conduct capacity building for climate change adaptation at national as well as regional level.
Introduce emissions standards for monitoring and evaluation of environmental performance

8.2 BASELINE FOR THE PROGRAM

The baseline is intended for staff of concerned government institutions in the South Sudan, Community Based Organizations, Pastoralists and Agro-Pastoralists, IDDRSI Platform Members and Facilitators, Research and Development Organizations, members of the Resilience and Gender Working Group, IDDRSI Partner Organizations, Civil Society Organizations and Faith-based Groups, National Food Security Platforms, and others who are affected by the four project outcomes.

8.2.1 Research and Development

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.

8.2.2 Donor coordination

In South Sudan development partners (DPs) working in the agriculture sector are guided by the Comprehensive Agricultural Development Master Plan (CAMP); and work within the Agriculture and Livelihoods Development Working Group (ALDWG), as well as the Partnership for Recovery and Resilience (PfRR) Framework. The key DPs active in the sector include DFID, FAO, WFP, EU, Netherlands, Canada, JICA, BMZ, SDC, USAID, AfDB and the World Bank. The DPs' agriculture sector interventions focus on the broad areas of (i) Improved management and equitable access to water sources for livelihood activities; (ii) Food production and improved income generation for women and youth; (iii) Livelihood diversification (e.g., animal production groups, cereal marketing groups, etc.); (iv) Construction of feeder roads; and (v) Peace building and conflict resolution.

The major issues highlighted are:

8.3 OTHER SERVICES

8.3.1 Access to Electricity (electric 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) accounts for just 1.4 percent of the electricity generated in South Sudan, with the balance coming privately through small diesel generators.

8.3.2 Access to Internet

Technological advancement in South Sudan lags behind most of its African neighbours due to the long wars the country had been going through. In 2010 the number of Internet users was only 7 per 100 people this number rose to 16/100 people by 2014 and phone subscriptions was 24.5/100 people (UN-Environment, 2018).

8.3.3 Access to safe water

The average amount of water consumption of South Sudanese is below one third of the amount recommended by the WHO. Piped water network coverage is very limited. The low quality of water causes many water-borne diseases. Development partners (including BMZ through GIZ & KfW, USAID, UNICEF, JICA, Netherlands, SDC, ICRC, NGOs, AfDB and the World Bank) are the major supporters in improving access to safe water; and improved sanitation and hygiene services in both rural and urban areas. Due to crisis, coordination meetings have been suspended, as most of the donors stress the importance of humanitarian assistance over that of development.

8.4 POVERTY REDUCTION STRATEGY

Poverty and vulnerability remained high in South Sudan since the conflicts broke out in December 2013; hence the humanitarian and charitable organizations to meet the local people's foods and nutrition

generally support agriculture. These resources and non-resources benefits include rights, political voices, employments, information, services, infrastructures development and natural resources exploitation and management. South Sudan's land-based economy relies heavily on subsistence farming for food security and economic development, most of which are small scale, private and predominantly family based (World Bank Group, South Sudan, 2019). The Revitalized Transitional Government of National Unity of South Sudan (R-TGoNU) formed in February 2020 creates a peaceful space and environment to increase economic growth, reconstruction and resilience towards poverty reduction approaches. The Revitalized Agreement on the Resolution of Conflicts in South Sudan raises hope to the conflicts and natural disasters affected South Sudanese population in the region to rebuild themselves. 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 productions 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 (AFDB - SS, 2020).

8.4.1 Food Security Situation

Currently, the food security and nutrition situation remain critical in South Sudan. *Most of the people (76%) in the country derive their livelihood from crop farming and animal husbandry (South Sudan IDDRSI Progress Report, 2020).* However, more than half of the country's estimated 12.23 million people are expected to face severe food insecurity at the height of the annual hunger season according to WFP's 2020 report on food security. The prevalence of Global Acute Malnutrition (GAM) amongst children under five stands at about 16% which is above the WHO's emergency level. A total of 1.8 million are in need of acute malnutrition treatment in 2021 including an estimated 313,000 under five children suffering from severe acute malnutrition (SAM). 1 million children under five and 483,000 pregnant and lactating women suffer from moderate acute malnutrition (IPC report, 2021).

8.4.2 Coping mechanisms

The diet becomes insufficient and less nutritious during the pre-harvest period, especially in dry lands. Household food security in the country traditionally depends on a complex system of food production, livestock, seasonal migration, informal trade, fishing and the collection of wild fruits, which was severely disrupted by the war. Activities to cope with this seasonal food scarcity might include selling livestock, charcoals, firewood and other homemade products and providing labor for cash or food. Introducing an appropriate number of livestock would be particularly helpful since they are more drought resilient than crops and can supply food throughout (CAMP, 2015).

8.4.3 Cross cutting Challenges

Access to land and land use:

This is a key factor of agricultural development, but:

- Land rights are not secured for many people in South Sudan, particularly for returnees, IDPs and women.
- Procedures for large-scale land acquisition have not been clarified nor properly followed. The absence of an audit and monitoring system reduces transparency and accountability in statutory land administration.
- As a result of decades of civil war, customary laws were weakened and are not effective in securing equal land rights for every community member.
- There are land boundary issues between urban and sub-urban areas.

- Tension between pastoralists and sedentary farmers is common in the country.

For further elaboration, Annex 1 gives aspects of Sustainable Land Management / Land Governance Strategy.

Conflict and Seasonal Migration

- Conflicts over access to water happen between agriculturalists and pastoralists who travel seeking water and grazing land for livestock.
- Seasonal migration of livestock keepers is occasionally accompanied with lots of challenges, conflicts over resources, youth disputes over women and cattle rustling. It sometimes results in deadly inter communal clashes leading to death of hundreds and this in turns causes insecurity and cattle raiding.
- Like any other pastoral communities, the livestock keepers in South Sudan migrate seasonally from their permanent settlements to the extensive floodplains “Toiches as known by the indigenous tribes)” typically along the White Nile river systems. At these permanent water sources during the dry season, animals’ accumulation leads to overgrazing, pervasive diseases transmission and conflicts over resources.
- Seasonal migratory routes are affected by the accessibility and availability of the pastures and water sources as well as the security status in the area. Cultivation is disrupted by the hostilities in many areas.
- When violence broke out in Juba on 15th December 2013 between the Government and opposition forces, it quickly spread to other locations in the country. People were then displaced by the hostilities, either within the country or in the neighbouring countries.
- Support for the Internally Displaced Persons (IDPs) and returnees are not sufficient to improve their livelihoods particularly in the agricultural productions.

8.4.4 HIV/AIDS

This is another threat, a disease that directly affects our potential, of the population involved in Agriculture sector in South Sudan. 2020 HIV/AIDS report for South Sudan indicate that 193,000 people are living with the HIV virus, mostly youth’s population.

8.4.5 Linkages with IGAD Regional Strategy (2016–2020) & Regional Programming paper (2019–2024)

South Sudan became the youngest IGAD member state after the long war of secession from the Sudan. However, no sooner did the dust settle that the country went into war with itself since 2013 through 2016. The conflict left about 400 000 people dead and over a million displaced within the country and in neighboring countries. The RT-GoNU through the concerted efforts of IGAD and the AU has ushered in some hope for peace through the implementation of the various aspects of the RT-GoNU.

Throughout this period the Regional body has been guiding South Sudan throughout the years of conflict May 10, 2021 · IGAD is concerned that despite life-threatening levels of food insecurity and malnutrition in South Sudan, the humanitarian response remains largely underfunded. A civil war that erupted in late 2013 has left more than 400 000 people dead and over a million displaced.

8.4.6 Linkages with AfDB Feed Africa Strategy by 2025

The Program for Building Resilience for Food and Nutrition Security is financed by the African Development Bank; and is being developed within the framework of the interest collectively expressed by IGAD Member States invest in the second phase of the recently concluded Drought Resilience and Sustainable Livelihoods Program (DRSLP). However, South Sudan did not participate in the first phase of DRSLP.

8.4.7 Institutional Responsibilities for Water Resources in South Sudan

Institutionally, the Ministry of Water Resources and Irrigation (MWRI) has overall leadership in the water sector. The Ministry has the responsibility for the following: (i) drafting and overseeing the implementation of policies, guidelines, master plans and regulations for water resources development, conservation, and management in the country; (ii) encouraging scientific research into the development of water resources; (iii) overseeing the design, construction, and management of dams and other surface storage infrastructure for irrigation, human and animal consumption and hydroelectricity generation; (iv) setting tariffs for water use; (v) creating policy on rural and urban water resource development and management; (vi) initiating irrigation development and management schemes; (vii) protecting the Sudd and other wetlands from pollution; and (viii) advising and supporting the states and local governments in building their capacity to assume all functions vested by the Constitution and government policy. The three key directorates responsible for the water resources sub-sector are Water Resources Management, Irrigation and Drainage, and the Hydrology and Survey.

To achieve these duties and responsibilities, MWRI has adopted a water policy in 2007 and a strategic framework in 2011. The overall goal of the water policy is to promote effective management of the quantity, quality and reliability of available water resources in order to maximize social and economic benefits while ensuring long-term environmental sustainability. Key guiding principles for water resources management are: (i) water is a shared resource and appropriate legal frameworks shall be established to govern all aspects of water use; and (ii) water resources planning shall involve all relevant stakeholders and will be undertaken on the basis of natural hydrologic boundaries. The 2007 policy discusses aspects of water use in fisheries, navigation, livestock, forestry, industries, environment, and wildlife and tourism development. However, it postpones the development of policies on irrigated agriculture to a future date, awaiting progress in the development and usage of water for irrigation uses and purposes.

The water sector strategic framework of 2011 discusses, among other things, South Sudan's challenges pertaining to water resources management, the complexities that arise from the trans boundary nature of its water resources and the priority assigned to integrated water resources management. Underscoring the roles played by several institutions and appreciating the need to integrate the decision-making process, the strategic framework recommends establishment of Water Council to act as the principal multi-stakeholder advisory body for the water sector (MWRI, 2007). The Council would also provide relevant support services to the Presidency and the Cabinet on approval of new and amended legislation and policies pertaining to all water related issues. In addition, the strategic framework recommends establishment of a Water Resources Management Authority (WRMA) to enforce regulatory functions on the management and use of water resources.

In 2012 alongside CAMP MWRI then embarked on formulation of the IDMP, which was finalized in 2015 with support of JICA. IDMP is the IWRM national framework for South Sudan, as it hinges assessment, allocation, management and development of water resources "to support agricultural production and productivity without jeopardizing the needs of other sectors and stakeholders". MWRI also, led drafting of the Water Bill, 2015 towards establishing of a Water Act. The 2015 Bill stipulates

under WRMA, establishment of basins' water boards, catchments'/sub-catchments' water committees and the water users' associations.

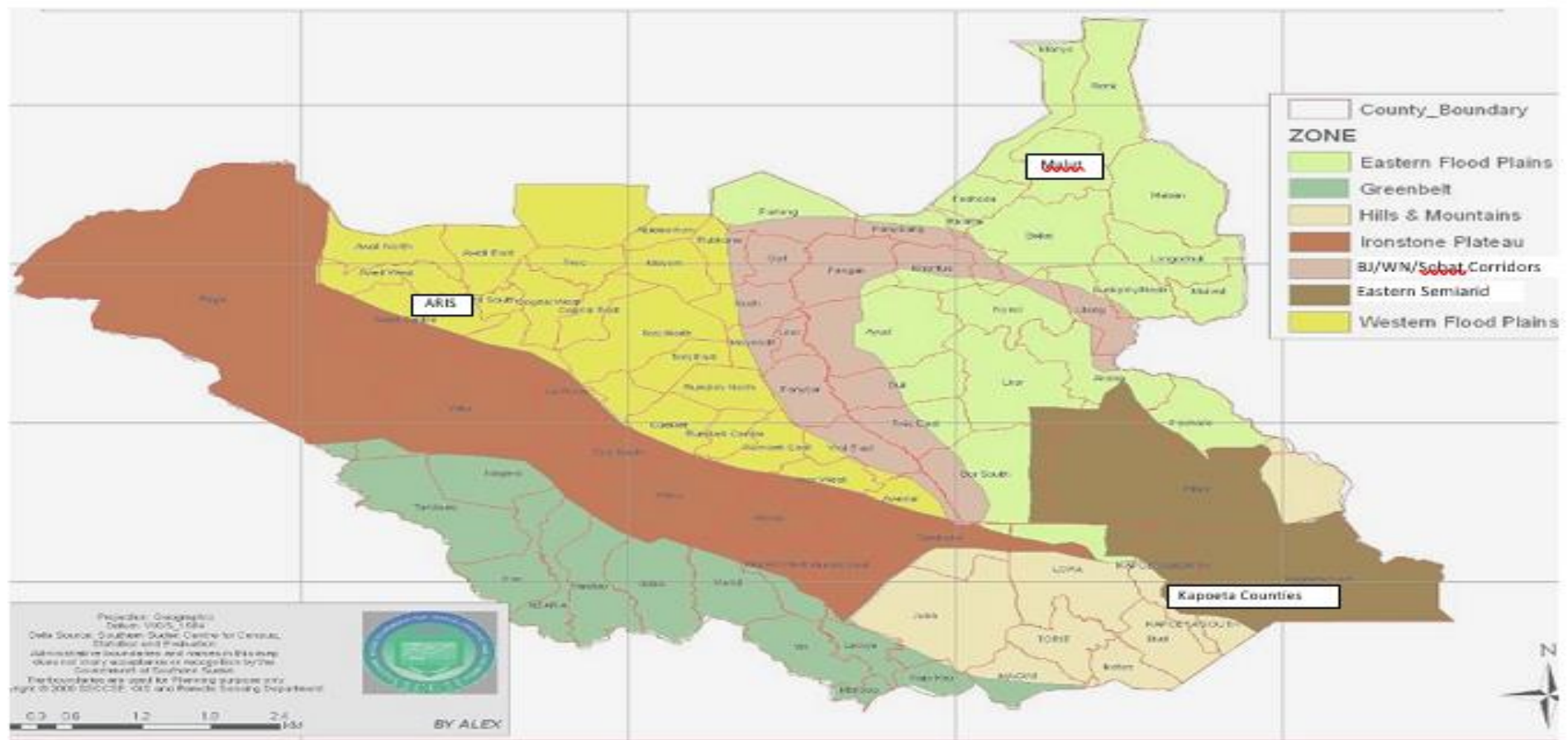


Figure 24: Location(s) of the infrastructure sites / project areas / intervention zones

9 DETAILED COST OF THE PROGRAM

Table 8: Summary of intervention cost (A detailed cost of the intervention is provided in Annexes 9 and 10)

S/No	Location	Intervention	Cost (USD)
1	Aweil West, Aweil Center and Aweil East	Rehabilitation of 1,260 ha of Aweil rice irrigation scheme including integration with fish farming, construction of animal health facilities, rehabilitation of existing boreholes and construction of new boreholes, and dredging of existing hafirs, Northern Bahr El Ghazal State	6,421,723.02
2	Kapeta South, Kapoeta East and Kapoeta North Counties	Construction of water reservoirs and livestock services in Kapoeta south, Kapoeta east and Kapoeta north counties of Eastern Equatoria State, south sudan	13,529,000
	Grand Total (USD)		19,950,723.02

10 ECONOMIC AND FINANCIAL ANALYSIS

Financial and economic analyses serve two different purposes. The financial analysis is used to document a reasonable expected return on investment to prospective investors. The economic analysis is used to document that the project is a net benefit to society as a whole – this is especially interesting in relation to public investments.

A **financial analysis** estimates the profitability of a project, from an investor's perspective. In a financial analysis you compare the costs of the project to the expected revenue over the project lifespan (Ministry of Water Resources and Irrigation, 2011). The net present value of this project is greater than the difference between the presented revenue and input considering the massive existing infrastructure.

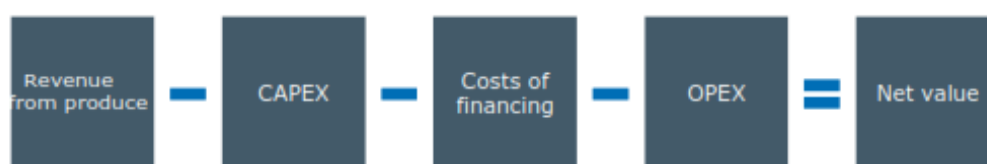


Figure 25: Approach to financial analysis

An **economic analysis** takes a broader view of the profitability of the project. In an economic analysis, you include external effects such as environmental impacts and health impacts. The value of external effects is typically assigned using economic opportunity costs or shadow prices. An economic analysis does not include taxes, tariffs, subsidies, etc. These costs do not add to economic productivity and are merely transactions between entities within the economy (Ministry of Water Resources and Irrigation, 2011).



Figure 26: Approach to economic analysis

Table 9: Recovery Period Calculation for Rehabilitation Of 1,260 Ha of Aweil Rice Irrigation Scheme Including Integration with Fish Farming, Construction of Animal Health Facilities, Rehabilitation of Existing Boreholes and Construction of New Boreholes, And Dredging of hafirs.

S/N	Description	Unit Price	Units	Quantity	Output (USD)
A	Produce				
1	Sale of Milled rice (year)	500.00	USD/Metric Ton	7,560.00	3,780,000.00
2	Sale of Fish	0.10	USD/kg	16,800,000.00	1,680,000.00
	Total Output (USD)				5,460,000.00
B	Production Cost	Unit Price	Units	Quantity	Input (USD)
1	Hydrometric Stations installations including equipment and civil works at the point of the canal of Lol River (one at Wedweil and another one at Peth) all on Lol river for water hydrometric purpose.	66,000.00	USD/Station	2.00	132,000.00
2	Water Quality monitoring (within the basins and on Lol River inlet and outlet). This will ensure protection of upstream users and to monitor over use of fertilizers in the rice and to meet minimum water quality standards for water for fishes.	42,000.00	USD/Season	2.00	84,000.00
3	Flood Protection/water reservoir Earth Dam on the canal from Lol river to Aweil Rice Farm (Actual required volume for one season of 120 days is 45,000 cubic metres (CM)) to ensure farming all seasons and to control flooding	8.00	USD/Cubic Metre	60,000.00	480,000.00
4	Rehabilitation and widening of 25KM Access road from Aweil town to rice field sites including planting of trees to protect it sides from erosion.	54,000.00	USD/KM	25.00	1,350,000.00

5	Feasibility studies (Topographic surveys, Engineering Hydrology, Geotechnical investigations, irrigation agronomy, agricultural soil and land suitability, environmental impact assessment, and Tilapia fish farming integration studies)	120,000.00	USD/Consultancy	1.00	120,000.00
6	Engineering Design works (Flood Protection/water reservoir Earth Dam and river abstraction point, irrigation design works, specifications and construction methods)	156,000.00	USD/Consultancy	1.00	156,000.00
7	Construction Works: Water Control structures rehabilitation works (Main canal, associated water control hydraulic structures, secondary irrigation canals, associated water control hydraulic structures within the secondary canals, raising of embankments)	360,000.00	USD/Construction	1.00	360,000.00
8	Supply of improved rice seeds including fish fingerlings and locally formulated fish feeds	100,800.00	USD/Season	2.00	201,600.00
9	Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season)	151,200.00	USD/Season	2.00	302,400.00
10	Supply of spare parts for rice mill for different grades of rice (One Spare parts, Switch separator)- Schule Germany made	12,000.00	USD/Supply	1.00	12,000.00
11	Operation and Maintenance (Fuel (80, 000 Liters of fuel/season -, Labour 99 staff, maintenance of 10 new 90 HP tractors)	371,640.00	USD/Season	2.00	743,280.00
13	Renovation of existing rice stores roofs	7.04	USD/Square Meter	11,880.00	83,683.02
14	Capacity building (training of technicians to maintain the tractors and irrigation structures)	6,000.00	USD/One Training	1.00	6,000.00
15	Six months contract for experts in Agronomy, Motor vehicle Mechanics, irrigations engineers, and agricultural engineers, aqua culturalists)	129,600.00	USD/Man-months	12.00	1,555,200.00

16	Chain link Fence of the scheme administration headquarters to protect the assets of the irrigation scheme from vandalism	60.00	USD/Linear Meter	1,600.00	96,000.00
17	Establishment of Research Centre for rice varieties	60,000.00	USD/Construction	1.00	60,000.00
18	Nursery School for kids of the irrigation scheme staff	60,000.00	USD/Construction	1.00	60,000.00
19	Mobility Vehicles for the scheme	24,000.00	USD/Supply	5.00	120,000.00
20	5 Motor cycle for agriculture extension officers	1,200.00	USD/Supply	5.00	6,000.00
21	20 bicycles	240.00	USD/Supply	20.00	4,800.00
22	Office furniture	480.00	USD/Supply	50.00	24,000.00
23	Renovations of scheme offices	50.40	USD/Square Metre	300.00	15,120.00
24	Wireless internet	4,320.00	USD/season	2.00	8,640.00
25	Solar power source for irrigation scheme headquarters	12,000.00	USD/Supply	1.00	12,000.00
26	Fencing of the rice irrigation scheme using chain link wire mesh	72.00	USD/Construction	2,000.00	144,000.00
27	Others: Rehabilitation of boreholes within Aweil west and Aweil Centre	1,200.00	USD/Construction	10.00	12,000.00
28	Expansion of the existing animal health clinic and including supply of veterinary medicines for five counties including of community animal workers	1,162.50	USD/Construction	80.00	93,000.00
29	Deepening of existing hafirs in Aweil East, north and west Counties	60,000.00	USD/Construction	3.00	180,000.00
	Total Output (USD)				6,421,723.02
	Recovery Period (years) = 6,421,723.02/ 5,460,000.00				1.18

Table 10: Annual operation cost Calculation for Rehabilitation of 1,260 Ha of Aweil Rice Irrigation Scheme Including Integration with Fish Farming, Construction of Animal Health Facilities, Rehabilitation of Existing Boreholes and Construction of New Boreholes, And Dredging of hafirs

S/N	Description	Unit Price	Units	Quantity	Output (USD)
A	Produce				
1	Sale of Milled rice (years)	500.00	USD/Metric Ton	7,560.00	3,780,000.00
2	Sale of Fish	0.10	USD/kg	16,800,000.00	1,680,000.00
	Total Output (USD)				5,460,000.00
B	Production Cost				
1	Hydrometric Stations installations including equipment and civil works at the point of the canal of Lol River (one at Wedweil and another one at Peth) all on Lol river for water hydrometric purpose.	66,000.00	USD/Station	2.00	
2	Water Quality monitoring (within the basins and on Lol River inlet and outlet). This will ensure protection of upstream users and to monitor over use of fertilizers in the rice and to meet minimum water quality standards for water for fishes.	42,000.00	USD/Season	2.00	84,000.00

3	Flood Protection/water reservoir Earth Dam on the canal from Lol river to Aweil Rice Farm (Actual required volume for one season of 120 days is 45,000 cubic meters (CM)) to ensure farming all seasons and to control flooding	8.00	USD/Cubic Meter	60,000.00	
4	Rehabilitation and widening of 25KM Access road from Aweil town to rice field sites including planting of trees to protect it sides from erosion.	54,000.00	USD/KM	25.00	
5	Feasibility studies (Topographic surveys, Engineering Hydrology, Geotechnical investigations, irrigation agronomy, agricultural soil and land suitability, environmental impact assessment, and Tilapia fish farming integration studies)	120,000.00	USD/Consultancy	1.00	
6	Engineering Design works (Flood Protection/water reservoir Earth Dam and river abstraction point, irrigation design works, specifications and construction methods)	156,000.00	USD/Consultancy	1.00	
7	Construction Works: Water Control structures rehabilitation works (Main canal, associated water control hydraulic structures, secondary irrigation canals, associated water control hydraulic structures within the secondary canals, raising of embankments)	360,000.00	USD/Construction	1.00	
8	Supply of improved rice seeds including fish fingerlings and locally formulated fish feeds	100,800.00	USD/Season	2.00	201,600.00
9	Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season)	151,200.00	USD/Season	2.00	302,400.00

10	Supply of spare parts for rice mill for different grades of rice (One Spare parts, Switch separator)- Schule Germany made	12,000.00	USD/Supply	1.00	
11	Operation and Maintenance (Fuel (80, 000 Liters of fuel/season -, Labour 99 staff, maintenance of 10 new 90 HP tractors)	371,640.00	USD/Season	2.00	743,280.00
13	Renovation of existing rice stores roofs	7.04	USD/Square Meter	11,880.00	
14	Capacity building (training of technicians to maintain the tractors and irrigation structures)	6,000.00	USD/One Training	1.00	
15	Six months contract for experts in Agronomy, Motor vehicle Mechanics, irrigations engineers, and agricultural engineers, aqua culturalists)	129,600.00	USD/Man-months	12.00	1,555,200.00
16	Chain link Fence of the scheme administration headquarters to protect the assets of the irrigation scheme from vandalism	60.00	USD/Linear Meter	1,600.00	
17	Establishment of Research Centre for rice varieties	60,000.00	USD/Construction	1.00	
18	Nursery School for kids of the irrigation scheme staff	60,000.00	USD/Construction	1.00	
19	Mobility Vehicles for the scheme	24,000.00	USD/Supply	5.00	
20	5 Motor cycle for agriculture extension officers	1,200.00	USD/Supply	5.00	
21	20 bicycles	240.00	USD/Supply	20.00	
22	Office furniture	480.00	USD/Supply	50.00	
23	Renovations of scheme offices	50.40	USD/Square Meter	300.00	

24	Wireless internet	4,320.00	USD/ season	2.00	8,640.00
25	Solar power source for irrigation scheme headquarters	12,000.00	USD/Supply	1.00	
26	Fencing of the rice irrigation scheme using chain link wire mesh	72.00	USD/Construction	2,000.00	
27	Others: Rehabilitation of boreholes within Aweil west and Aweil Centre	1,200.00	USD/Construction	10.00	
28	Expansion of the existing animal health clinic and including supply of veterinary medicines for five counties including of community animal workers	1,162.50	USD/Construction	80.00	
29	Deepening of existing hafirs in Aweil East, north and west Counties	60,000.00	USD/Construction	3.00	
	Total Annual Operation Cost (USD)				2,895,120.00

Table 11: Cost Benefit Ration Calculation for Rehabilitation of 1,260 Ha of Aweil Rice Irrigation Scheme Including Integration with Fish Farming, Construction of Animal Health Facilities, Rehabilitation of Existing Boreholes and Construction of New Boreholes, And Dredging of hafirs

Assumed Discounted Rate of the Bank:						10%		
	Cost					Benefit		
Year	Investment (USD)	O&M (USD)	Total (USD)	Discounted Rate (10%)	Present Value (USD)	Sales (USD)	Discount Rate (10%)	Present Value (USD)
1	6,421,723.02		6,421,723.02	0.91	5,837,930.02	5,460,000.00	0.91	4,963,636.36
2		2,895,120.00	2,895,120.00	0.83	2,392,661.16	5,460,000.00	0.83	4,512,396.69
3		2,895,120.00	2,895,120.00	0.75	2,175,146.51	5,460,000.00	0.75	4,102,178.81
Total (USD)					10,405,737.68			13,578,211.87
Benefit Cost Ratio					13,578,211.87 / 10,405,737.68 = 1.30			
Net Present Value (USD)					13,578,211.87 - 10,405,737.68 = 3,172,474.19			

Table 12: Internal Rate of Return Calculation for Rehabilitation of 1,260 Ha of Aweil Rice Irrigation Scheme Including Integration with Fish Farming, Construction of Animal Health Facilities, Rehabilitation of Existing Boreholes and Construction of New Boreholes, And Dredging of hafirs

Year	Cost (USD)	Benefit (USD)	Net Benefit (USD)	Discount Rate (10%)	Present Value (USD)
1	(6,421,723.02)	5,460,000.00	(961,723.02)	0.29	(279,421.93)
2	(2,895,120.00)	5,460,000.00	2,564,880.00	0.08	216,515.00
3	(2,895,120.00)	5,460,000.00	2,564,880.00	0.02	62,906.93
	Net Present Value (USD)				0.00
	Internal Rate of Return (IRR)				244%

As seen in tables above, the rehabilitation of Aweil Rice farm is a project of great economic potential in achieving food and nutrition security in South Sudan. With its potential production of 3 metric ton per hectare and considering the high demand for rice as evidenced in the huge quantities of imported rice, investment in this project would aid in economic recovery of South Sudan.

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For the projects in Kapoeta, they all failed in financial analysis and passed in economic analysis. The benefits from these projects are difficult to quantify. Particular example is the construction of hafirs for livestock use. Estimating the improvement in the health of the animal as a result of availability of water within a short distance is fairly difficult to estimate.

11 PROGRAM SUSTAINABILITY AND NEXT PHASES

Given the huge revenue from Aweil rice irrigation scheme, this project is self-sustainable and therefore would be gradually improved until a desired output is achieved.

The next phases to benefit largely from the annexes

12 RISKS AND MITIGATION MEASURES

The table below gives a summary of possible risks to which the project may be exposed and possible mitigation efforts to be applied.

Table 13: A general summary of risks that the project may be exposed to, its probability of happening, effects and mitigation efforts that should be exerted

No.	Risk	Probability	Effect	Recommended precaution / Mitigation measure
1	Insecurity problem in the sub-region	High	High	Follow-up with the Client and take appropriate measures avoiding areas of insecurity
2	Drought and floods	High	High	Application of predictive early warning system and pictorial evaluation tools
3	Crop production and productivity failure due to climate variability	High	High	Implementation of CSA principles including sustainable and equal access to farming inputs (climate resilient seeds) and services
3	Cattle raiding/rustling	High	High	Community sensitization and dialogue among livestock keepers
4	Risk of harmonization of deliverables	High	Moderate	A common summary validated by the Client is to be drawn up as part of the first establishment report
5	Political instability	High	Moderate	Political dialogue and strengthening of institutions
6	Regional expert-national expert interface and interface with another design office (EESS study)	High	High	-Collaboration anchored from the start of the mission -The Customer is a stakeholder in the management of this interface

13 LIST OF PROGRAM GOODS AND SERVICES

- Equitable access to land, water resources and secure land-use systems, including protection of pastures from encroachment and strengthening of local and/or customary systems so that they are better able to negotiate dry-season access to key resources for pastoralists;
- Trade expansion, market integration and increasing regional interconnectivity, together with high and growing demand for animal proteins all over the world;
- Conflict avoidance: Pastoralists' reliance on mobility makes them particularly vulnerable to conflict and fear of conflict, which can cut off their access to key resources and block them from important markets;
- Establishment of predictive early warning system and pictorial evaluation tools to monitor natural disasters like floods, drought, etc. and coordination of disaster management approaches between the government (Ministry of Humanitarian Affairs and Disaster Management) and the Humanitarian Organizations;
- Technological developments enhancing mobility and telecommunications (e.g. geographic information systems to map the state of rangeland resources);
- Control of transboundary animal diseases (e.g. foot-and-mouth disease, rift valley fever, peste des petits ruminants, etc.) as a prerequisite for tapping into regional and global markets. For instance, stringent sanitary standards for international trade in animals and animal products have limited the export of livestock products to profitable international markets (e.g. from countries of the Horn of Africa to Saudi Arabia);
- Pests and disease control programs by the Ministry of Livestock and Ministry of Agriculture and Food Security;
- Livestock vaccination programs by the government and development partners;
- Enhancement of interlinkages among crop and livestock producers, including pastoralists, as part of the development of domestic markets in South Sudan to cope with increased demand for food crops, meat and milk.
- Supporting women's empowerment, looking not only at how to enable enterprises run by women to become more market-oriented, but in particular at how to ensure that women capture the benefits of economic empowerment;
- Supporting women's access to productive resources and main assets (water, land, fuel wood, markets, knowledge), promoting their participation in small-scale farming/livestock production and strengthening their role in decision-making processes;
- Cooperation between the Government of South Sudan, AfDB and IMF in service provision such as the electricity provision in Juba through Juba Electricity Distribution Company (JEDCO), urban water provision and meeting government's fiscal year deficits.

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15 ANNEXES

Annex 1: Sustainable Land Management / Land Governance Strategy

South Sudan's total land area is 640,745 square kilometers, of which more than half is estimated to be suitable for agriculture. In addition, South Sudan has the second-largest wetlands in Africa and the largest intact savanna ecosystem in East Africa. Natural forests and woodlands cover 29% of the total land area. There are currently six national parks and 13 game reserves in South Sudan, covering 11% of the land area (UNDP 2012a; GoSS 2011a; GoSS 2011b; GoSS 2011c; FAO, 2010). South Sudan includes 10 states and estimated population of about 11.3 million people, made up of 64 ethnic groups (USAID, 2013). Approximately 78% of all households earn their livelihoods from farming, pastoralism or a mix of both. Farming is predominantly rain-fed, and farmers cultivate their small plots with handheld tools. Pastoralists hold approximately 12 million cattle in aggregate and, in addition, there are millions of poultry, goats, pigs, horses, donkeys and sheep. Sedentary farming is on the rise in South Sudan, which has reduced the amount of grazing land available for pastoralists (Ghougassian 2012; GoSS 2011a; World Bank 2010a; USAID 2010a; FAO, 2010).

Land management (land-use pattern and tenure)

The 2009, South Sudan Land Commission (SSLC) is charged with development of land policies and draft legislation to clarify and strengthen land administrative systems and the rights of landholders (USAID, 2013). The Transitional Constitution of 2011 states that all land in South Sudan is owned by the people of South Sudan, and charges the government with regulating land tenure, land use and exercise of rights to land. The constitution classifies land as public, community or private land, and requires the Government of South Sudan to recognize customary land rights when exercising the government's rights to land and other natural resources. The constitution does not clarify the extent to which customary rights can limit government's rights, but does require that all levels of government incorporate customary rights and practices into their policies and strategies. Furthermore, the Land Act, 2009, the Local Government Act, 2009, and the Investment Promotion Act (2009) were also developed to establish the institutions and mechanisms of governance that would address pressure points and fill vacuums created by conflict, uneven development and lack of transparency and accountability in land and its resource governance (GoSS 2011f; GoSS 2011g). The three laws establish the fundamental framework for the fair and transparent administration of land rights in South Sudan. The Land Act regulates land tenure and equally recognizes rights to customary, public and private tenure. The Local Government Act defines primary responsibilities of local government and traditional government authorities in the regulation and management of land, which includes charging customary institutions with particular responsibilities for administering community land rights. The Investment Promotion Act establishes procedures for facilitating access to land for private investment, including by foreign investors, in ways that balance the interests of both current right holders and investors. Although a framework has been developed, government officials have a poor understanding of the laws and lack the capacity to interpret and carry them out. There is also a lack of awareness by the population as a whole, which further impedes progress (GoSS 2011e; GoSS 2011g). The SSLC also developed a draft Land Policy that strengthens the rights of land holders, communities and citizens within the new framework and guidelines established by the Land Act (2009). It emphasizes the importance of access to land as a "social right," a feature of many customary land tenure systems that allows community members to access land irrespective of wealth or economic status (Deng and Mittal 2011). Customary law has governed the use of land in South Sudan for centuries, with each ethnic group applying its own laws relating to land and land rights within its own territory. Although they vary from community to community, customary institutions and traditional mechanisms continue to govern the access, use and allocation of land (USAID 2010b).

Under the Transitional Constitution of the Republic of South Sudan, 2011, the people of South Sudan own all the country's land and its usage is regulated by the government in accordance with the constitution and law. The applicable law in this case as indicated above is the Land Act, 2009. Both the Transitional Constitution and the 2009 Land Act prescribe a three-category land tenure system divided into public land, community land and private land. Public land means all lands owned, held or otherwise acquired by any level of government from the National to State, County, Payam and Boma levels. Any unclaimed land by an individual or a community belongs to the government by a default. Community land includes all lands traditionally and historically held or used by local communities or their members. This category could include communal grazing lands for animals, hunting grounds or locations of traditional sacrifices and worship. Private land includes registered land held by any person under leasehold tenure, investment land acquired under lease from the government, and any other land designated as private land in accordance with the law. The implicit assumption in this framework is that all investment land or land for business is acquired from the government through the leasehold tenure. However, the government does not own enough public land to lease it for investment, and here comes the paradox of the law act saying the land belongs to the people. The reality as the Transitional Constitution dictates is that the government owns the land and all the people hold leasehold titles over their plots.

As the citizens of the country who were IDPS, and refugees in the neighboring countries are now coming back home to settle in their ancestral lands and livestock population growth has brought about increased tensions as cultivation expands into livestock routes and crops get destroyed in the process, more conflicts over land use are cropping up. The livelihood and mobility related tensions predominantly concern access to water and grazing land between pastoralists and agricultural groups but also among pastoralist groups themselves are not uncommon. As land is a basic asset for South Sudanese and any families without secure rights to land for a home or a plot to cultivate face significant obstacles overcoming poverty. Because of all these problems, land and other natural resources are being unwisely used thereby resulting into varied spatial and temporal degrees of land degradation, including deforestation, erosion, soil infertility and productivity decline.

The land tenure system in South Sudan

The 2009 Land Act states that the people of southern Sudan own all land, and the state is responsible for regulating use of the land (Deng (2014)). However, the Land Act classifies all land in South Sudan as public, private, or community land. Public land includes various forms of government property, including:

- Land for government facilities;
- Transport corridors;
- Urban parks and recreational areas;
- Forest reserves, wildlife reserves and national parks;
- Certain wetlands and waterways; and
- A number of pre-war agricultural schemes and agro-industrial complexes.

Private land includes land held by individuals in freehold or leasehold. In other words, the Land Act recognizes three private land tenure types: customary, freehold and leasehold. Land used for residences, agriculture, and forestry and grazing can be held under customary tenure. Although the Land Act recognizes freehold as a valid form of ownership, there is currently no land held in freehold anywhere in South Sudan. As a result, private land consists entirely of leaseholds in which primary ownership rests with state governments. Most of these leaseholds are situated in urban areas for residential or commercial purposes. Community land refers to land held under customary land tenure. There is no *terra nullius*, or 'no man's land', in South Sudan. Communities, defined mainly in terms of ethnic groupings or subgroupings, own virtually all land in the country in the sense that they retain the right to regulate its usage according to their own particular customary land tenure system (Rolandsen 2009). South Sudan is home to about 65 ethnic groups whose territories span the entire country. Customary land tenure systems vary across the country.

Some groups, such as the Shilluk, incorporate more centralized systems of land governance. The Shilluk are led by the Reth (Shilluk King), who has a greater deal of authority over decision-making on land issues than many other traditional authorities in South Sudan. Other customary land tenure systems adopt more decentralized structures, in which authority is distributed among several institutions of traditional authority in the community. Another line of distinction can be broadly drawn between groups that practice different livelihood approaches, such as groups that adhere to primarily agriculturalist or pastoralist lifestyles. Under customary tenure, access to land is seen as a 'social right' and serves an important safety net for populations residing in rural areas. Land is typically assigned to families and their descendants in perpetuity. In that sense, identity plays a role in determining one's land rights. People belonging to a certain ethnic group have a right to access land within that group's territory. However, the fact that peoples' land rights depend so heavily on their identity can also restrict individuals and groups from outside the community from settling on community land. There is a long history of identity politics revolving around land issues being used as a tool of divide-and-rule in South Sudan (SIHA, 2013).

The role of identity in determining land rights also has implications for internally displaced persons (IDPs) and refugees (SIHA 2013). IDPs and refugees are commonly permitted to settle temporarily on community lands if they have a good reason for leaving their homelands, but there is usually an explicit condition that once the cause of their displacement subsides, they will return to their home areas. Another concern with customary land tenure relates to the manner in which it treats women's rights. The Transitional Constitution and the Land Act include provisions that purport to protect women's land rights. Nonetheless, many customary systems continue to restrict women's ability to own land independently of their husbands or male relatives (Oystein, 2009). The risks of landlessness are particularly acute for divorced women. Upon divorce, women are often denied a share of family wealth and property, even if that property was obtained after marriage. If the husband's family has paid the full bride's wealth (typically in the form of cattle) to his wife's family, a divorced woman may also be denied custody over her children. When divorced women's birth families decline to accept them back into the family home, the women may be left with nowhere to go. This insecure tenure status may also make it difficult for women to flee abusive relationships, since if they divorce their husbands they often stand to lose all their property and can even be denied custody of their children. Most customary law systems include mechanisms to provide for widows, but in practice, the families of their deceased husbands often dispossess widows of their lands, even when doing so is not in accordance with customary law (SIHA 2013).

Land-use pattern and tenure or status of land use / land tenure system policy in South Sudan

The principal aim of Southern Sudan's land policy is to ensure that the greatest numbers of citizens are secure in their rights to land as defined by law (SSLC, 2011). The government shall facilitate access to land at reasonable cost for all citizens, regardless of their socio-economic status. All Southern Sudanese who hold land under legally recognized forms of tenure would be protected from the capricious or arbitrary loss of land rights. Where land is taken for public purposes, landholders will receive fair and just compensation. The 2011 draft Land Policy, currently under review, clarifies some ambiguities in the Land Act by endorsing in general terms the existing patterns of land tenure as they relate to land use, as follows: (1) community tenure will be the principal form of tenure in areas that are predominantly rural; (2) public and freehold tenure will be the principal forms of tenure in areas that are officially gazetted as urban areas under the Town and Country Planning Act; (3) public land also includes land over which no private ownership (including customary ownership) is established, roads and other public transportation thoroughfares, water courses over which community ownership cannot be established and forest and wildlife areas formally gazette as national reserves or parks; and 4) peri-urban areas may be held under community, public or private tenure (GoSS 2011f, LANDac, 2012).

The Land Act indicates the importance of customary authority and mandates the establishment of County Land Authorities and district-level Payam Land Councils. Land Authorities and Councils are local land

institutions comprised of county and district level representatives entrusted to act as civic authorities and administrators over community land. The composition of the county level bodies is as follows: one representative from each town and municipal council; one representative from the Ministry of Housing, Physical Planning and Environment appointed by the Minister; a representative of traditional authority; one representative of civil society; and, one-woman representative recommended by the County Women Association. State Governors will appoint individuals to the Land Authorities based on recommendations from County Commissioners. Land Authorities' responsibilities include: holding and allocating public lands on behalf of local government; making recommendations on gazetted land planning; advising on resettlement of IDPs; facilitating the registration and transfer of land; supporting cadastral operations and surveys; advising local communities on land tenure, usage and exercise of rights; and coordinating with the SSLC and other government bodies. The Payam Land Councils are responsible for the management and administration of land at the district level. Districts are comprised of subsections called bomas. Members of each Payam Land Council will be appointed by the State Minister based on recommendations from County Commissioners and in consultation with the traditional authority in the payams. Payam Land Councils are composed of: the executive chief of each boma and a representative from the Farmers and Herders Association, representatives of a civil society group and one woman recommended by the payam Women's Association (GoSS, 2011f; GoSS, 2009a).

Although the Land Act mandates the establishment of local land institutions, there are no clear procedures for establishing land authorities or councils and, as a result, very few have been created. Furthermore, although, the draft Land Policy does not provide additional guidance, but recommends the development of a Community Land Act that would establish guiding principles and a legal framework for the governance of community lands by traditional and formal governing institutions (GoSS, 2011f; GoSS, 2009a).

Further, although, customary land rights are inheritable and can be subject to usufruct rights and sharecropper agreements, but they cannot be permanently alienated. Traditional authorities may allocate lifetime tenure rights to customary land (Deng, 2014). However, if a parcel is non-residential and exceeds 250 feddans (about 105 hectares), traditional authorities must notify local government and secure their approval in advance of making any transfer. Freehold rights are held in perpetuity and include the right to transfer the land temporarily or permanently. The Land Law does not state how freehold rights are acquired. Leaseholds can be obtained for customary and freehold land, and can be granted for up to 99 years. Two local government bodies must approve leases of more than 105 hectares of customary land. Foreigners cannot own land in South Sudan, but can lease land for periods up to 99 years (GoSS 2009a; Rolandsen 2009).

The Land Act and draft Land Policy recognize the importance of, and aim to facilitate, the resettlement and reintegration of IDPs, refugees and other categories of persons whose rights to land were affected by the civil war. Moreover, the Land Act grants a right of restitution if a landholder lost his or her land rights (formal or customary) after being involuntarily displaced as a result of the 1983 civil war. The right of restitution exists regardless of whether the land was taken over by an individual or by the government, and extends to family members, legal heirs and any other person who had an interest in the land at the time it was lost. According to the Land Act, claims for restitution must have been filed to traditional authorities or the South Sudan Land Commission (SSLC) within three years of the enactment of the Land Act (i.e., by January 2012). The Land Act provides for monetary compensation to the claimant in the event that the government cannot provide land. It is not clear how many claims have been filed with either traditional authorities or the SSLC, and the current status of such claims is unknown; however, once adopted, the draft Land Policy would extend the restitution period in acknowledgment of the fact that people are unaware of their restitution rights and the associated timeline (GoSS 2011f; USAID 2010b; GoSS 2009a).

Under the Land Act and draft Land Policy, the GoSS cannot force IDPs and returnees to return to their ancestral homes. And both the law and the draft policy lack formalized rules to resettle or compensate

returnees. Despite the absence of a structured framework, in some areas local management systems have been flexible and have absorbed returning community members. Many repatriated South Sudanese choose to stay in Juba and other commercial towns, where their presence puts increased pressure on resources and assets such as land, and formal land administration systems are failing to cope with the influx of people. The lack of a clear policy and legal framework, and limited institutional capacity in both rural and urban areas compounds the challenge of resettling returnees and IDPs in South Sudan (USAID 2010b; USAID 2010c).

The Transitional Constitution, Land Act and draft Land Policy recognize that the right to land shall not be denied to any citizen by the GoSS, State Government or community on the basis of sex, ethnicity or religion. In addition, the Constitution stipulates that women have the right to own and inherit land, together with any surviving legal heir or heirs of the deceased. However, despite the legal framework's incorporation of language that protects women and other vulnerable groups, the key legislation governing statutory land tenure still contains openings for discrimination. For example, the Land Act provides for one slot in each Land Country Authority and payam Land Authority to be allocated to a woman. But these provisions do not meet the threshold envisaged in the constitution that 25% of seats in government bodies be filled by women. When it comes to the issue of succession and inheritance, there is currently no legislation to help operationalize those sections in the Constitution that provide for women's right to own property and share in the estate of deceased husbands (together with any surviving heir of the deceased). The provision is ambiguous and does not explicitly provide for daughters' rights in the estate of a deceased father (GoSS 2011f; GoSS 2009a; USAID 2012a).

The customary land tenure system in South Sudan limits women's access, control and ownership of land. Knowledge, recognition and protection of women's rights remain limited throughout South Sudan because most men and women are not aware of the rights of women in accessing land. But when men and women are aware, they often claim that cultural and traditional norms should override any legal provisions. Women generally do not own or inherit land in South Sudan. They typically access land only through their husbands, and may lose this access if widowed. Even where traditional institutions are willing to allocate land to women, most customary laws do not consider women equal to men, and this limits how women can hold rights to land. Thus, women's land rights remain largely conditional, derived through their marital or childbearing status, or guaranteed through other male relatives. It is also common for widows, daughters and divorced women to be dispossessed of their land rights. For example, in some communities, a widow can be forced to leave her marital land following the death of her husband, or, male relatives can deny daughters inheritance of family lands. While some argue that customary rules and practices should adapt to changing social circumstances, others resist change, fearing its impact on tradition and cultural identity. These competing notions lead to a significant gap between the law and practice, particularly in rural areas (GoSS 2011f; USAID 2010b; GoSS 2009a; USAID 2012a).

Historically, customary systems for land and property rights incorporated important safeguards for women's access to land, and family and marriage customs generally protected the access rights of older women and widows. With the conclusion of the civil war, however, a large number of women (mostly younger) are returning to their ancestral homes. An estimated 45–50% of these women are returning as heads of their households, since many men died during the conflict with Sudan. Rights for younger women are traditionally weaker, and customary institutions are ill-equipped to deal with the fact that younger women have increasingly become heads of households. Issues of women's access to land and property rights have thus become more contentious in both rural and urban communities (USAID 2010b).

The issue of women's access to land and property rights needs to be addressed in the context of prevailing customary tenure practices as well as within the context of provisions in the South Sudan Transitional

Constitution that establish women's equal rights to land and property. Generally, there seems to be a consensus among government authorities that women's rights to access, inherit and own land is a significant issue that should be addressed. But efforts to strengthen women's land and property rights remain a challenge due to difficulties in bridging the gap between traditional authorities, who prefer to govern women's access to land within a customary framework that restricts these rights, and proponents of the new legal framework that puts women on equal footing with men (USAID 2010b).

To secure the land rights for all citizens, both the Land Act and draft Land Policy provide for the registration of land in South Sudan. The Land Act states that all land, whether held individually or collectively, shall be registered and granted a title. Systematic registration shall take place at the request of the state and be carried out by the Ministry of Housing, Physical Planning and Environment. Communities can register their land in the name of the community, in the name of a traditional leader as trustee for the community or in the name of a clan, family or community association. Once community land is registered, individual members of the community may be entitled to register individual rights to land within the community land area (GoSS, 2011f; GoSS, 2009a).

Status of Physical Land Degradation / Reclamation

Land degradation is defined as the deterioration of the quality of land because of it being subjected to use and abuse such as the uses which lead to deforestation, overgrazing and unregulated agricultural practices (Dima, 2006).

Linkages with UNCCD/ Global Mechanism's – Land Degradation Neutrality (LDN)

Land degradation and desertification threatens the wellbeing of many people in South Sudan, raising the risks of migration and communal conflicts. Loss of biodiversity and climate change further exacerbates the situation and is expected to affect the suitability of vast areas for food production and human settlement (Lado, 2020). To address the matter, the UNCCD appealed to the international community to identify trends and drivers of land degradation, define baselines for land degradation and to voluntarily set land degradation neutrality (LDN) targets and formulate key policy measures and transformative projects to combat land degradation and desertification by 2030 (Lado, 2020).

As the Republic of South Sudan is a bio-diverse country, it has recognized the loss of this biodiversity and agricultural land as a result of unsustainable management practices, drought and desertification as serious threats to sustainable development and poverty alleviation (Lado, 2020). Because of such a loss the Republic of South Sudan acceded to the UNCCD on 17th February 2014 and became a newly-fledged member on 18th May 2014 with the Ministry of Agriculture and Food Security as the Focal Ministry. Besides, its membership in the UNCCD, the country is also a party to the other two Rio Conventions, namely the United Nations Framework Convention on Climate Change (UNFCCC), and the United Nations Convention on Biological Diversity (UNCBD). After becoming a member of UNCCD on 18th May 2014, South Sudan has since then taken concrete steps in addressing issues of land degradation. In 2014, the LDN Target Setting Program (TSP) was launched, and subsequently endorsed by COP12 in October 2015. In addition, the country's commitment can be traced back to its national development priorities (Lado, 2020). Four pillars and priorities have been identified in the draft National Development Plan of the country (GOSS 2011). These are namely pillar 1: Governance, pillar 2: Economic development; pillar 3: Social and human development, and pillar 4: Conflict prevention and security. The priorities under pillar 1 deal with legislation. Pillar 2's priorities are concerned with agriculture and animal production, and infrastructure. Pillar 3's priorities include education among others (GOSS 2011). Land Degradation Neutrality is strongly associated with these pillars and other several SDGs such as poverty reduction, environmental protection, sustainable use of natural resources and food security. Moreover, many socio-economic benefits namely employment creation and poverty reduction are linked to LDN. For example, reforestation and agroforestry

can contribute both to LDN achievement and increased land productivity, employment creation and poverty reduction, particularly in rural areas. Other LDN-related benefits include benefits for amelioration of climate change as well as the country's delivery on the SDG commitments such as poverty alleviation and sustainable use of natural resources, combat desertification, restore degraded land and soil, reduce droughts and floods, and aims to become a land degradation-free (Lado, 2020).

South Sudan's other commitments and engagements include the Intended Nationally Determined Contribution (INDC under the UNFCCC), the alignment of the National Action Plan (NAP) under UNFCCC and the incorporation of the Aichi biodiversity targets into the National Biodiversity Strategy and Action Plan (NBSAP). The INDCs are included in the National Adaptation Program of Action (NAPA) on Climate Change and are implemented across all policy sectors (GOSS 2015). South Sudan aims to gazette approximately 20% as reserve forests. It also aims at reforestation and afforestation projects to plant 20 million trees over a period of ten years (two million trees in each of its ten states) as indicted in the National Environmental Policy (South Sudan 2015), as well as conditional actions in the agriculture, transport, clean energy and other sectors. South Sudan does not yet have a National Action Program (NAP under UNCCD) to combat desertification, land degradation and drought. However, the National Biodiversity Strategy and Action Plan (NBSAP) recognize the Strategic Plan of the CBD (2011-2020) and the Aichi Targets set in October 2010. The 20 general targets have been transformed into national realities. Land degradation neutrality related targets include target 5 on the rate of loss of natural habitats, target 7 on sustainable management of areas under agriculture, aquaculture and forestry, target.

Last, but not least, LDN offers a number of opportunities to mobilize climate financing, private investment and national budgetary resources. Among the identified funding opportunities are international and regional agencies, institutions or organizations such as Global Environment Facility (GEF), the African Development Bank (AfDB), the Islamic Development Bank (IDB), the United Nations Development Program (UNDP), the Food and Agriculture Organization of the United Nations (FAO), the International Union for Conservation of Nature (IUCN), the Green Climate Fund and the LDN Fund. South Sudan is also aware of sources of financing for climate change-related activities which include the Adaptation Fund (AF), the Least Developed Country Fund (LDCF) and the Special Climate Fund (SCF). However, access to these funds is limited by the lack of peace and the poor financial system of South Sudan (GOSS 2007).

Land degradation

In the 1970s and 1980s the Project Development Unit, a World Bank funded project undertook a number of studies in South Sudan- baseline socio-economic surveys, crop trials, sociological studies and exploratory soil surveys in six development districts. These were Aweil, Gogrial, Mundri, Rumbek, Wau and Yei. The soil survey reports indicate that in almost all the districts, some of the soils have been degraded and become infertile with reduced ability to support either crop production or livestock grazing (Dima, 2006). In other words, a degraded land or soil cannot longer perform its natural responsibilities of supporting life forms such as plants, trees, crops, animals and other fauna to a satisfactory level. Based on a number of other studies from 1973 to 2007 in South Sudan, the average annual rate of deforestation was approximately two percent (USAID, 2013). A 1980 FAO/UNEP study estimated that 3.7 million hectares of forests were being cleared each year by farmers and loggers (Lanley, 1982). Recent estimates put the figure at 2.9 million hectares, while reforestation in the same period in the 1980s was about 133,000 hectares or about 5 % of deforestation (Dima, 2006). Cleaver et. al., (1994) assert that deforestation has been responsible for prolonged periods of below average rainfall and the cause of the accumulation of carbon dioxide and nitrous acid, the two of the greenhouse gases.

Some ecologists opined that most of Sub Saharan Africa's natural resource base and ecological environment is deteriorating primarily because of the high rate of loss of the vegetative cover, as a result of deforestation and convergence of global and regional climatic changes and deviation from longer- term to shorter –term

fallow periods (Dima, 2006). Cleaver et al (1994), estimate that Sub Saharan Africa's 679 million hectares of forest in 1980 has been diminishing at the rate of 2.9 million hectares per annum through slash and burn, logging and stabling of large commercial farms. The resulting deforestation has been reflected in half of the farmland having soil degradation and erosion. It is therefore, a common knowledge that the radius for collecting firewood and charcoal becomes longer as the population of a town increases. This is evident in the town of Juba, the national capital of the Republic of South Sudan as well as in the other towns of South Sudan.

Livestock grazing is an important and extensive land use system in South Sudan. This is largely practiced in the flood plains in the Sudd, but also in the ironstone plateau, the central hills and in the South Eastern plains (Dima, 2006). South Sudan is estimated to have a livestock population of about 36 million consisting of 11.7 million cattle, 12.4 million goats, and 12 million sheep. This population is expected to grow at 2 percent to 3 percent per year, and the rangelands are already considered to be overstocked (Fernando and Garvey (2013). The traditional systems adopted by the livestock keepers tend to compact the soils and overtime result in some grass and shrub species disappearing from the range. Because of the large herds kept in some of these areas, overgrazing is now visible in some of the areas, especially during the dry season and around watering points along the cattle routes to the toich. Besides overgrazing, livestock especially cattle are known for causing soil erosion through their feet dislodging grass stems and roots as they graze on the range (Dima, 2006). Overtime this results in the loosening of the soil surface and both wind and water erosion set in.

From the above-mentioned studies on land soil in South Sudan, it can be concluded that there are clear indications that the quality of land has deteriorated in many places. That with expected increase in population of human beings and animals, the deterioration process of the land and the environment as a whole is likely to become worse. For example, in the Central Rain lands and the Flood plains, grazing land and watering facilities may become battlefields amongst communities and tribes sharing these resources. In the Equatoria Region, particularly in the Ironstone plateau and the Central Hills, soils deterioration is becoming a serious problem in some places as revealed by the exploratory soil survey in a number of development districts undertaken by the PDU in the 1970s and 1980s. Generally, up to 2,776 square kilometers of forests and other wooded land were being lost annually in South Sudan (Winslow et al. 2011). Some parts of the country, such as a strip of land about 50 to 200 km along South Sudan-Sudan border, have been turned into deserts (Winslow et al. 2011; Republic of South Sudan, 2015). Likewise, arid and semi-arid areas in the Southeast of South Sudan are becoming desert-like. Similarly, pockets of tropical rainforest along the country's borders with Uganda and the Democratic Republic of Congo, respectively, are being lost at an alarming rate (Winslow et al. 2011), e.g. Mount Dongotono's vegetation is expected to disappear if deforestation continues at its current rate (NBSAP, 2015). The same may happen to the vegetation cover at Didinga hills, and the causes of these in South Sudan are not well understood.

Currently up to 2,776 km² of forests and other wooded land were being lost annually in South Sudan. In addition, 50 to 200 km from northern South Sudan has been transformed from a semi-desert to a desert environment (Republic of South Sudan 2015 and the desert is moving southwards. Besides, unwise and expanding agriculture coupled with burning of vegetation has resulted in degradation of soil and ecosystem services (African Development Bank Group, 2013). Based on a number of studies from 1973 to 2007, the average annual rate of deforestation was approximately two percent (USAID, 2013).

Recognizing land degradation as a major hindrance to sustainable growth, and restoration of degraded lands as a critical element to promote equity, reduce poverty, improve net primary productivity and restore soil fertility, the Government of Republic of South Sudan (GoSS) signed on to the membership of the United Nations Convention to Combat Desertification (UNCCD), and adopted Land Degradation Neutrality (LDN) Target Setting Program as a means to fulfilling this mandate. The country defined its LDN baseline, voluntarily set as its targets and developed transformative projects and programs to achieve LDN by 2030.

Further, as a way of addressing these issues, government shall provide the pastoral groups and the agricultural communities with a sustainable institutional framework for peaceful negotiation over use of common property resources. The government shall also facilitate the community land management institutions in establishing flexible arrangements for equitable grazing land and water resources sharing across community boundaries. Community tenure arrangements that recognize access to land as a social right provide an important safety net that can help reduce poverty.

As a result, the Ministry of Environment and Forestry and other environmentally related ministries such as Ministry of Agriculture and Food Security, Ministry of Water Resources and Irrigation and Ministry of Wildlife Conservation and Tourism should prepare guidelines, laws and regulations for the sustainable exploitation of the land resource in South Sudan, under all the ecological regions of the country and their environments.

History of land management in South Sudan

South Sudan like the rest of the seven member states in the IGAD region has different laws governing land as a consequence of its colonial history, diversity of cultural and religious norms and endowment with natural resources (Teshome and Sidler, 2015). Before the independence of the country in 1961, Customary law in the region has governed the use of land for centuries, with each ethnic group applying its own laws relating to land and land rights within its own geographical setting, while the national land legislation in the old Sudan was based on the colonial model, which strongly favored state ownership of land. The Anglo-Egyptian Condominium period land laws put unregistered land as a state property. The 1905 Land Settlement Ordinance, and its successor, the 1925 Land Settlement and Registration Ordinance, both stipulated that, “waste, forest, and unoccupied land shall be deemed to be the property of the government, until the contrary is proved.” In 1970, the Nimeiri regime took the state ownership of land one step further with the Unregistered Land Act, declaring that all unregistered land of any kind, occupied or unoccupied, belonged to the state and was deemed to be registered in the name of the state. Since rural land areas in South Sudan were almost completely unregistered, the Unregistered Land Act effectively eliminated any legal claims that communities may have had on their ancestral homelands. The lengthy two civil wars (1955-1972; 1983-2005) waged by the Southern Sudanese against the Sudan have also undermined land governance in South Sudan. Furthermore, now and after sixteen years from the end of the last civil war with the signing of the comprehensive peace agreement (CPA) in 2005, and after ten years of independence, the supposedly development-oriented aspects of land, including its administration and land use planning, have received less attention than issues relating to food security, land-related conflict and access to land for displaced populations. Nonetheless, certain reforms have been introduced to the institutional and legislative framework in 2005 and 2011, but due to weak rule of law and human and financial constraints, they have had a limited impact on effective land governance.

When the regional autonomous Government of Southern Sudan (GoSS) was established in 2005, with the implementation of the CPA, there was a degree of uncertainty as to whether the previous national land laws that southern Sudanese considered to be oppressive would continue to be enforced in southern Sudan. To address the legal uncertainty and provide a legal foundation to the ideas espoused in the 2005 Comprehensive Peace Agreement (CPA) and the 2005 Interim Constitution of Southern Sudan (ICSS), the Southern Sudan Legislative Assembly passed three key pieces of legislation in 2009: The Land Act, the Local Government Act, and the Investment Promotion Act. Land Act, 2009; led to the formation of the Land Commission as its sole administrator and its sections 41, 42 and 43; provide general principles of land management for its uses and role of central and state governments. It reinforces the government's recognition of customary land tenure in the CPA and the ICSS, stating, “Customary land rights including those held in common shall have equal force and effect in law with freehold or leasehold rights...” It allows community land to be allocated for investment purposes so long as the investment activity reflects an important interest for the community and contributes economically and socially to the development of the

local community. The Land Act also requires that state authorities provide approval for land acquisitions above 250 feddans (105 hectares), and calls for regulations to be put in place that prescribe a ceiling on land allocations. Both the Land Act and the Local Government Act require that the government consult with local communities and take into consideration their views on decisions related to community land. The Land Act gives special protection to pastoralists, stating that, “no person shall without permission... carry out any activity on the communal grazing land which may prevent or restrict the residents of the traditional communities concerned from exercising their grazing rights.” It also requires project proponents to conduct environmental and social impact assessments (ESIAs) prior to engaging in any activities that might affect the people or the environment. Upon completion of the investment, the Land Act states that leased land “shall revert back to the community.” Though the Land Act allows for long-term leases of up to 99 years, the Investment Promotion Act explicitly limits foreign investments in agriculture and forestry to renewable terms of 30 and 60 years, respectively. Assuming that leases constitute investment property and can therefore be considered to be investments in their own right, any foreign-owned agricultural lease longer than 30 years and any foreign-owned forestry lease longer than 60 years would thus be inconsistent with this provision of the Investment Promotion Act. Due to the poor uptake of these laws, however, many government institutions in South Sudan are not aware of this restriction and 99-year leases for foreign investments in agriculture and forestry are not uncommon.

Land Act, 2009 and land classification

The 2009 Land Act classifies all land in South Sudan as public, private, or community land. Public land includes land for government facilities; transport corridors; urban parks and recreational areas; forest reserves, wildlife reserves and national parks; certain wetlands and waterways; and a number of pre-war agricultural schemes and agro-industrial complexes. Private land includes land held by individuals in freehold or leasehold. Although the Land Act recognizes freehold as a valid form of ownership, there is currently no land held in freehold anywhere in South Sudan. As a result, private land consists entirely of leaseholds in which primary ownership rests with state governments. Most of these leaseholds are situated in urban areas for residential or commercial purposes. Community land refers to land held under customary land tenure. There is ‘no man’s land’, in South Sudan. Communities, defined mainly in terms of ethnic groupings or subgroupings, own virtually all land in the country in the sense that they retain the right to regulate its usage according to their own particular customary land tenure system (Rolandsen, 2009). South Sudan is home to about 64 ethnic groups whose territories span the entire country. Customary land tenure systems vary across the country. Some groups, such as the Shilluk, incorporate more centralized systems of land governance. The Shilluk are led by the Reth (Shilluk King), who has a greater deal of authority over decision-making on land issues than many other traditional authorities in South Sudan. Other customary land tenure systems adopt more decentralized structures, in which authority is distributed among several institutions of traditional authority in the community. This means land classification in South Sudan is also based on the types of livelihoods. Livelihood patterns are determined by the agro-ecological conditions as well as the culture and traditions of the various tribes. The Livelihood Profile prepared by SSCCSE in 2006 states that Southern Sudan’s traditional livelihood systems are a combination of cattle rearing, crop production, fishing, wild food collection, hunting and trade. For most households in South Sudan, cattle keeping are the fundamental basis for wealth and social status. Crop production plays an important complementary role, but is generally perceived as a less important activity more for cultural than agro-ecological reasons, especially among the Nilotic tribes (Dinka and Nuer). Access to food is highly seasonal and location-specific and in some parts of the country a majority of households move around to exploit seasonal patterns of rainfall. Mobility is crucial and food insecurity often arises where inter-tribal clashes and other conflicts constrain this mobility. Under customary tenure, access to land is seen as a ‘social right’ and serves an important safety net for populations residing in rural areas. Land is typically assigned to families and their descendants in perpetuity. In that sense, identity plays a role in determining one’s land rights. People belonging to a certain ethnic group have a right to access land within that group’s territory. However, the fact that peoples’ land rights depend so heavily on their identity can also restrict individuals

and groups from outside the community from settling on community land. There is a long history of identity politics revolving around land issues being used as a tool of divide-and-rule in South Sudan. The role of identity in determining land rights also has implications for internally displaced persons (IDPs) and refugees. IDPs and refugees are commonly permitted to settle temporarily on community lands if they have a good reason for leaving their homelands, but there is usually an explicit condition that once the cause of their displacement subsides, they will return to their home areas.

Another concern with customary land tenure relates to land rights of women, youth and other vulnerable groups. Though the 2009 Land Act states that women shall have the right to own and inherit land together with any heirs of the deceased, women's land rights are at present highly insecure (De Wit 2004; Pantuliano 2007; GOSS 2009a). Obstacles abound for widowed women when trying to claim inherited leasehold rights from the government. Divorced women are particularly disadvantaged as most of this category lose custody of their children and subsequently, access to land. Reliance on customary law might marginalize women because customary tenure systems offer only indirect right of access to land either through their parents and brother, or through their husbands when married (USAID, 2010). During the consultations for the new land policy in 2010, special workshops on improving women's access to land and property were organized. But putting this to practice continues to be problematic, partly because the land policy is yet to be passed and signed into a law. Land right of youth and other vulnerable groups continues to be problematic as well, and needs to be strengthened. Though the paternal nature of the customary landholding in South Sudan gives inheritance right of land to male children, priority of inheritance is often given to married males, excluding a great deal of youth from having free access to land. Likewise, vulnerable groups such as people with disabilities gain access to land through their dependents (parents, brothers or sisters). Securing land rights of these categories of the society will continue to face some challenges as long as these are not properly articulated in national policies and laws. Surprisingly, none of the existing legal frame works on land has explicitly addressed land concerns of youth and other vulnerable groups.

Land administration, institutions and policy

At the international and regional levels, policy and institutional frameworks have been developed that create opportunities for enhancing land governance in the IGAD region. At the national level, South Sudan has established immediately after the signing of the CPA in 2005, an institution responsible for the management of land resources and that is the South Sudan Land Commission (SSLC). The SSLC is responsible for establishing land policy within South Sudan, enforcing land law, resolving land disputes, assessing compensation for land acquisitions, studying and recording land-use practices in areas where natural resources development occurs, and conducting hearings and formulating rules of procedure. A land registry has already been established in the Ministry of Housing and Physical Planning with coordinated registries maintained at the state level. The SSLC has adopted a land policy in 2013. The principal aim of the land policy is to strengthen land tenure security for all citizens of Southern Sudan who hold land or wish to hold land. Land tenure security is important for the well-being of individual citizens, men and women, wealthy and poor. One of the most guiding land policy principles, besides, security of land rights, equitable access to land, and gender equity, is the sustainable use of land and natural resources. Current holders of rights to land and other natural resources have an obligation to their neighbors, to the country and to future generations to use what they have been given sustainably. The policy, in conjunction with other government policies for agriculture, forestry, water use and the environment, considers good stewardship of land and natural resources to be an obligation of land ownership. Policy statements explicitly stated in the South Sudan land policy statements are:

1) Tenure security will be provided under a diversity of tenure systems: This means the government shall facilitate access to land at reasonable cost for all citizens, regardless of their socio-economic status. All Southern Sudanese who hold land under legally recognized forms of tenure would be protected from

the capricious or arbitrary loss of land rights. Where land is taken for public purposes, landholders will receive fair and just compensation.

2) The role of security of land tenure is to reduce poverty among the country citizens: The government recognizes that provision of equitable, secure access to land is an important component of any strategy to reduce poverty in Southern Sudan. Land is a basic asset for Southern Sudanese. Families without secure rights to land for a home or a plot to cultivate face significant obstacles overcoming poverty. Community tenure arrangements that recognize access to land as a social right provide an important safety net that can help reduce poverty. Poor families living in urban areas often face particular difficulties in gaining access to land for housing and businesses, due to the high costs of land. The policy will encourage efforts by the government and the private sector to provide orderly and timely access to land in urban areas to all citizens.

3) Restitution of land rights: The policy recognizes that ensuring that refugees, IDPs and returnees have secure land rights is essential to the future peace and security of Southern Sudan. The policy calls for the acceleration of efforts to assist IDPs and refugees to make a free and informed choice in shaping solutions to their displacement. These choices may include local integration, return to their community of origin or relocation elsewhere in Southern Sudan. The policy supports efforts that facilitate the transition from displacement to a future of long-lasting peace and sustainable development.

4) Exercise of the right of eminent domain: The recognized authority of the government to take or allocate land from private owners as well as regulate land-use in the public's interest is a common tool of governance worldwide. The exercise of this authority is subject to the test of whether or not there is compelling public health, economic growth, or environmental protection objectives at stake in which the public has an interest. When exercising the power of eminent domain, government must demonstrate the compelling reasons for action and provide fair and adequate compensation to affected landowners in a timely manner. The law of eminent domain shall provide affected stakeholders, including individuals and organizations, with a legitimate interest to seek an injunction from the judiciary against the exercise of this authority, provided it can be shown this power was exercised in an arbitrary or unfair manner, without compelling reason, or in violation of the law. The government may propose to take, reserve, or re-allocate land for a range of legitimate public uses, including the establishment of national parks, forest reserves, military installations, and rights-of-way. Government's power of eminent domain is restricted to securing land for public use only, and not for subsequent transfer or sale to private individuals. Given concerns about corruption, the historical legacy of distrust toward the arbitrary exercise of State power, and the expectation that government should act in the interest of the wider public, government at all levels must exercise this authority with restraint, transparency, and accountability. Government authorities are required to provide clear public explanations when it exercises its authority and restricts or removes private or customary rights in land.

5) Public Participation: Members of the public affected by land use or land development decisions that have potential impacts on their enjoyment of current or future land rights will have the opportunity to present their views directly or through designated representatives before decision-making authorities.

6) Assigning roles and responsibilities for land administration: The roles of the central government in land administration will principally be those of setting standards, ensuring accordance with the constitution and federal laws, and coordinating or mediating among lower levels of government. The Land Commission will convene a broadly-based review of the current roles and responsibilities of all institutions involved in land administration and rights adjudication, with a view to identifying areas of concurrent powers and responsibilities. The Commission will develop recommendations intended to clarify, differentiate, and expand or limit the authority of different government institutions as necessary to simplify and rationalize land administration in Southern Sudan.

7) Equality of men and women in the exercise of land rights: The policy requires all government agencies and all traditional authorities to ensure that men and women enjoy equality of rights to land and other property. The policy requires that men and women be treated fairly and equally when they seek access to administrative and legal services related to exercise of their land rights.

8) Recognition of the community land tenure systems: The policy recognizes the importance of community tenure arrangements in providing land to millions of Southern Sudanese, particularly in rural areas, as a social right. Because land is a social right under community tenure systems, poor people have access to land at no or little cost for housing, agriculture and small business purposes. Community tenure contributes to poverty reduction.

9) A need for public education about land rights: The policy endorses efforts by the government and civil society to inform Southern Sudanese of their land rights. Given the importance of land tenure security to Southern Sudan's economic development and to the establishment of peace and security across the region, the international community is encouraged to support programs in land rights education. Southern Sudan civil society organizations have important roles to play in land rights education and in providing legal assistance to citizens seeking restitution of lost land rights or fair treatment before land administrative bodies.

10) Mediation of land rights conflicts: The Southern Sudan Land Commission and state-level Land Commissions have important roles to play in mediating land-related conflicts. Their capacities to assist land authorities at state and county levels, customary authorities, and aggrieved parties to resolve conflicts equitably will be increased. Traditional authorities have long been effective in mediating conflicts, but the complexity of the land disputes they often face today require new conflict mediation skills. These will be provided through training and various kinds of technical assistance. Government's commitment to an independent judiciary will give legitimacy to the outcome of disputes settled in courts. Acceptance by government and extension of legal recognition to alternative dispute resolution mechanisms will also enhance Southern Sudan's capacity to settle land-related disputes efficiently and peacefully.

11) Land rights registration and land records: The policy recognizes that land rights registration has an important and growing role to play in extending tenure security to land holders. The greatest need for land rights registration, usually taking the form of recording of leasehold and freehold rights in official records maintained by the Ministry of Physical Infrastructure, will be in cities and towns and in rapidly growing pre-urban areas. Generally speaking, the capacity of authorities with responsibilities to register land rights is currently weak. The accuracy of land registration documents requires improvement. The quality of property diagrams is below standard. Recommendations are to be made to develop the capacity to accurately register land rights at various levels of government.

12) Development of land markets: Land transactions based on sales between individuals currently take place mainly in towns and cities, which are places of greatest commercial activity and population growth in Southern Sudan. An accurate and secure land registration system is an essential service that government provides in facilitating the smooth functioning of land markets in urban areas. Market transactions of land do not traditionally feature in community rights systems. However, there is evidence that community systems are accommodating a growing number of land transactions based on sale of land rights, particularly of land held under community tenure and administered by chiefs in pre-urban areas. In rural areas, local entrepreneurs and others are seeking new opportunities, including farming opportunities, in areas with suitable land. The Community Land Act will recognize and accommodate market transactions of rights in community land through provisions that help ensure they take place with due consultation with existing rights holders and after review by appropriate local authorities. The emergence of new land markets including rental markets will be encouraged as they have potential to broaden access to land.

13) Promoting of private investment: National economic development and job creation are important objectives of the central government. The acquisition and allocation of land for private investment is an important means for fulfilling that objective. Procedural requirements that increase the time and costs borne by investors without providing any perceivable public benefit or protection are excessive and constrain economic growth. Where land is provided for private investment, the boundaries and terms of use will be clearly indicated and known by all affected stakeholders.

14) Recognition for extending tenure security to residents of ‘informal’ settlements: The so-called informal settlements are growing rapidly in Juba and other centers of population growth in Southern Sudan. The Land Policy recognizes the land and service needs of residents of informal settlements as legitimate needs, and the policy encourages an approach to informal settlement planning and upgrading that starts with people and communities where they are. The policy does not endorse forced removal of residents of informal settlements, and residents should be moved only when adequate assistance is provided to help residents settle on adequate land at alternative locations, under secure tenure. Already, preliminary studies have shown that residents have developed community registers that list households residing in their areas. GoSS and State and local planners should use community-generated data as a starting point for extending permanent land rights to residents and as aids to planning the upgrading of settlements.

15) Community rights to natural resources used in common: In some jurisdictions, community land used in common for forest products, grazing and water supply has been alienated by central and state level authorities for public use or for sale or lease to private investors without taking account of the ownership interests of communities in the land and its associated natural resources. This has occurred despite the fact that historically and customarily communal land has fallen under the ownership of communities, and traditional or other community-level authorities have regulated its use. As demand for land grows for large-scale enterprises, particularly for agricultural uses, there is a danger that the land needs and current and future land rights of existing and mainly small-scale crop and livestock producers in areas claimed by large enterprises will be overlooked or dismissed.

16) A need for a land use planning and management: The use of land in urban and rural areas as well as in sensitive ecosystems has been a major area of concern in Southern Sudan. Problems of rapid urbanization, inadequate land use planning, poor natural resources/ecosystem conservation and management, and differences between government and communities regarding urban planning and land use which may result in eviction of residents of informal settlements require appropriate policy responses.

17) A need for an efficient and transparent land administration: Land administration refers to processes of determining, recording and disseminating information about the ownership, value and use of land and its associated resources. An efficient land administration system, among other things, guarantees the recording of land rights, promotes tenure security, and guides land transactions.

18) A need for a balanced land use and agricultural development: The land policy encourages development of a balanced and integrated rural agricultural economy that accommodates a diversity of agricultural enterprises, including small-scale family farms dedicated to production for family consumption and sale as well as larger-scale commercial enterprises, oriented to market production, particularly for local markets but also for export. The land policy also recognizes the important role of pastoral livestock production in rural economic and cultural and social life. The needs of livestock producers and crop producers too often come into conflict and rural land management institutions will be assisted to effectively manage conflicts when and where they occur and in ways that treat all land users equitably.

19) A need for mediating agricultural land use conflicts: The high rate of human and livestock population growth has brought about increased tensions as cultivation expands into livestock routes and crops get destroyed in the process. The livelihood and mobility related tensions predominantly concern

access to water and grazing land between pastoralists and agricultural groups but also among pastoralist groups themselves. As a way of addressing these issues, Government shall provide the pastoral groups and agricultural communities with a sustainable institutional framework for peaceful negotiation over use of common property resources. The government shall also facilitate the community land management institutions in establishing flexible arrangements for equitable grazing land and water resources sharing across community boundaries.

Sustainable Land and Water Resource Management

Sustainable land management is defined as a knowledge-based procedure that helps to integrate land, water, biodiversity and environmental management to meet rising food and fiber demand while sustaining ecosystem services and livelihoods (World Bank, 2006). Additionally, a definition developed at the 1992 Earth Summit identified sustainable land management as the use and management of land resources such as soil, water, animals and plants for the production of goods to meet changing human needs, while ensuring the long-term productive potential of these resources and maintenance of environmental functions (FAO, 2011). As a result, sustainable land management is necessary to meet the requirements of a growing population. Improper land management can lead to land degradation and a significant reduction in the productive and service functions (World Bank, 2006).

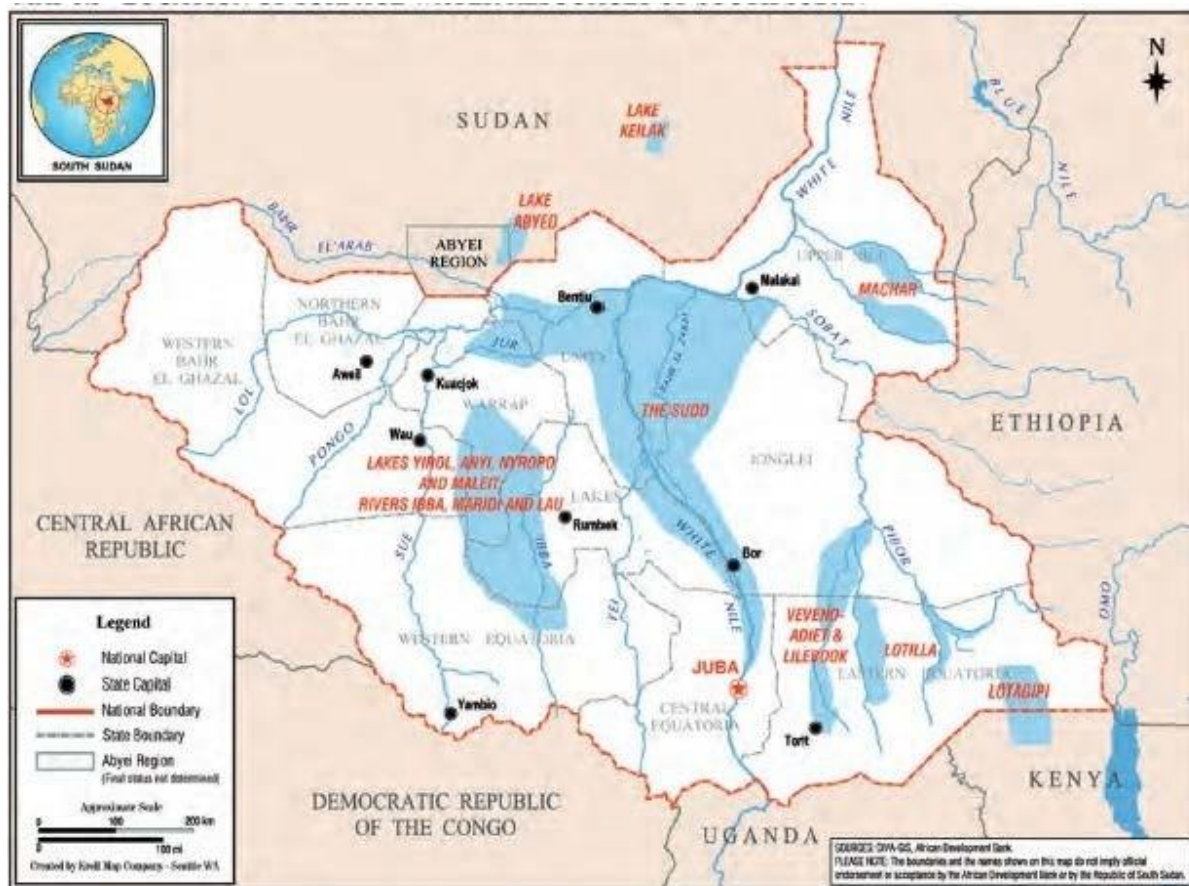
The IGAD sustainable land management is derived directly from the IGAD Regional Strategy of 2016-2020 and its accompanying Implementation Plan (IGAD, 2017). The objective of the Intergovernmental Authority on Development (IGAD) for Land Governance Strategy is to enhance the integration of land governance concerns into development frameworks for both sustainable land management and economic development in the region. This is in line with the objectives of IGAD and its institutional strategy; AU Declaration, Agenda 2063, Framework and Guidelines on Land Policy in Africa, Agenda 21; decisions of the World Summit on Sustainable Development (WSSD) and the Sustainable Development Goals (SDGs).

A sustained development in South Sudan, including reduction in poverty and improved food security, depends on secure access to both the land and water resources of a country. Moreover, successful implementation of infrastructure programs to support economic growth in a country depends on sustained progress in dealing with basic issues related to land and water rights and access. Continued conflict over and or uncertainty about these rights will result in delays in infrastructure investment decisions and implementation and lower overall economic growth (GoSS, 2011).

Annex 2: Water Resources potential in South Sudan

South Sudan is drained by one of the main tributaries of the Nile, the White Nile (Bahr al Abyad), flowing north from Lake Victoria through highland regions of Uganda where it is known as Victoria Nile: It then descends into the East African Rift System until it reaches northern shores of Lake Albert (on the border of Uganda with DR Congo) and flows out as Albert Nile. Albert Nile enters South Sudan, just south of Nimule and the it becomes the Bahr el-Jebel. At Bor, below Mangalla on the Bahr el-Jebel, the great swamp of the Nile, the Sudd begins. The river has no well-defined channel here; the water flows slowly through a network of spillways and lakes choked with papyrus and reeds (Africa Development Bank, 2019). About 50% of the Bahr el-Jebel flow into the White Nile is lost in the Sudd wetlands (African Studies Centre, 2014), primarily due to evaporation and transpiration. The White Nile has several substantial tributaries that traverse South Sudan. In the southwest, the Bahr al Ghazal drains a sizeable basin area. Although the drainage area is extensive, evaporation takes most of the water from the slow-moving streams in this region; and the discharge of the Bahr al Ghazal into the White Nile is minimal. In southeast Sudan, the Sobat River, which is formed by the Baro and Pibor rivers, drains an area of western Ethiopia and the hills near South

Sudan - Uganda border. The Sobat's discharge is considerable. The figure below shows the locations of the main surface water resources of South Sudan.



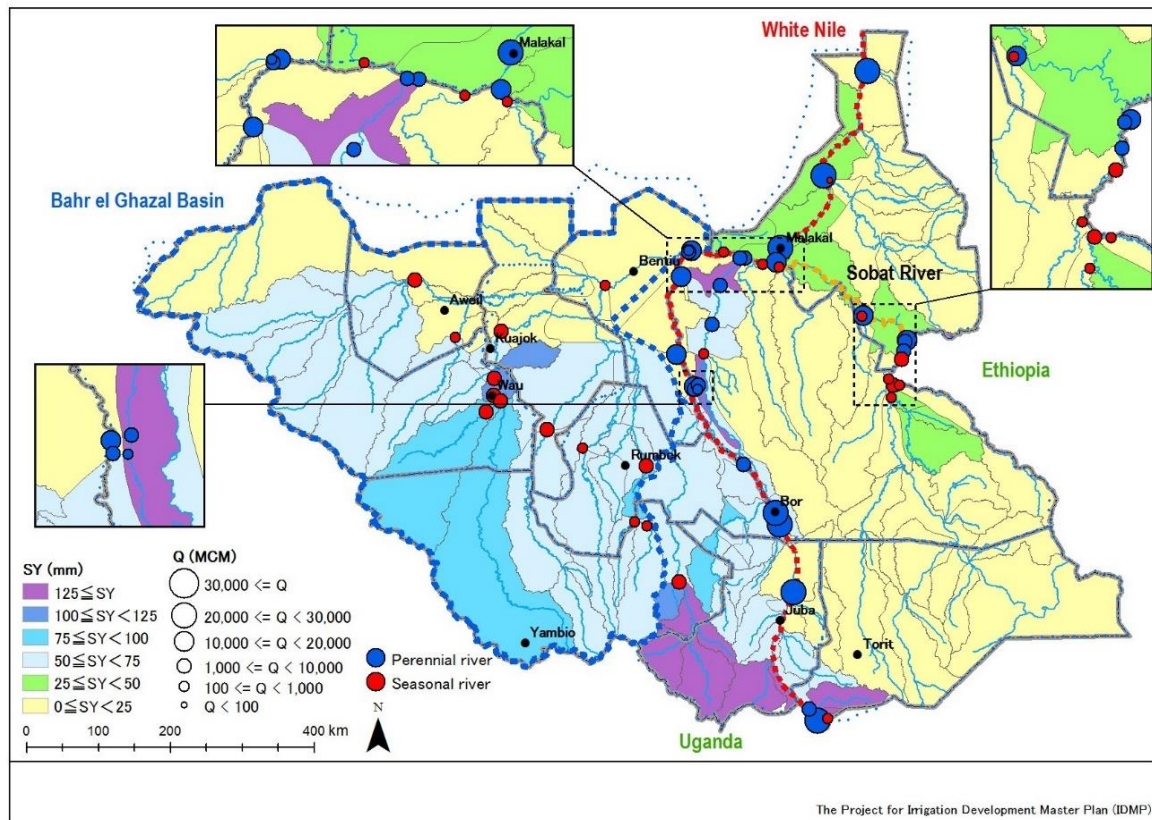
Rivers and surface water bodies distribution (African Studies Centre, 2014)

South Sudan's major water resources are the White Nile, its tributaries and aquifers. According to the National Environmental Action Plan (NEAP), South Sudan is located entirely within the Nile River Basin; and accounts for approximately 20% of the total area of the Basin, which is estimated to be about 3.1 million km². An estimated 28 billion cubic meters, representing 30% of the flow of Nile water, passes through South Sudan to Sudan and onto Egypt. River Sobat, at its confluence with the White Nile just south of Malakal, discharges about 14 billion m³ per annum into the White Nile. The Bahr el Jebel basin discharges about 30 billion m³ per annum, but only 14 billion m³ per annum passes into Lake No, where it meets Bahr el-Ghazal to form the White Nile. The Bahr el Ghazal basin, which discharges about 12 billion m³ per annum loses 11.4 billion m³ per annum of its flow in the swamps, marshes and wetlands leaving only 0.6 billion m³ to flow into Lake No.

A large part of South Sudan is covered by wetlands as well, the most important of which is the Sudd. The Sudd is an inland delta of the White Nile and is made up of lakes, swamps, marshes and extensive flood plains. It is also one of the largest wetlands in the world, averages in size at about 30,000 square kilometers and covers about 5% of the area of South Sudan. The Sudd has been declared a Ramsar site, which confers global recognition and importance to this wetland. There are many other wetland systems throughout South Sudan, some of which are quite extensive. However, wetlands in South Sudan are only protected if they are part of national parks, game reserves or forest reserves. As a result, many of the wetlands in South Sudan

are at risk from exploitation. Some estimates show that all wetlands comprise 7% of the total area of South Sudan.

The figure below illustrates the distribution of surface water potential of South Sudan.



South Sudan surface water resource distribution and potential (IDMP, 2015)

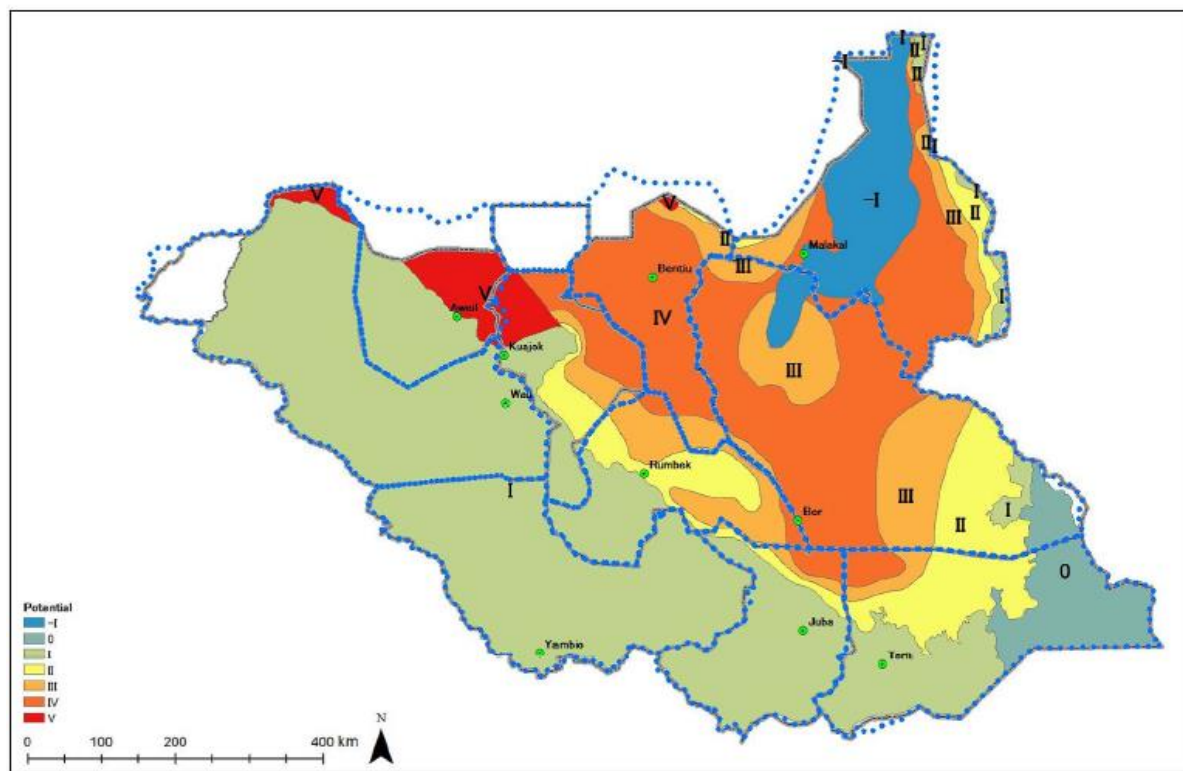
Overgrazing and deforestation has also affected water resources quality increasing turbidity and siltation in water structures in other states.

Groundwater

South Sudan has only one major groundwater basin called the Sudd basin with a total area of 433,000 km² (RSS' IDMP, 2015). The Sudd basin consists of four main aquifers, namely: 1) Alluvium, 2) Umm Ruwaba formation, 3) Nubian sandstone and 4) basement complex (GOSS, 2015). South Sudan huge groundwater resources are found in the Um Ruwaba Formation and basement complex. The Um-Ruwaba is characterized by unconsolidated clays and gravels with low to high permeability; and it is recharged by the seasonal rainfall and river flooding. The basement complex prevails in parts of Western Equatoria, Eastern Equatoria, and Central Equatoria as well as in Western Bahr el-Ghazal states and is characterized by poor water bearing formation. However, fractures and weathered zones provide water of good quality and

quantity. Currently, groundwater in South Sudan, is the principal source of drinking water, but very little work has been undertaken to determine the distribution and extraction levels of these resources. Hence, the full extent of the aquifers and related characteristics is unknown at this time.

A few studies carried out on groundwater quality standards in some states show that salinity levels exceeding allowable limits have been observed in Upper Nile, Jonglei and Unity states making groundwater unsafe in some areas of these states. While higher concentrations of fluoride, sulphate and nitrates have been observed in other few states. Other issues include the need to monitor ground water quality around oil exploration sites in Unity and Upper Nile States and undertake assessments of the impact of the effluent from the waste stabilization and oxidation ponds around Juba. MWRI-RSS has developed a national water quality guideline, but the major concern will continue to be undertaking periodic monitoring and enforcement of regulations related to water use. A map of the hydrogeological zones and groundwater potential of South Sudan is shown in Figure ..., blow.



Groundwater Potential Map (IDMP, 2015)

The economy of South Sudan is highly dependent on agriculture, with about 60% of the total labor engaged either directly or indirectly in agriculture. The agricultural sector remains underdeveloped due to the political instability of the country and the primitive method of farming systems. Food insecurity is a major problem due to low agricultural production connected with weather conditions and lack of water infrastructure and knowledge. The availability and quality of water, besides representing a fundamental resource as drinking water, is necessary for a good development of agricultural and breeding activities; and consequently for a sustainable development of the local economy. RSS' IDMP, Chapter 6 (Strategic Programmes) inventoried existing irrigation projects; and identified and enlisted new Irrigation Schemes to be developed, as captured in Table 6.2.8 (List of Proposed Irrigation Schemes).

Challenges in Land and Water Resource Management

As noted earlier in the section on land classification, most rural residents in the country rely on customary land tenure systems, but these are under pressure from violence, insecurity, refugees and IDPs resettlement. According to the IS Academie (2011), implementation of the Land Act of 2009 is going on, while large-scale land acquisitions that lack transparency are ongoing, and may lead to more conflict over water and land. There is a detailed agenda of concerns about the status of land tenure arrangements for the country. These are clearly articulated in a series of reports prepared under the auspices of the USAID-funded Sudan Property Rights Program, especially, in regards to Conflicts among rural communities over access to resources such as water and grazing lands.

Annex 3: Macroeconomic framework

South Sudan'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 earnings 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 infrastructures. Value addition is constrained by lack of raw materials, lack of power, lack of managers and skilled workers, and lack of finance.

The 2019 state budget was estimated at \$1.3 billion, a 155% increase from 2018. Non-oil revenues increased by an estimated 19% in 2019. The top two spending priorities are infrastructure (54%) and organized forces, including the military, police, prison, and fire-fighting services (14%). The fiscal deficit was estimated at 2.5% of GDP in 2019, down from 6.1% in 2018. Reforms will help move the fiscal deficit, projected at 1.3% of GDP in 2020, to a surplus of 0.5% in 2021.

The country is in debt distress, due to high and extra budgetary spending. Financing the fiscal deficit, primarily through loans, has reduced debt sustainability with total debt at 41.7% of GDP in March 2019. The current account deficit widened to 6.4% of GDP in 2019 from 4.5% in 2018. Exports of crude oil accounts for more than 95% which is expected to fund the current account deficit and boost foreign reserves. Private investment in the nonoil sector reached an estimated \$22 million in 2019. (AfDB, 2017).

Main Indicators	2018	2019	2020	2021	2022
GDP (<i>billions USD</i>)	4.66e	4.93e	4.18	4.58	4.98
GDP (<i>Constant Prices, Annual % Change</i>)	-1.9e	0.9e	4.1	-2.3	0.8
GDP per Capita (<i>USD</i>)	359e	369e	303	323	341
General Government Gross Debt (<i>in % of GDP</i>)	48.189	65.427	71.737	56.748	47.498
Inflation Rate (%)	83.5	51.2	27.1	33.1	26.9
Current Account (<i>billions USD</i>)	-0.35	0.04e	0.61	-0.42	-0.66
Current Account (<i>in % of GDP</i>)	-7.5	0.9e	14.6	-9.2	-13.2

Industries and factories, by type

South Sudan's topmost export is **crude petroleum**. Other exports include gum Arabic. Because of food insecurity and the limited manufacturing sector, the country imports most items, including many foodstuffs, motor vehicles, machinery, and manufactured goods. Agriculture, services, and manufacturing industries are grossly underdeveloped. Agro-industry set up is yet to be established except the gum Arabic industry operates process in tons and export to the foreign markets. Meat processing takes place in large quantity with limited slaughterhouses without exports Private sector presence is weak due to the unstable environment in processing the raw materials (World Bank Group, 2018).

Annex 4: Status of land/environment under different agro-silvo-pastoral and transhumance activities

Livestock population density can be defined as the concentration of livestock groups in a particular location or niche. The niche could be a water point or a grazing land or settlement peripheries. Livestock population density differs according to the agro-ecological zones in South Sudan. In the Greenbelts and the Ironstone plateau, livestock density is very low since pure crop productions in addition to mixed farming are the most important agriculture practices in the area. Dwarf goats, mountainous shorthorn zebu and sheep are the most prominent livestock species in the area. Their number has a negligible effect on the range carrying capacity. However, the settlement of the internally displaced persons (IDPs) from Lakes and Jonglei States in these areas during the long war whereby they brought with them several thousands of heads of livestock had created some negative impact on the environment which include overgrazing around the settlements, deliberate encroachment of livestock into the crop fields of the sedentary farmers, intermittent conflicts over drinking water during the dry season and arrogant behavior of the herdsmen to the native population. All the cited points had ignited gun battles between the natives and the IDPs in Western Equatoria state in the late 2004 and more recently in 2014. Similar conditions are also reported in both Central and Eastern Equatoria States. Therefore, the authorities should take heed of the situation. The negative influence of livestock population density on land and the range resources is mostly observed in the Flood plains and the semi-arid areas of Eastern Equatoria during the dry season. The pastoralist or agro-pastoralist is able to increase indefinitely the size of his herd/flock without considering its effects on the communal grazing land and water resources. These zones have low range biomass and high stocking rates which could predispose the grazing lands to overgrazing and soil degradation. In these areas there is always news of tribal conflicts

between different antagonistic tribes Dinka versus Nuer; Dinka versus Dinka; Nuer versus Nuer; Dinka versus Murle; Murle versus Dinka; Nuer versus Murle; Toposa versus Murle; Toposa versus Boya. Thousands of people may lose their lives and properties from both sides in these bloody wars (Udo, 2004). Another set of conflicts over grazing lands and water resources as a result of high livestock population density do occur between the Arabs tribes from Northern Sudan and Nilotic tribes along the Bahr el Arab, Bahr el Ghazal and White Nile basins when the former brings their livestock for grazing land and water during the dry season. In all these conflicts, modern machine guns are used instead of traditional weapons such as spears and swords. Urban farming had increased tremendously in many towns such as Juba, Wau, Malakal and others during the last long civil war and the recent conflicts. Most of the people took refuge to the towns with their livestock. The most prominent animal species present include goats, sheep and some few heads of cattle. The population densities of these animals have increased at higher rate and most of them do not receive any service at all. They can be observed roaming the streets and the neighborhood daily scavenging for whatever they get on their ways. These animals have become now an environmental hazard since they can graze/browse on trees or ornamental plants they encountered on their route. Therefore, the South Sudanese range environment can only be sustained if stocking rates are matched to the carrying capacity of the rangelands. As has been shown elsewhere in sub-Saharan Africa (Abate, 2006) areas with high livestock densities are always overgrazed of palatable grasses and shrubs leaving behind less palatable species that become prominent under drought and can barely meet the maintenance and reproduction requirements of livestock. Thus, it is useful for livestock keepers to consistently cull and sell unproductive animals such as infertile females and old castrated males using the well-established system of livestock auctions in order to ensure that the range holds manageable numbers of animals. As the R-ARCSS is being implemented, the return to normalcy of major towns in South Sudan could provide internal markets for livestock producers. Moreover, there are already livestock trade opportunities with Uganda, Kenya, DRC and Sudan, which need to be formalized through investment in infrastructure, trade agreements and enabling policies.

Migratory infrastructure

Secure access to dry season resources is critical for nomadic, transhumant pastoral and agro-pastoral livestock keepers. Transitional Constitution of South Sudan grants protection to access seasonal resources in the country, but there is no policy regulating migration in the country. There are migratory routes in place, which were established by MARF, but their safety is not guaranteed up to date. In the neighboring Darfur State of Sudan, over 4,000 km of transhumance routes were constructed between 2005 and 2012. These routes measure 150 meters wide and are marked at 1-3 km intervals. The State compensated communities whose land was incorporated into the migration route, including establishment of services like water supply, schools, mobile veterinary clinics for the nomadic communities. The police and local administrators who often accompany the nomads also provide security for migrating communities. Therefore, South Sudan can draw lessons from its neighbors when such infrastructures are to be put in place.

Marketing infrastructure for livestock

Stock routes in the country are not developed. Thus, movement of traders with livestock from main production areas to market centers is a menace. As a result, herds in transit to markets are often exposed to water and feed shortages and to diseases that affect their body condition. Similarly, during flooding, the stock routes become impassable which affects the supply of live animals to markets. Cattle rustling and insecurity also hamper the usage of stock routes in the country. Livestock traders also suffer usually multiple taxation when transporting livestock to market centers across the country.

Market infrastructure for ruminant livestock consists of: -

- i. Local (primary markets); this is where producers sell their livestock at farm gate price i.e., they are the main sellers. Counties with significant livestock population have 3-4 of this kind of markets, at least 136 of them can be found across South Sudan (CAMP, 2013).
- ii. Auctions/secondary markets; this is where producers' traders form a mix of sellers. Each county has an approximated one auction or market with large number of livestock. There are 48 auctions or secondary markets across the country (CAMP, 2013).
- iii. Terminal markets/auctions; these are commonly found in the urban centers in Greater Bahr el Ghazal, Upper Nile and Equatoria regions where live animals from surrounding areas are mostly sold for slaughter. There are 8 of these markets in Central Equatoria and one each in Western Bahr el Ghazal, Upper Nile, Northern Bahr el Ghazal, Jonglei and Eastern Equatoria States. There are 13 terminal markets and a total of 197 livestock markets in South Sudan. Livestock across the country are exported to other countries such as Ethiopia, Kenya and Sudan. Livestock were also exported to Ugandan markets before the Comprehensive Peace Agreement (CPA) was signed in 2005.

Transhumance – pastoralism

In South Sudan, only 6% of households depend entirely on livestock for their livelihoods (NBHS, 2012). Communities in the country recognized as traditional pastoralists are the Nyanagatom and Toposa in Eastern Equatoria and the Jie and Murle in Jonglei. NBS report indicated that dependence on livestock-based livelihoods is important in the rural and urban areas of Eastern Equatoria, Jonglei, Unity and Upper Nile States. People in rural and urban areas of Lakes and Warrap States also depend on livestock but to a lesser extent (NBS, 2012).

However, SNV/MARF (2010) reported much higher figures for livestock production in the country with 40% households being agro-pastoral, 37% pastoral, 8% livestock producers based on other systems and 15% not involved in livestock production at all (Musinga *et al.*, 2010). The SNV/MARF data also revealed that many households in Jonglei, Warrap, and Northern Bahr el Ghazal States were pastoral at 70, 65, and 45%, respectively. There was no pastoral population reported in Western Equatoria State. The huge data discrepancy between the two data sets (NBS and SNV/MARF) that were generated within the same period could only be national livestock census.

Some of the key characteristics of pastoral production systems include: -

- ❖ Concentrated in the Arid/Pastoral, the Nile-Sobat and the Flood Plain livelihood zones. These zones are characterized by lowland areas which are prone to drought and flooding, low amount of rainfall of about 200 mm in south-eastern Equatoria and 700-1,300 mm in the Flood Plains. During the dry season, temperatures can go as high as 35°C in these areas.
- ❖ Livestock are mainly kept for prestige and a basis for wealth (SSCCSE, 2006).
- ❖ Subsistence form of production is predominant based on indigenous breeds. Cow/heifer to bull ratios is high and this is only intended for breeding and milk production purposes.
- ❖ Milk and meat are the main sources of food for deriving nutrients as well as blood, which is consumed, in large amounts during the prolonged droughts.
- ❖ In this production system, large herds are kept i.e., 100-300 heads for medium sized herds, 400-600 heads for richer households, and less than 30 cattle in poor households
- ❖ Production is based on natural resources and majority of the households rely on rangelands for grazing and water resources.

Transhumance – agro-pastoralism

In South Sudan, most livestock producers are agro-pastoral, where their livelihoods depend essentially on livestock in co-existence with crop production. Economically, agro-pastoral households derive more than 50% of their income from cropping and 10-50% from livestock (Swift, 1998). Just like pastoral communities, agro-pastoralists are sedentary; they depend on natural resources for production and are transhumant. Communities in South Sudan that are traditionally agro-pastoralists include the Dinka, the Mundari and the Nuer, who consider livestock as an important resource but does not contribute 50% of their livelihoods (Musinga *et al.*, 2010).

Some key characteristics of agro-pastoral system include: -

- ❖ Crop production is the main form of production, with livestock supplementing it. But livestock are important insurance against crop failure especially during drought.
- ❖ Livestock are mainly kept for food, dowry/kinship relations and resolving socio-economic problems including legal and cultural obligation.
- ❖ Herd sizes are relatively small, 10-100 heads of cattle in addition to small ruminants. Households with 1-10 heads are considered poor and those with more than 200 wealthy.
- ❖ Reliance on natural resources is substantial but crop residues are an important resource.
- ❖ Cattle camps are important institutions in this production system, similar to pastoral system, with some evidence of cropping (FAO/WFP, 2013).
- ❖ This production system is also characterized by low market and trade integration, with most sales done during the periods of food shortage. These kinds of sales are referred to as distress sales, and are normally meant to address specific socio-economic issues or obligations.
- ❖ Conflict and insecurity over natural resources are common, where antagonistic tribes often clash for control of resources especially in the zones of Flood Plain and Nile-Sobat Rivers.

Signs of mobility

Large herds are usually taken by young people out of the Ironstone plateau to escape biting flies and flood water, small ruminants and some lactating cows and calves are left in the vicinity to provide the family with milk. In the Intermediate land, the growth and palatability of the ranges are controlled by setting an early fire to grasses in November to enable re-growth of palatable pasture for the animals. The concentration of livestock population from different cattle camps for this scarce resource is the major cause of conflicts between the regular users and the alien to the area. Livestock unit/Km² is very high (100 – 500LU/Km²).

The use of intermediate grazing during the dry season is often limited by lack of drinking water. In such a situation, the animals have to concentrate around the water points known as Hafirs, which may be natural or manmade ponds into which rain or ground water is collected. In the South-Eastern Hills and Mountains, the luxuriant forests and tall grasses occupy the sloppy area. They have high biomass whose feeding value to the animals' decline rapidly as a result of lignification. During the dry season, the pastoralists move their livestock to either the slopes of the Boma hills or Didinga mountain ranges or to the river basins on the eastern side of the Southern Flood plains. Livestock from all the antagonistic tribes inhabiting Eastern Upper Nile and Eastern Equatoria regions may converge in those areas for grazing land and water; this can sometimes lead to bloody conflicts for controlling these resources. During the dry season, the nomadic Arab tribes (Messeriya, Rizeigat and others) from Sudan (Southern Darfur, Southern Kordofan and White Nile States) move with their animals' southwards into Bahr el Ghazal region and White Nile basins in search of pasture and water. The livestock unit per sq. km is very high since animals are move in herding/flocking groups (200-700 LU/Km²). With the rain season begins, they move northwards to their bases to escape the biting flies and the mud. In all cases, pastoralists' movements could be considered as a sound system of conserving the ecosystem and the environment provided that there is no encroachment of the livestock into the agricultural land and vice versa (Abate, 2006).

Annex 5: Existence of secondary resources (Non-timber forest products=NTFPs; Medicinal and aromatic plants= MAPs, fodder tree.).

Rainfall in the livestock producing areas in HoA is variable and rarely exceeds 850 mm per annum (FAO, 1998; Abate, 2006). However, the rain is sufficient to support grass species of the genera *Agrostis*, *Panicum*, *Cenchrus*, *Echinochloa*, *Andropogon*, *Brachiaria*, *Sporobolus*, *Chloris*, *Sorghum* and *Hyparrhenia* which are usually associated with browse species of *Acacia*, *Balanites*, *Indigofera*, *Leucaena* and *Carica* (Elis, 1982). The nutritive value of some these species are given in Table xx below which showed them to contain high levels of essential nutrients and energy.

Chemical composition (g kg⁻¹ DM) and energy value (MJ kg⁻¹ DM) of grass and fodder species native to South Sudan rangelands¹

Plant species	CP	CF	Ca	P	ME
<i>Cenchrus ciliaris</i>	56.1	488.0	3.8	1.5	8.32
<i>Panicum maximum</i>	97.2	433.5	4.1	1.7	9.36
<i>Penisetum purpureum</i>	77.9	334.8	4.0	2.1	7.68
<i>Chloris gayana</i>	81.3	456.1	3.9	1.9	8.48
<i>Sorghum arundinaceum</i>	67.3	504.5	4.9	2.9	8.32
<i>Hyparrhenia rufa</i>	42.0	376.5	2.63	1.5	9.04
<i>Acacia albida</i> (fruit)	109.0	202.5	-	-	11.80
<i>Acacia tortilis</i> (leaves)	128.4	105.0	38.5	2.2	11.94
<i>Balanites aegyptiaca</i> (leaves)	116.5	164.0	4.8	0.5	11.2
<i>Leucaena leucocephala</i> (leaves)	218.6	200.5	5.6	3.2	11.52
Source: Abate (2006) Key: ¹ After Elis (1982); (-) indicates values not available					

Annex 6: Diagnosis of production sector and value chains

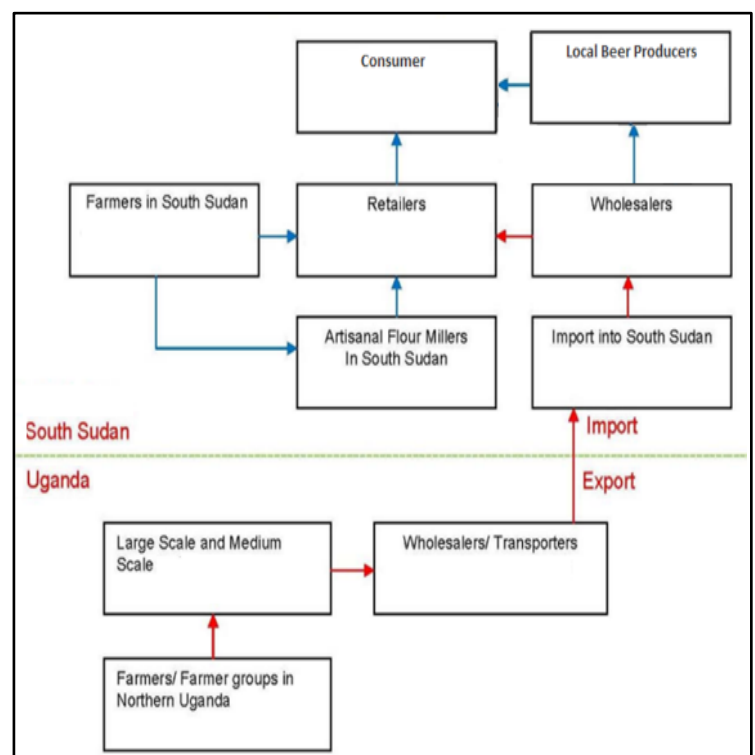
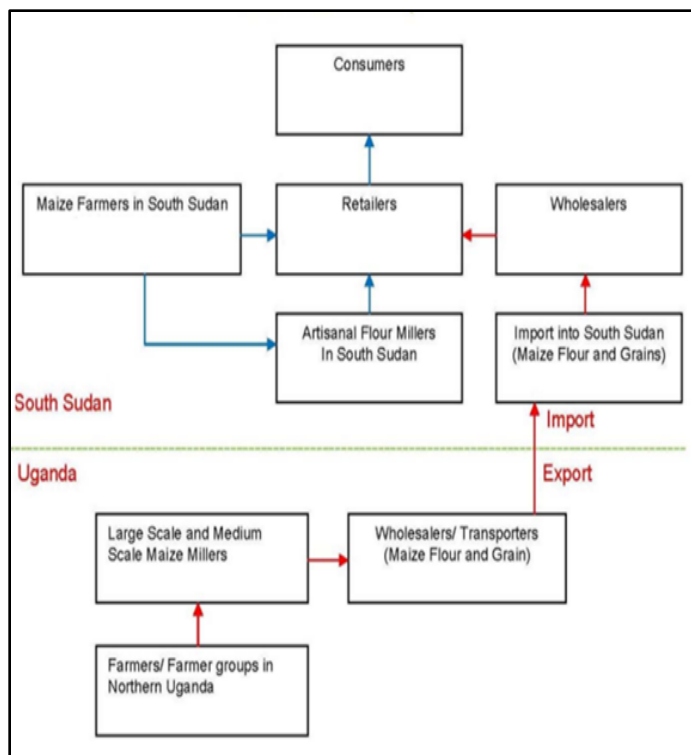
Crops

Sorghum

Is a warm weather indigenous crop that grows in nearly everywhere in the country and is resilient to harsh, drier environment? 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 and improved storage options are not readily available. About 30 percent of local sorghum is sold commercially, 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 tones (FAO, 2017).

Maize

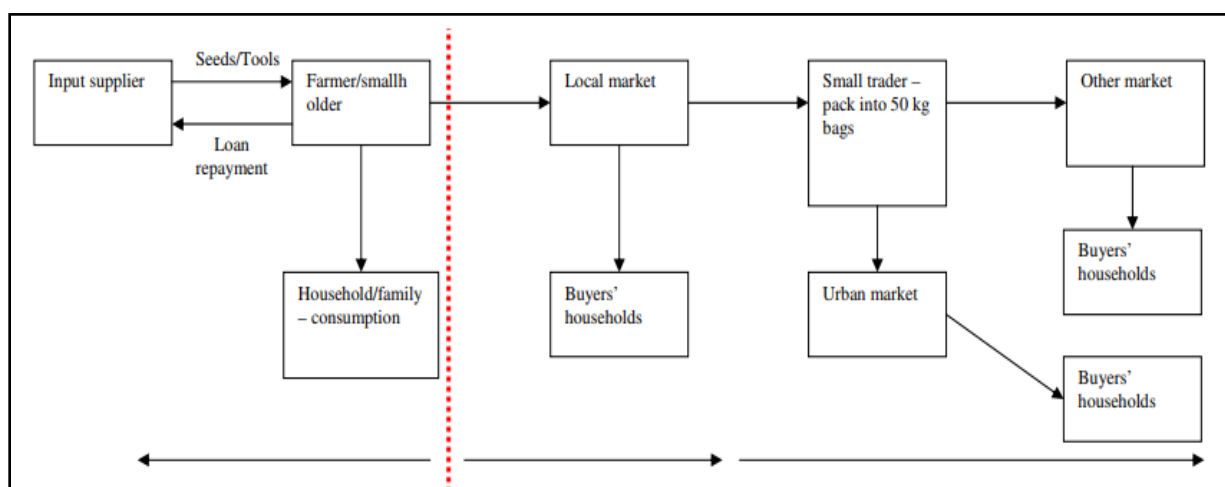
Has replaced sorghum as the most popular staple crop in Greater Equatoria, where it can be grown for two seasons in a year. Maize is sometimes intercropped with groundnuts, beans, cowpeas, or pumpkin. Ugandan maize dominates the country's markets and is the largest imported staple in South Sudan in 2017 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).



Sorghum and maize value chains (South Sudan Crop Watch Overview of cereal production in 2017)

Cassava

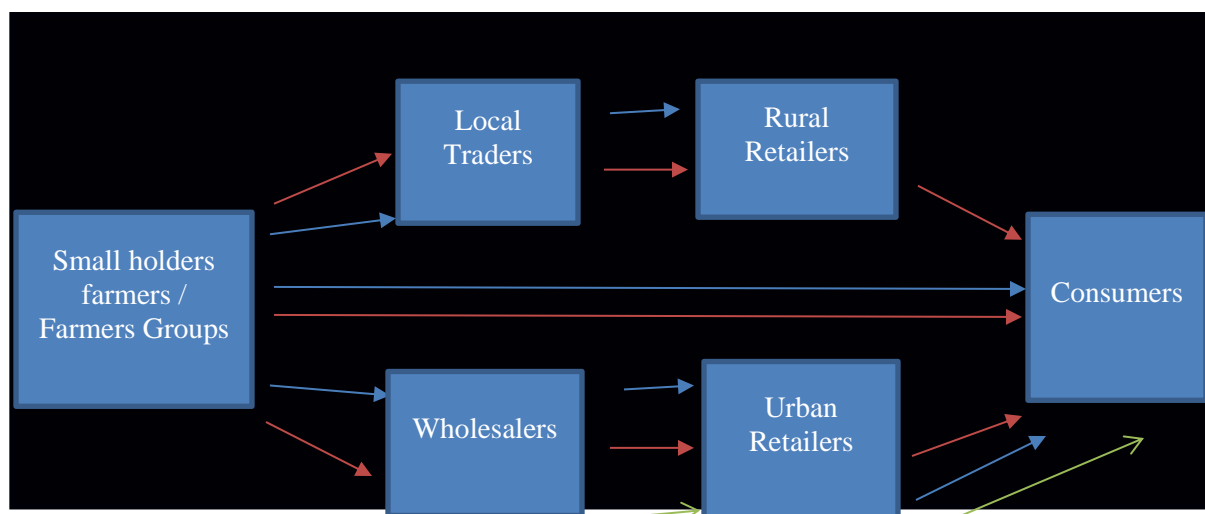
Is a major crop in Greenbelt region that contributes to food security and commercial production? A 2007 study identified 198 cultivars being used by farmers in Greater Equatoria, and the most popular at the time. Popularity depends on a wide variety of attributes including, maturing time, sweetness, fiber content, suitability for flour, etc. (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, and 29 percent grow cassava for brewing, 2 percent for animal feed, and very few for cassava cuttings and firewood. 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).



Cassava value chains (South Sudan Crop Watch Overview of cereal production in 2017, CAAS-Lib Synthesis Report)

Groundnuts

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.



Groundnuts value chain (Basic Guidelines for Small Holder Farmers in South Sudan)

Key: Light blue color= Raw and unshelled; Red color= Shelled; Green color= Processed.

Oilseeds (sesame and sunflower)

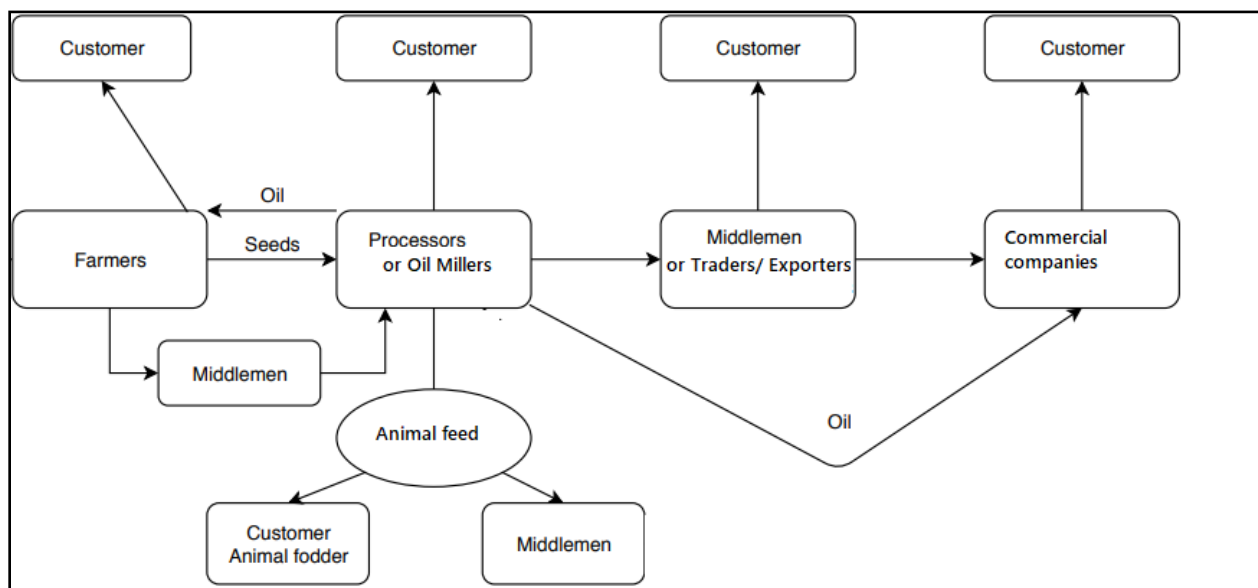
Sesame

South Sudan ranks 5th in the world for area harvested to sesame seeds, but it ranks 64th in the world for yield due to difficulties along the value chain, especially in production. Farmers use few inputs, little mechanization, and grow under rain fed 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 in 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, 2nd report). 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 farm gate 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.

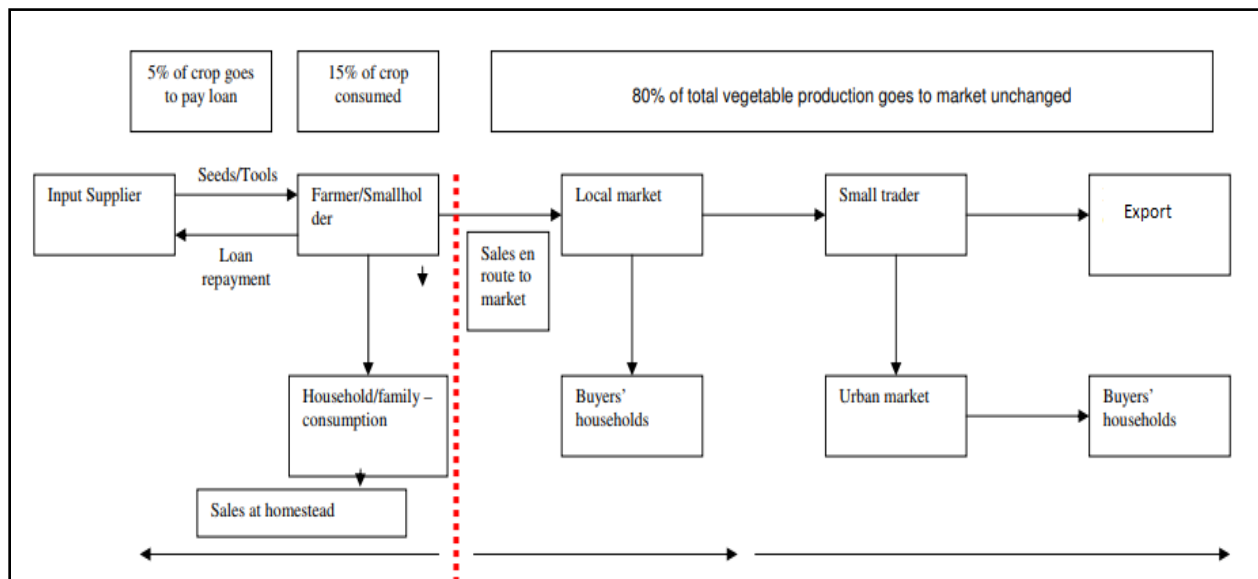
Sunflower

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 33rd in the world for harvested area and 34th in the world in term of yield. It is a dry land 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.



Vegetables

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 Ingo's and the UN, 10 promotions have 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.

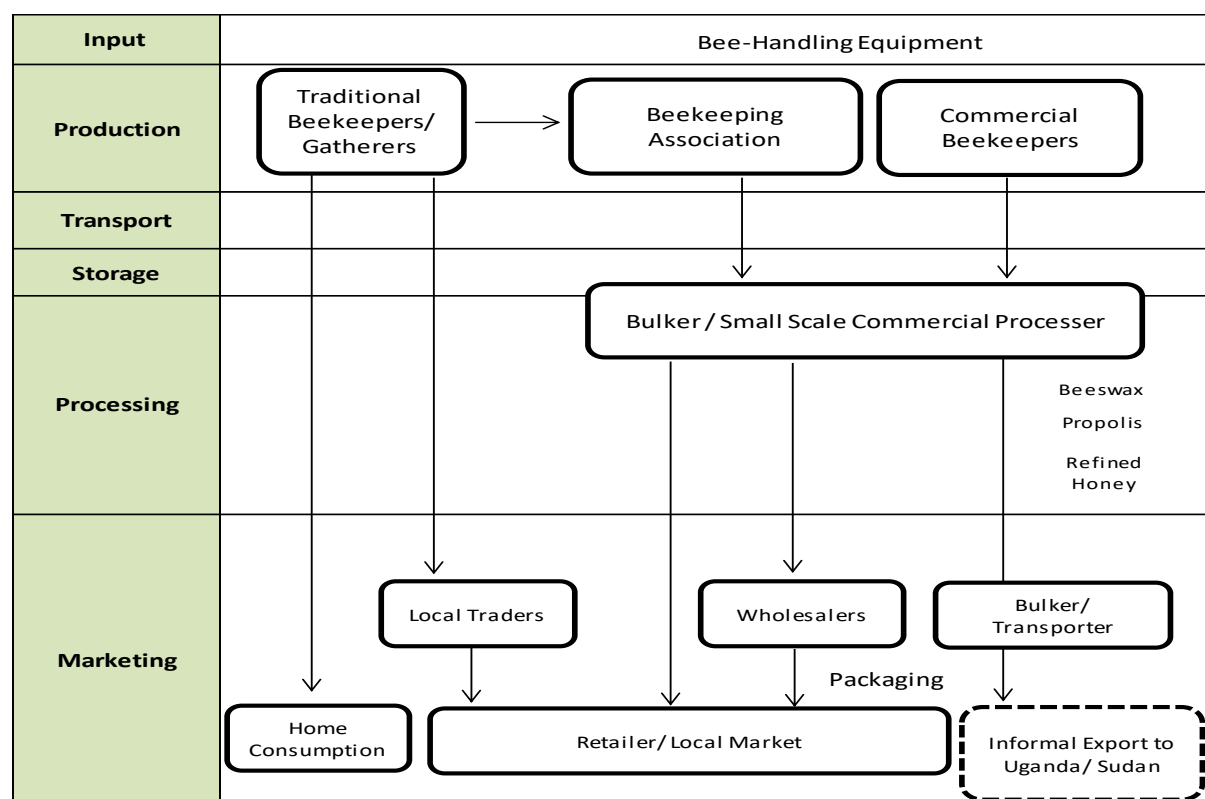


vegetable value chains (South Sudan Crop Watch Overview of cereal production in 2017, CAAS-Lib Synthesis Report)

Beekeeping

South Sudan also has a legacy of honey gathering and traditional beekeeping with honey playing an important role in supplementing diets, providing income and an important commodity in socio-cultural exchanges. Beekeeping is an important supplemental source of livelihood for 18% of South Sudanese households. Mostly crop cultivators who keep bees or collect wild honey as an off-farm, off-season activity, practice it. However, in some counties, beekeeping is the most important enterprise such as in Mvolo, Bogori and Mundri West in WES, and in Raga WBG, where the county emblem is a honey bee, symbolizing the importance of beekeeping to the economy of the county. Honey contributes to food security, consumed locally, and is sold for income to meet food needs. The income potential of honey is not realized as over 56% is consumed locally. Beekeeping is an important livelihood option for vulnerable communities: women's groups, including those from female headed households one of the three most important livelihood options, such as in WBG. For some tribes such as the Jurbel in Wulu County Lakes State and the Bongo in

Warrap, honey plays important socio-cultural roles related to marriage and kinship ties are benefitting from income and sale of honey.



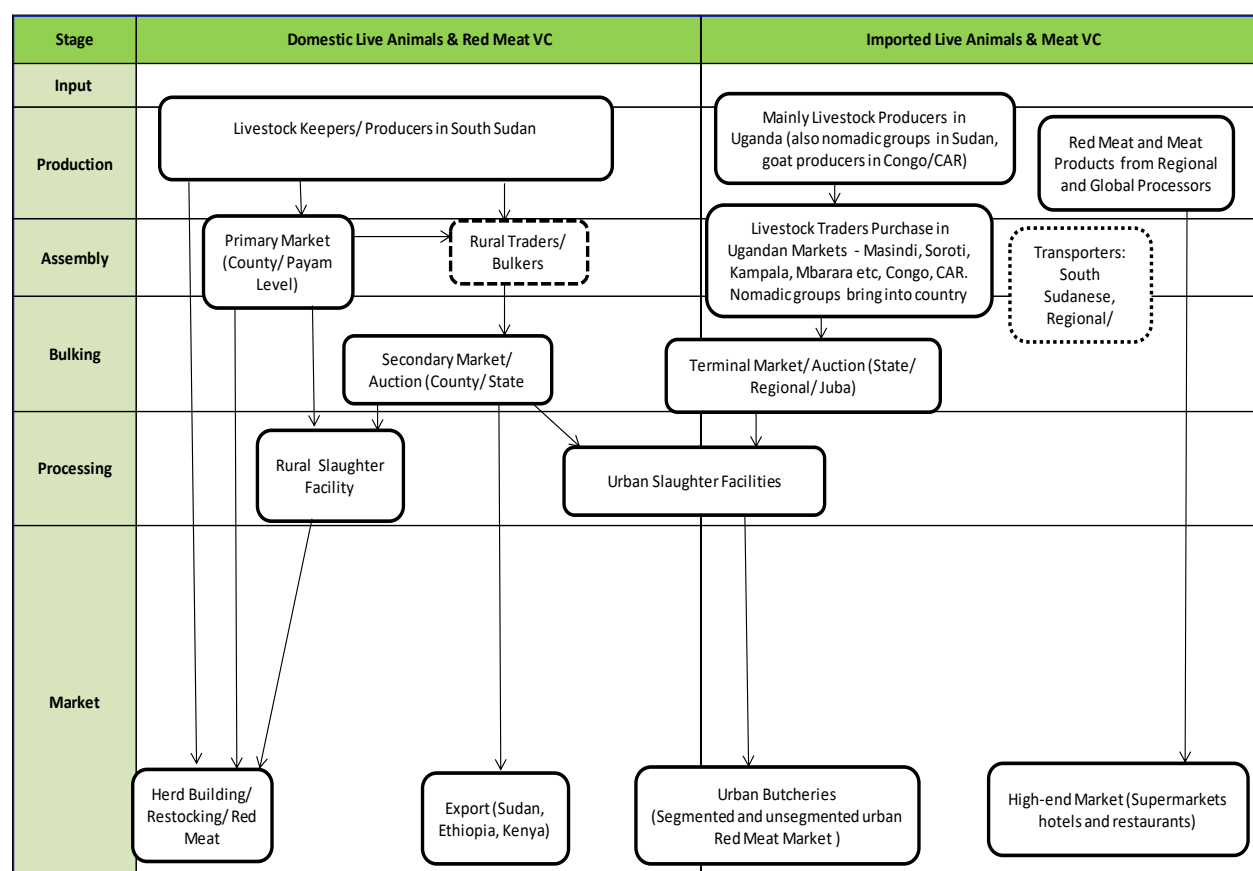
Honey value chain (CAMP Task Team, March-July 2013, CAMP Situation Analysis)

Livestock and animal production sectors and value chains

Livestock (meat and milk) value chains

South Sudan has a substantial livestock resource, a legacy of a historical endowment, that was well documented in the seminal pre-independence, pre-civil war 1954 British colonial assessment of the natural resources and development potential of the then Southern Provinces of the Sudan. 294 The assessment found that in 1954 southern Sudan had a considerable livestock resource recognized as a great asset that would be of significance for sustainably increasing the financial self-sufficiency of the region. There was widespread ownership of livestock across the region except for parts where trypanosomiasis (sleeping sickness in human beings) was prevalent. Animal production was based on traditional migratory systems (pastoral systems) but in most areas, mixed economies (agro-pastoral), in which cattle were an essential part, were evident. Today, South Sudan's ruminant livestock wealth is still largely in the hands of traditional agro-pastoralist and pastoralist systems that hold 47% and 43% of South Sudan's livestock wealth; the remaining 10% being in the hands of smallholder livestock keepers mainly in urban and peri-urban areas. The strengths of the traditional systems must be acknowledged in a situation where due to protracted civil

war and marginalization livelihoods were decimated, input systems, animal health services and marketing were underdeveloped, never developed or greatly eroded effectively undermining productive and profitable economic activity.

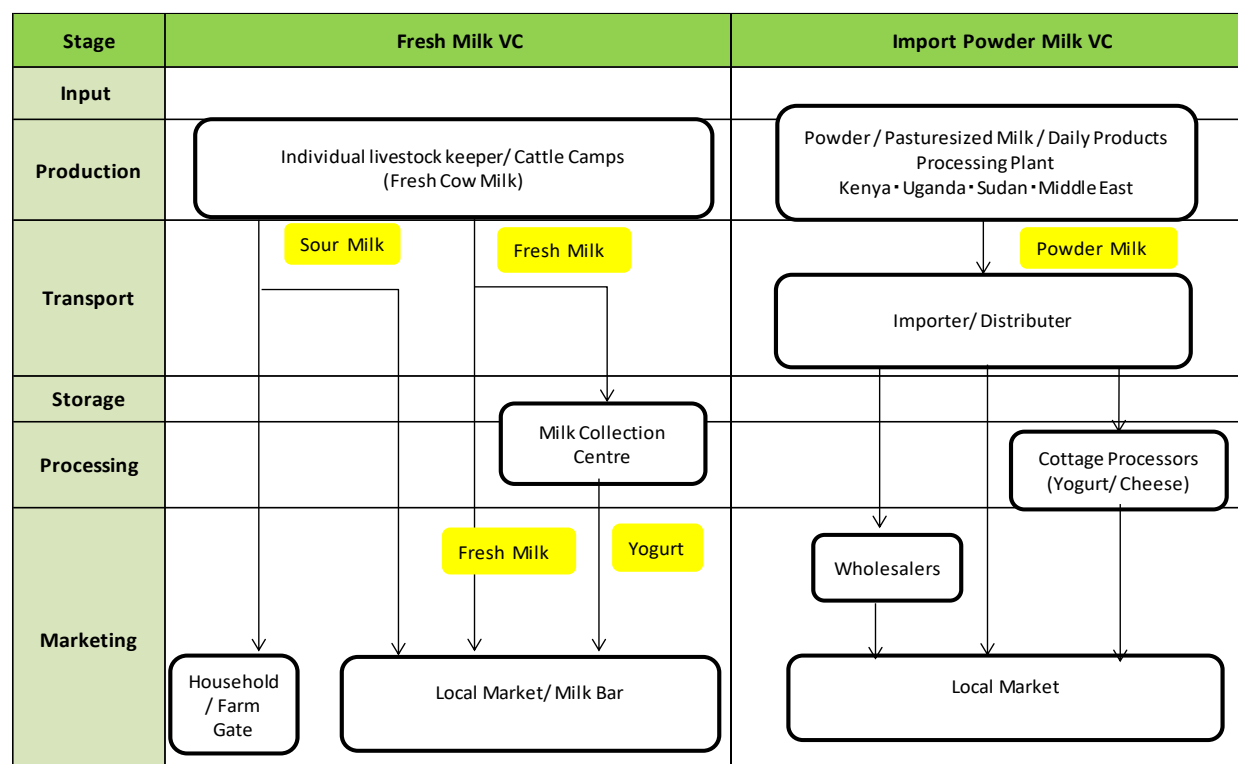


Live animals and red meat value chain (CAMP Task Team, March-July 2013, CAMP Situation Analysis)

Milk value chain

Although a variety of different dairy products are available in the South Sudan market, there are two main segments: domestically produced fresh cow milk, and imported powder milk: the fresh milk segment dominates, with an estimated total production of around 550 million litres annually with a value of SSP 4.5 billion at an average price of SSP 5 for 600 ml. However, some fresh milk is brought into the country, for example from Arua, in northwest Uganda to Yei. Powder milk is important in urban centres and even in the rural areas of states with low cattle populations where up to 2kg/person are consumed annually, with an estimated 3874 tons imported annually. Small amounts of goat and sheep milk are produced in some states,

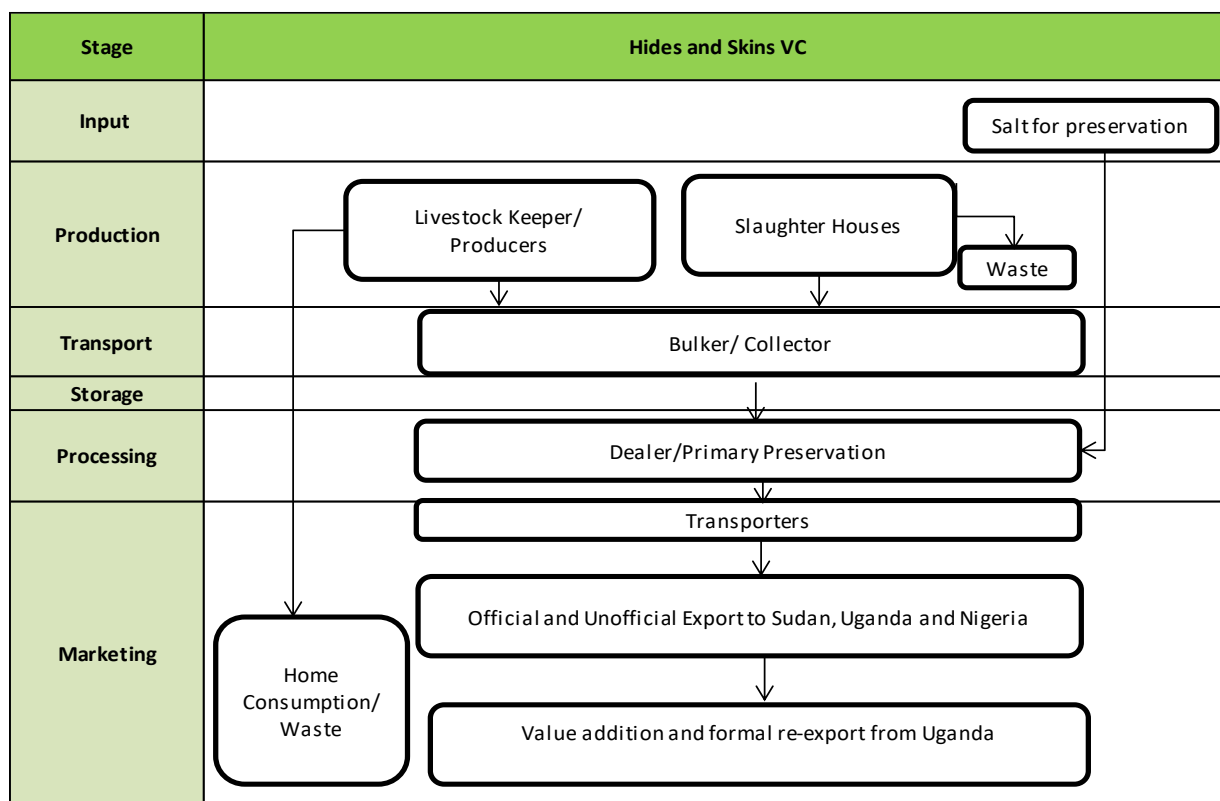
like in Eastern Equatoria, mainly to supplement diets during periods of food stress especially during prolonged dry seasons and droughts. Most is consumed domestically and does not enter the market.



Milk value chain (CAMP Task Team, March-July 2013, CAMP Situation Analysis)

Hides and skins value chain

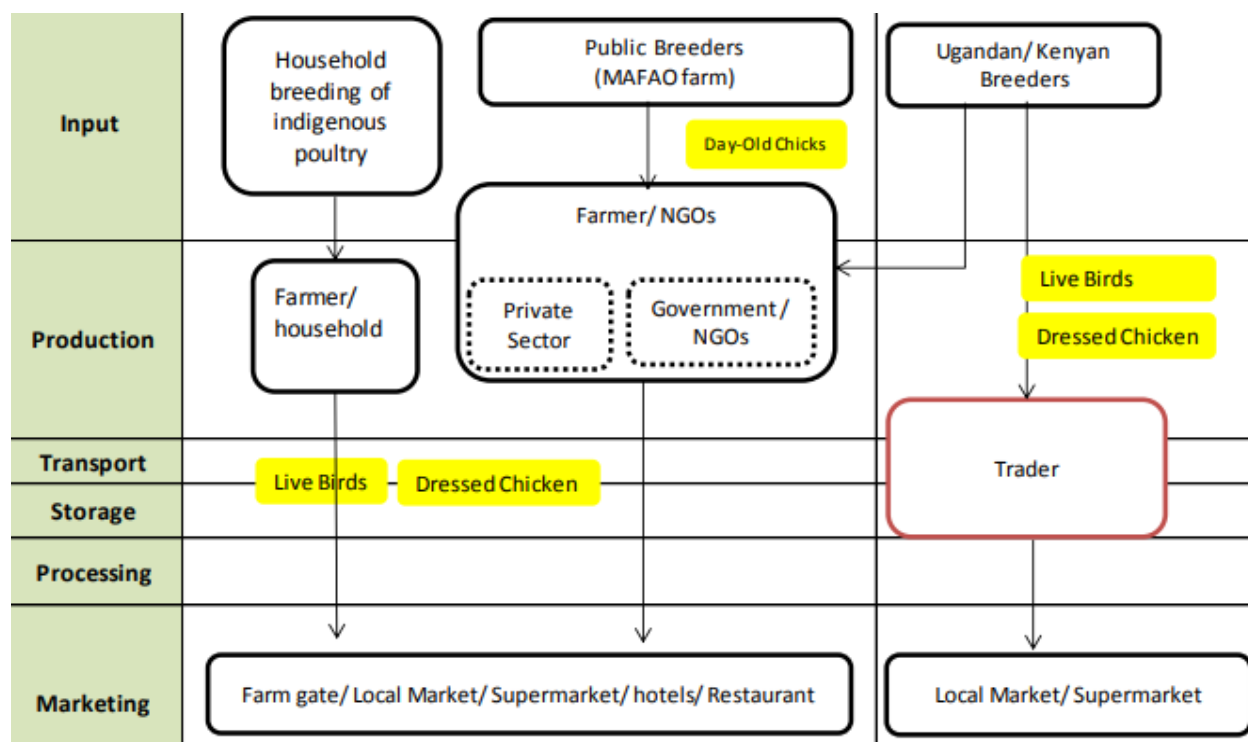
Hides and skins emerge as harvestable commodities at slaughter, an estimated annual production of 170,000 hides and 1.6 million skins. While the concentration of slaughter is within slaughter facilities, many livestock, especially small ruminants are slaughtered in homes or restaurants where the hides and skins are not recognized as a marketable commodity and either disposed as waste or consumed domestically. While most of the hides and skins that are traded originate from slaughter facilities, it is estimated that even through that channel only 20%³ of recovered hides and skins eventually enter the market.



Hides and skins value chain (CAMP Task Team, March-July 2013, CAMP Situation Analysis)

Poultry

This 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) that 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.



Chicken value chain (Poultry training manual 2016)

Exploitation of fisheries resources and value chains

Capture fisheries production in South Sudan is estimated at 143,381 tons per year, worth at least USD 510 million (CAMP, 2013). Fish sold in retail markets across the country are in fresh, dried and salted form. The exact number of fishermen remains unknown, but estimates indicate that, there are 220,000 subsistence including at least 12,000 commercial fishermen all over the country. About 1.7 million people in South Sudan living mostly in rural households depend directly on capture fisheries and fish products for income, livelihood and food security. CAMP data indicates that per capita consumption of fish is estimated at 17kg/person/year in South Sudan.

Due to the lack of proper storage facilities, poor road connectivity and transport system, much of the fish produced is dried. Dried fish distribution takes place all over the country. Dried fish is reliable and can be kept for longer periods without refrigeration, and is popular with consumers. However, there is serious problem of beetle infestations on dried fish if stored for too long. This reduces the nutritional value and retail price. Smoked fish tends to suffer less, and there have been repeated attempts to introduce Chokor fish smokers to fishing communities. Large amounts of smoked fish are imported from Uganda.

The main fishing gear is the gill net. Other common gears include cast nets, spears and cover pots, depending on the area being fished. A variety of boats and canoes are involved in fishing and transport of fisheries products, though un-motorized planked and dugout canoes are the most common, powered either by paddles or poles, depending on the locations. Outboard motors are rare for fishing but extensively used to transport fresh and dried fish (GRSS, 2011).

Activity	J	F	M	A	M	J	J	A	S	O	N	D
1. Rainy Season												
2. Dry Season												
3. Peak Fishing Period												
4. Low Fishing Period												
5. Farming Season												
6. Tilapia and Season												
7. Nile Perch Season												
8. Catfish Season												
9. Hottest Months												
10. Coolest Months												
11. Cattle Grazing season												
12. Harvesting of crops												

Fishing season of South Sudan (GIZ unpublished reports (2012); GRSS (2011))

Aquaculture

Aquaculture has great potential, but currently there is little aquaculture being undertaken in the country. Areas for commercial and subsistence level aquaculture of significant size are available, but they have not been accurately mapped and assessed. Other constraints to aquaculture development include land tenure uncertainty, a lack of hatcheries, no feed mills and a shortage of skills. Technology and skills transfer from neighboring countries such as Uganda and Kenya are probably the best way to advance the sector in the short term, though Integrated Agriculture Aquaculture is very appropriate for village level introduction, as is already happening in parts of the Green Belt, but in the future development efforts will have to be more targeted with support to clusters of entrepreneurial farmers operating around towns (CAMP, 2013).

Fish products market prices

Fresh fish market prices in South Sudan are relatively low in places near to rivers and lakes and higher the further away from the source, except in Juba, where high demand and low supplies makes fresh fish prices high all the time. The cost and unreliability of transport, along with informal taxation, is a major influence on the increase in fish prices away from the source. In Juba a constant supply of fresh Tilapia and Nile Perch from Uganda, whole gutted and chilled on ice puts a baseline limit on fresh fish prices, at SSP22/kg in 2013, and fresh fish therefore is generally less than this price (in Juba fish is sold by the piece or heap, so prices vary by as much as 20% on the same stall). Even when fresh fish can be got to market, the conditions in the markets are generally unhygienic and unappetizing to the consumer. Modern markets have

been built in some places, such as in Terekeka (by the SPCRP GIZ project), and in Rumbek but much more requires to be done.

Fish products Transportation: Limited transport capacity is a central challenge facing the fishery sector in South Sudan, including Upper Nile State. The vast majority of fishers do not own motorized transport capable of bringing their harvest – fresh or preserved – to larger market centers. Fish is transported longer distances using river barges, river boats, motorbikes and trucks. During the rainy season, land access to most fishing communities is not possible, putting a high reliance on the use of river boats to transport fish.

Traders/Fish collectors: After fish is braided and dried, fish collectors or traders often collect it from the various fishing camps. These individuals collect large quantities for sale to wholesale markets in larger market centers.

Hygiene: Hygienic measures at the wholesale and retail markets in South Sudan are limited. Fresh fish is displayed on tables with no ice and are exposed to heat, insects and dust. Dried fish braids are often laid on the ground and are also exposed to dust and insects.

Fish products Demand in Malakal Markets of Upper Nile state

The absorption capacity of markets for increased production is not known. There have been no comprehensive market studies that have examined fish marketing in South Sudan.³¹ What is clear, particularly in the Upper Nile State, is that there is little demand for value added and high quality fish products. The market in Malakal is very under-developed, as the purchasing power of the local population is extremely low. As a result, people purchase what is cheapest and do not often value quality over price. Moreover, the trade that existed formerly between Upper Nile State and Khartoum – estimated at 10,000 tonnes per year – is considerably reduced since the closure of the border, further limiting the market option in Upper Nile State and cutting off the only relatively developed market. This leaves very little room for value addition and other activities that add to the price of fish for the consumer.

Juba Fish Market Chain There is little evidence of direct links between fish harvested in the Upper Nile State and fish sold in markets places around Juba. This, however, does not mean that Upper Nile fish is not sold in Juba. Even if Upper Nile State fish is currently not sold in Juba, it remains a large and ever expanding market and is an option that the project must examine. A survey of several market places in Juba and discussion with government officials and fisher experts provides the below description of the fish marketing system in Juba.

Fresh Fish Markets in Juba

There are several fish markets in Juba. The main fresh fish market in Juba is located near the Konyo-Konyo market place. The fish market sells approximately 300 kg of fish per day. Old freezer units are used to hold the fish, usually on crushed ice. The main species sold is Tilapia. Fish come mainly from two sources: 1) Uganda: Most of the Tilapia is brought from Uganda once per week. The fish are transported already gutted and on crushed in refrigerated trucks. 2) Bor: a smaller amount of fish from Bor (and area) is brought to Juba on river barges. The barges carry between two and three tonnes and travel between Bor and Juba on average twice per month. Fishmongers near the Konyo-Konyo market in Juba are from Uganda and have links to the fish traders importing the fish. The Ugandans use mobile phones to transfer information about fish supply and prices, in addition to using the phones to transfer funds, a growing practice in the fishery sector that has yet to take hold in South Sudan.

Four major constraints to fresh fish marketing

- i. Poor roads and expensive transport
- ii. Limited Ice availability which is also and costly
- iii. Informal taxation
- iv. Poor retail markets

Annex 7: Details of forest resources and biodiversity

Vegetation

The swamp is surrounded by shallow/deep flooded, buried and floating roots as follows;

- *Phragmites communis* (common reed)
- *Echinochloa pyramidalis*
- *Oryza barthii* (wild rice)
- *Echinochloa stagnina*
- *Vossia cuspidate* (Hippo grass)
- *Cyperus papyrus*
- *Typha domingensis* (species of cat tail and and/or *Typha latifolia*).

Fauna

The Sudd provides food and water to large populations of migrating birds, with more than 400 species of bird found here including Shoebills, Great White Pelicans, and Black Crowned Cranes. As the surrounding landscape is a large swathe of dry Sahel across Africa the swamp is also a haven for migrating animals, especially antelopes such as the endangered Nile Lechwe, Tiang, Reedbuck, and the world's largest population of White-eared Kob, estimated at around 1.2 million animal population comparable to Tanzania's better-known Serengeti National Park as the shallow water is frequented by crocodiles and hippopotami.

In more upland areas the Sudd has been known as a historic habitat for the endangered Painted Hunting Dog, *Lycaon pictus* and other animal species.

Ecosystem diversity of South Sudan

South Sudan is covered in a rich biodiversity of ecosystems, which are dynamic complexes of plant, animal and microorganism communities, and their non-living environment interacting as functional units. The large range of ecosystems in South Sudan is commonly divided into the following categories: -

Lowland forests

Location and Distribution

These ecosystems are found in the extreme south-west near the borders with Central African Republic (CAR), DR Congo and Uganda and around the foothills of Imatong Mountains. Some small patches could be found on the Aloma Plateau of Yei County and the Azza forests of Maridi, Yambio areas. It also, includes foothills and parts of the Imatong Mountains, Loti, Talanga and Lobune areas of Eastern Equatoria State.

Characteristics

Basically, this consists of the northern most parts of the Congo basin forests and the fauna floras are similar. Species here include: the lowland Bongo (*Tragelaphus eurycerus*), the forest buffalo (*Syncerus caffer nanus*), the giant forest hog (*Hylochoerus meinertzhageni*), the red river hog (*Potamochoerus porcus*) and a series of monkey species.

Status and Threats

The most threatened species include the eastern chimpanzee (*Pantrogodytes schweinfurthii*), elephants (*Loxodonta Africana cyclotis*), also some forest communities in these areas are threatened.

Montane Forests

Location and Distribution:

These areas are specifically located around Imatong, Dongotona, Acholis, Didinga and jebel Gumbiri mountains in the southeastern parts of Eastern Equatoria state.

Characteristics:

This is one of Africa's biodiversity hotspots. It is part of the Afromontane Eco-zone and constitutes the largest continuous closed canopy forests in South Sudan. It has a rich wildlife bank and endemic plant life. It is actually home to more than half of the recorded plant species in South Sudan. The common tree species are: *Podocarpus milanjanus*, *Juniperus* spp., *Procera* spp., *Croton* spp., *Macaranga* spp., *Albizia amara*, and *Arundinalia alpine*, *Vernonia* spp. and Erica shrub tree species. Animals include the blue duiker, and the bushbuck.

Status and Threats:

The areas are highly defragmented and deforested due to high pressures of valley farming, uncontrolled bush fires, the direct effects of shifting cultivation and uninformed land clearance practices. Soil erosion is widespread especially on the slopes of Imatong and Dongotona mountains where cultivation is practiced and is responsible for the loss of two thirds of its forest cover between 1986 and 2011. At the current pace, it is likely that it will be cleared of all vegetation by 2020 (UN Environment, 2018).

Savannah woodlands

Location and Distribution

This zone constitutes South Sudan's largest ecological region. It is found between the patches of lowland forests to the west and grassland savannahs and flood plains to the east in Equatoria, Upper Nile and Bahr el Ghazal. The rainfall in this region varies from 900-1,300 mm per annum. The low rainfall woodland savannah occurs mainly in Upper Nile covering about 2.9 percent of the country's total land area. Meanwhile, the high rainfall savannah occupies the remaining 52.6 percent of the country.

Characteristics

The Savannah wood lands have a rich diversity of flora and fauna, reptiles, amphibians, other invertebrate's species are abundant. Common large animals include: Elephants (*Loxodonta africana*), hippopotamus (*Hippopotamus amphibious*), water bucks (*Kobus ellipsiprymnus*), giraffe spp., Oribi (*Ourebia ourebi*), duikers (*Cephalopus* spp.), Uganda Kob (*Kobus kob thomasi*), and many more like buffalos, primates (Gorillas, Chimpanzees, monkeys) etc. The dominant plant species of the high rainfall wooded savannah include: *Celtis zenkeri*, *Chrysophyllum albidum*, *Holoptelia grandis*, *Terminalia* spp., *Albizia amara*, *Albizia zygia*, *Bridellia* spp., *Dombeya* spp., etc.

Status and Threats

Up till 2007, the natural forests in Northern Bahr el Ghazal were intact and they were not affected by the civil war. The uncontrolled harvesting of especially Mahogany (*Khaya senegalensis*) trees and other tree species have greatly shifted the land cover pattern due to human activities.

Grassland savannah

Location and Distribution

This forms a continuous belt in the northern, eastern and south-eastern parts of South Sudan's flood plains.

Characteristics

They consist of open short grasslands with scattered trees and shrubs, representing the largest area of intact savannah ecosystem that is left in East Africa. The dominant woody tree species include *Acacia* spp., *Balanites* spp., and *Combretum* spp. the dominant perennial grasses consists of the roofing grass; *Hyperthernia* spp., *Andropogon* spp., and *Panicum* spp. this ecosystem constitutes South Sudan's ungulate animal migrations of the white eared kob (*Kobus kob leucotis*) and the Tiang (*Damaliscus lunatus tiang*).

Status and Threats

Several mamal species are globally threatened including the Cheetah (*Acynonix jubatus*), wild dogs (*Lycaon pictus*), the big cats like the lion (*Panthera leo*), elephants *Loxodonta Africana*), Giraffes (*Giraffa camelopardalis*) – Nubian and Kordofan giraffe), *Giraffa cameopardalis antiquorum*

The importance of Savannahs

Provision of forage for domestic livestock which in turn support human livelihoods with meat, milk, wool and leather products.

- They are the major habitat for breeding; migrating and wintering birds, soil and they also play a major role in cycling water, and nutrients and stabilization of soils.
- The provision of food, wild fauna, construction materials etc.
- The storage of vast quantities of carbon that helps to limit the effects of global warming.

Sudd swamps and other wetlands

Location and Distribution

These include the permanent water bodies like the Sudd and Machar swamps of South Sudan.

Characteristics

The dominant vegetation of the Sudd and other wetlands comprise of *Typha dominguesis* and cattail, (*T. latifolia*) and they occupy 75 per cent of the total swamp areas with *Cyperus papyrus* forming the central core of the vegetation. There is diversity of fish and macro invertebrate fauna. The wildlife includes elephants, Buffalos, other mammals are also present. There is a large diversity of resident migratory birds that include the largest population of shoebill stork (*Balaeniceps rex*) of about 5,000 birds in Africa; also, the white stork (*Ciconia ciconia*), black tern, *Chlidonias nigra*), and the black crowned crane (*Balearica*

pavonina). The major species of snakes and amphibians include: The Nile crocodile, *Crocodylus niloticus*; African rock python (*Python sebae*), and several other snake species.

Status and Threats

The main danger is from invasive alien plant species and encroachment of cattle and desert creep from the north threaten the swamps rich diversity. The water hyacinth (*Eichorinia crassipes*) has now become dominant and forms an almost continuous floating mass on the Sudd and its river channels. The endangered species include Hippopotamus and the Sitatunga (*Tragellapus spekei*), the white pelican (*Pelecanus onocrotalus*), and the black crowned crane (*Balearica pavonina*).

The importance of Wetlands

The wetlands of South Sudan provide rich habitats for fish, birds, mammals, reptiles and amphibians and many rare and threatened animal species.

- Has the potential to be of great economic value for South Sudan, if it is managed for environmental, economic and social sustainability.
- It is of great symbolic value of national identity for South Sudan; UN environment (2018) estimates that the support the Sudd provides in relation to wildlife, diversity, and mitigation of climate change could reach US\$ 1billion.
- Livelihood support for numerous communities, pastoralists who depend on the wetlands for dry season grazing.
- The Sudd of South Sudan is also a Ramsar Convention protected areas.

Semi-arid regions

Location and Distribution

This occupies the extreme southeastern parts of Equatoria around the Ilemi triangle and around the areas of Renk in the North of the country.

Characteristics

This is characteristically an extension of the Kenyan semi-arid zone. It comprises of patches of grasslands and acacia bushland. The most abundant mammals' species are the Grant's gazelles (*Gazella granti*), Beisa (*Oryx beisa*), and the lesser kudu (*Tragelaphus imberbis*), the common eland (*Taurotragus oryx*), elephants, etc. these are also present in the Ilemi triangle in the area of Loelle).

Status and Threats

This largely depends on the rainfall, which is highly unpredictable and measures between 600-800 mm of rain per annum. It has a poor underground water resource. Most elephant poaching is practiced in this ecosystem.

Annex 8: Beneficiaries of the project/ site, disaggregated by gender

Gender Focal point of projects in South Sudan is to master gender mainstreaming and guiding project profiles. For example, the 'subsistence farmer sorghum production project' recognizes women's role as the major producer of sorghum as well as their role in the home and local society, recommending: -

- 1) Consideration of gender balance in participants' selection;
- 2) Collection of gender disaggregated data in baseline and end-line surveys;
- 3) Attention to the risk of gender disparity;
- 4) Gender training for extension workers; and
- 5) Involvement and consultation of gender experts.

The master plan also has a gender specific project for institutional development, 'gender capacity development project', aiming at gender mainstreaming of programmes and policies of the ministry. By contrast, policy development project, such as 'establishment of a firm legislative framework project' does not have gender analysis. The project tried to incorporate gender perspectives, producing positive results. However, there is room for improvement, requiring a review of how activities can be gender mainstreamed. For example, only 'giving gender consideration' for participating farmer selection may not lead to the intended outcome. Because most crop producers are women, it may be better to set the minimum level of women's participation to at least 50%.

For women participants to garner family support, projects must inform family members of project activities and the role of family members as supporters of the women participants.

Women's have limited access to technology, and lacks of understanding of women's rights to land are identified as barriers for agricultural development. Therefore, all projects must raise awareness of gender and regular gender training of government staff and agriculturalists.

Annex 9: FEASIBILITY STUDY FOR THE PROGRAM TO BUILD RESILIENCE FOR FOOD AND NUTRITION SECURITY IN THE HORN OF AFRICA (HOA)

Project Site: Aweil West County and Aweil Municipality

Specific Interventions: Rehabilitation of 1,260 ha of Aweil rice irrigation scheme including integration with fish farming, construction of animal health facilities, rehabilitation of existing boreholes and construction of new boreholes, and dredging of existing hafirs.

Introduction

The Aweil rice irrigation scheme project is located in Northern Bahr El Ghazal State, specifically in Aweil West County and Aweil Municipality and uses the Lol River water source for irrigation. Its potential area is estimated at 11,000 Fadden (4,620 ha). This project has been identified as a potential intervention for improving livelihoods of the people of South Sudan and thus achieving food and nutrition security in the Horn of Africa.

A team of consultants from ECU-GAIC conducted a field visit to Aweil from 13th– 16th July, 2021 to confirm the details of the proposed interventions and to collect primary data in support of costing of the interventions on different aspects of the feasibility study. Field data was collected using questionnaire, focus group discussions, field observations and interviewing key informants. The team response to the pertinent issues for the implementation of the projects are as follows:

1. Legal Aspects of The Project in Terms of Land Ownership

According to South Sudan Land Act, 2009, there are three classification of land ownerships: public, private, or community land. Public land includes land for government facilities; transport corridors; urban parks and recreational areas; forest reserves, wildlife reserves and national parks; certain wetlands and waterways; and a number of **pre-war agricultural schemes** and **agro-industrial complexes**. Community land refers to land held under customary land tenure. Communities, defined mainly in terms of ethnic groupings or subgroupings, own virtually all land in the country in the sense that they retain the right to regulate its usage according to their own particular customary land tenure system.

The land where Aweil rice farm is located belongs to the category of land owned by the public according to the constitution of South Sudan therefore it's regulated by the government of South Sudan. The irrigation scheme land was formerly owned by three communities namely: Ajuet, Sheimel and Aweil Centre. The State government has jurisdiction over the land formerly owned by these three communities. The national government appoints the management of the irrigation scheme, clearly showing the influence of the national government on the irrigation scheme.

Currently the State Government is using crop sharing system for cultivating rice in the Aweil farm. The government supports the farmers in cultivation (tractor support), in availing improved seeds, in proper water management practices, and in availing modern harvesting mechanisms. The farmers in return share the crop with the government at a ratio of 60:40 with the government taking 40% and farmers taking 60% of the produce. The government buys the rice produce from the farmers.

2. Environmental Compliance in terms impacts

An environmental impact assessment was conducted on December 2010 by an Ethiopian company called ABCE and the Consortium Members for Irrigation Pump Installation & Rehabilitation of Water Control infrastructures. For this intervention, we are proposing the construction of an earth dam along the canal from Lol River to the rice farm. We are also envisioning the use of fertilizers to improve yield and integration with fish farming. There is need for environmental impact assessment for the earth dam, use of fertilizers and integration of fish farm. It's unlikely that any of these proposed activities would impact the environment. However, we propose an environmental audit to be carried out on the whole scheme.

3. Beneficiaries of the projects in terms of households and activities there

Aweil rice irrigation has the potential of supplying food needs of South Sudan and even for export. During its best days, rice used to be exported to Europe from the irrigation scheme. The immediate beneficiaries are the inhabitants of the metropolitan town of Aweil municipality who will enjoy low-cost rice and members of the three chiefdoms of Ajuet, Sheimel and Aweil Centre. Once in operation, considering the current allocation of 2 feddans per household, it's estimated that over 1,500 household would directly benefit from the project with even benefiting indirectly.

4. Capacities of the project.

The major project is the rehabilitation of 3000 Feddan (1,260 ha) of Aweil rice farm. The costs involved in its renovations are tabulated below:

S/N	Project	Capacity	Comments
1	Installation Hydrometric Stations on Lol River	2 Gauging Stations	For early warning and sizing of hydraulic structures
2	Water Quality monitoring along Lol River	Once a season	To protect upstream users from impact of use of fertilizers
3	Earth Dam/Flood Protection/water reservoir/	60,000 Meter Cubic	Ensure rice farming all year round and for flood protection
4	Rehabilitation and widening of 25KM Access road	25 KM	Improve Access to rice farm
5	Feasibility studies (Topographic surveys, Engineering Hydrology, Geotechnical investigations, irrigation agronomy, agricultural soil and land suitability, environmental impact assessment, and Tilapia fish farming integration studies)	One time consultancy fees	consultancy fees
6	Engineering Design works (Flood Protection/water reservoir Earth Dam and river abstraction point, irrigation design works, specifications and construction methods)	One time consultancy fees	consultancy fees
7	Construction Works: Water Control structures rehabilitation works (Main canal, associated water control hydraulic structures, secondary irrigation canals, associated water control hydraulic structures within the secondary canals, raising of embankments)	One time construction fees	Construction fees. More time Needed to quantify the canal lengths, drainage Drainage channel lengths

8	Supply of improved rice seeds including fish fingerlings and locally formulated fish feeds	One time supply of enough seeds for one season	supply of enough seeds for one season
9	Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season)	One time supply of Fertilizers for one season	supply of fertilizers for one season
10	Supply of spare parts for rice mill for different grades of rice (One Spare parts, Switch separator)- Schule Germany made	One time supply of one spare Part for the rice mill	supply of one spare Part for the rice mill
11	Operation and Maintenance (Fuel (80, 000 Liters of fuel/season -, Labour 99 staff, 10 new 90 HP tractors)	One season cost for operation And maintenance	cost for operation And maintenance
12	Income: Output – 2 tonne of rice per hectare and revenue from sale of fish)	Once the irrigation is operational, It has the capacity to produce 2 tonnes of rice per hectare	Very profitable project to invest in. Return period Is less than 4 seasons.
13	Renovation of existing rice stores roofs	Approximately 11,880 m ² of existing warehouses roofs are leaking	Fee for renovation of roofs
14	Capacity building (training of technicians to maintain the tractors and irrigation structures)	One-time fee for training technicians to manage their existing equipment	Training fees
15	Six months contract for experts in Agronomy, Motor vehicle Mechanics, irrigations engineers, and agricultural engineers, aqua culturalists)	Six months salaries of highly qualified 5 staff to jump start the operation of the irrigation scheme	Salaries of experts
16	Chain link Fence of the scheme administration headquarters to protect the assets of the irrigation scheme from vandalism	Approximately 1.6KM of fence of the office compound of irrigation scheme to be fence	Fence construction

17	Establishment of Research Centre for rice varieties	Construction and staffing of one research center	Construction and staffing of research centre
18	Nursery School for kids of the irrigation scheme staff	Construction of one block of three nursery school	Construction
19	Mobility Vehicles for the scheme	Supply of 5 motor vehicles for mobility	Supply
20	5 Motor cycle for agriculture extension officers	Supply of 5 motor cycles for mobility	Supply
21	20 bicycles	Supply of 20 bicycles for mobility	Supply
22	Office furniture	Supply of 50 office furniture	Supply
23	Renovations of scheme offices	About 300 m ² of roof areas of existing offices	Renovation
24	Wireless internet	One-time fee for use of internet	fees
25	Solar power source for irrigation scheme headquarters	One-time fee for installation of solar panels to supply electricity	fees
26	Fencing of the rice irrigation scheme using chain link wire mesh	2000 KM of chain link fence for the irrigation scheme	Construction fees
27	Others: Rehabilitation of boreholes within Aweil west and Aweil Centre	Purchase of spare parts to rehabilitate 10 Boreholes in Aweil west and Aweil Centre	Spare parts
28	Expansion of the existing animal health clinic and including supply of veterinary medicines for five counties including of community animal workers	80 m ² construction of an animal clinic within Aweil town	Construction
29	Deepening of existing hafirs in Aweil East, north and west Counties	Cost of dredging 3 existing hafirs to increase their storage capacity	Construction

DETAILED COST BREAK DOWN

S/N	Description	Rate (USD)	Units	Quantity	Amount (USD)
1	Hydrometric Stations installations including equipment and civil works at the point of the canal of Lol River (one at Wedweil and another one at Peth) all on Lol river for water hydrometric purpose.	66,000.00	USD/Station	2.00	132,000.00
2	Water Quality monitoring (within the basins and on Lol River inlet and outlet). This will ensure protection of upstream users and to monitor over use of fertilizers in the rice and to meet minimum water quality standards for water for fishes.	42,000.00	USD/Season	2.00	84,000.00
3	Flood Protection/water reservoir Earth Dam on the canal from Lol river to Aweil Rice Farm (Actual required volume for one season of 120 days is 45,000 cubic metres (CM)) to ensure farming all seasons and to control flooding	8.00	USD/Cubic Metre	60,000.00	480,000.00
4	Rehabilitation and widening of 25KM Access road from Aweil town to rice field sites including planting of trees to protect it sides from erosion.	54,000.00	USD/KM	25.00	1,350,000.00
5	Feasibility studies (Topographic surveys, Engineering Hydrology, Geotechnical investigations, irrigation agronomy, agricultural soil and land suitability, environmental impact assessment, and Tilapia fish farming integration studies)	120,000.00	USD/Consultancy	1.00	120,000.00

6	Engineering Design works (Flood Protection/water reservoir Earth Dam and river abstraction point, irrigation design works, specifications and construction methods)	156,000.00	USD/Consultancy	1.00	156,000.00
7	Construction Works: Water Control structures rehabilitation works (Main canal, associated water control hydraulic structures, secondary irrigation canals, associated water control hydraulic structures within the secondary canals, raising of embankments)	360,000.00	USD/Construction	1.00	360,000.00
8	Supply of improved rice seeds including fish fingerlings and locally formulated fish feeds	100,800.00	USD/Season	2.00	201,600.00
9	Supply of fertilizers (Phosphate and Urea, herbicides, pesticides and fungicides) – urea 50Kg /feddan/season, TSP (50 kg/feddan/season)	151,200.00	USD/Season	2.00	302,400.00
10	Supply of spare parts for rice mill for different grades of rice (One Spare parts, Switch separator)-Schule Germany made	12,000.00	USD/Supply	1.00	12,000.00
11	Operation and Maintenance (Fuel (80, 000 Liters of fuel/season -, Labour 99 staff, maintenance of 10 new 90 HP tractors)	371,640.00	USD/Season	2.00	743,280.00
13	Renovation of existing rice stores roofs	7.04	USD/Square Meter	11,880.00	83,683.02
14	Capacity building (training of technicians to maintain the tractors and irrigation structures)	6,000.00	USD/One Training	1.00	6,000.00
15	Six months contract for experts in Agronomy, Motor vehicle Mechanics, irrigations engineers, and agricultural engineers, aqua culturalists)	129,600.00	USD/Man-months	12.00	1,555,200.00

16	Chain link Fence of the scheme administration headquarters to protect the assets of the irrigation scheme from vandalism	60.00	USD/Linear Meter	1,600.00	96,000.00
17	Establishment of Research Centre for rice varieties	60,000.00	USD/Construction	1.00	60,000.00
18	Nursery School for kids of the irrigation scheme staff	60,000.00	USD/Construction	1.00	60,000.00
19	Mobility Vehicles for the scheme	24,000.00	USD/Supply	5.00	120,000.00
20	5 Motor cycle for agriculture extension officers	1,200.00	USD/Supply	5.00	6,000.00
21	20 bicycles	240.00	USD/Supply	20.00	4,800.00
22	Office furniture	480.00	USD/Supply	50.00	24,000.00
23	Renovations of scheme offices	50.40	USD/Square Metre	300.00	15,120.00
24	Wireless internet	4,320.00	USD/ season	2.00	8,640.00
25	Solar power source for irrigation scheme headquarters	12,000.00	USD/Supply	1.00	12,000.00
26	Fencing of the rice irrigation scheme using chain link wire mesh	72.00	USD/Construction	2,000.00	144,000.00
27	Others: Rehabilitation of boreholes within Aweil west and Aweil Centre	1,200.00	USD/Construction	10.00	12,000.00
28	Expansion of the existing animal health clinic and including supply of veterinary medicines for five counties including of community animal workers	1,162.50	USD/Construction	80.00	93,000.00
29	Deepening of existing hafirs in Aweil East, north and west Counties	60,000.00	USD/Construction	3.00	180,000.00
Total Output (USD)					6,421,723.02

KM -
Kilometres

Annex 10: THE FEASIBILITY STUDY TO ASSESS THE CONSTRUCTION OF WATER RESERVOIRS AND LIVESTOCK SERVICES IN KAPOETA SOUTH, KAPOETA EAST AND KAPOETA NORTH COUNTIES OF EASTERN EQUATORIA STATE, SOUTH SUDAN

BACKGROUND

Recurrent droughts and unpredictable rainfall patterns are characteristic of arid and semi-arid lands (ASALs), which receive less than 600 mm of annual rainfall and comprise more than 70% of the Horn of Africa region, where the eight IGAD member countries (Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda) are located. The IGAD region covers an area of 5.2 million km² with a population of over 250 million people. It is endowed with a tremendous range of natural resources and an enormous potential for a variety of opportunities to generate wealth and development. Despite this great potential, IGAD member countries are struggling to cope with the vagaries of their difficult and worsening ecological conditions. Over the years, the severity and frequency of droughts have increased and their effects are exacerbated by the increasing phenomena of desertification, land degradation, global warming and climate change. These circumstances have created conditions of chronic vulnerability in these countries with; persistent food insecurity, widespread economic hardship, conflicts, migration and unspeakable human suffering, all affecting the pastoral and agro-pastoral communities that inhabit the region.

As an example, in Ethiopia, Somalia, Eritrea and Kenya, more than 20 million people are in dire need of food, clean water and basic sanitation. The potential for large-scale loss of human life is real, and the crisis is expected to worsen over the next few years, especially for pastoral communities. It is no coincidence that the most affected areas are those that suffer from persistent poverty due to marginalization, conflict and lack of investment. While a severe drought undoubtedly led to the current scale of the disaster, the crisis was caused mostly by people and policies, as well as by exacting weather conditions. An adequate response to the current crisis must not only address urgent humanitarian needs, but also tackle these underlying challenges. The prolonged drought in the Horn of Africa is therefore the immediate cause of the severe food crisis which is already affecting more than 20 million people in parts of Kenya, Ethiopia, Djibouti and Somalia and South Sudan.

As a result of the negative impact of drought on the lives and livelihoods of several million people and the resulting suffering and loss of human and animal life, the heads of State of IGAD member countries met at a summit in Nairobi on September 8-9, 2011. At the summit, they deliberated at length on drought-related challenges and developed the Nairobi Declaration, committing significant new investments in dry lands to end drought-related emergencies. They pledged, among other things, to initiate regional projects addressing the underlying causes of vulnerability in drought-prone areas, focusing on the urgency to engage long-term joint interventions aimed at building resilience and economic development. The meeting also emphasised the importance of a coordinated approach to deal with the effects of climate change.

At the end of the Summit, an agreement was reached to develop the regional strategic framework for disaster resilience and sustainability in the Horn of Africa. The aim was to reduce the impact of disasters in the region taking into account the frameworks and existing action programs, and allocate a significant share of national revenues to finance the initiative. In support and solidarity with the preceding decision, the African Development Bank (AfDB) decided to finance part of the initiative in stages, and in a number of countries within the framework of the Multinational Drought Resilience and Sustainable Livelihoods Program (DRSLP).

The Multinational Drought Resilience and Sustainable Livelihoods Program (DRSLP) in the Horn of Africa were designed to be implemented in three phases of five years each. The first phase of the program, which

was to last from 2013 to 2017, is co-financed by the AfDB. The program aims to contribute to poverty reduction, food security and accelerated sustainable economic growth in the Horn of Africa through improved rural incomes. Specifically, it aims to improve the drought resilience of arid and semi-arid land communities. Project interventions cover water supply for humans, livestock, irrigation and sanitation; improving plant and animal production, marketing and disease management.

The new and upcoming second phase of the DRSLP titled; Program for Building Resilience for Food and Nutrition Security in the Horn of Africa, herein referred as the HoA Program, follows the decision of the African Development Bank at the February 2019 roundtable on financing the Climate Investment Plan for the Sahel region (PIC-RS 2018 -2030). The objective was to support the implementation of the “Priority program to catalyze climate investments in the Sahel (PPCI 2020-2025)”. This was made operational by the AfDB's commitment to support a regional program for CILSS countries (Western Sahel) and a regional program for IGAD countries (Eastern Sahel).

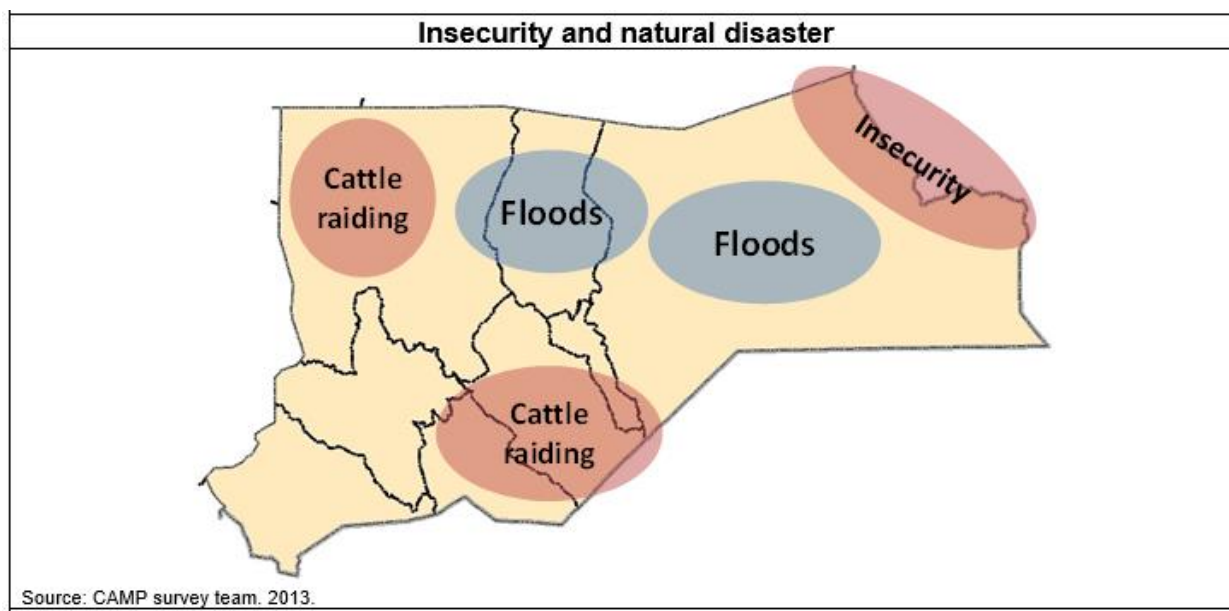
Therefore, a team of four National Experts undertook a feasibility study in the three Kapoeta Counties of Eastern Equatoria State from 14th to 17th July 2021, as part of the stakeholder consultations on the Program for Building Resilience for Food and Nutrition Security in the Horn of Africa. The stakeholder consultations were planned prior to the field visit to present program components and to gather concerns and expectations about the project. In each county, the stakeholder consultation meetings brought together representatives of government technical services (agriculture, livestock, water and sanitation, rural engineering, infrastructure, environment, forests, soils conservation, climate change and rural development donors, NGOs, etc.) chiefs, community members and associations of users of natural resources in the trans boundary clusters (Atekere Foundation).

The Program for Building Resilience for Food and Nutrition Security is financed by the African Development Bank; and is being developed within the framework of the interest collectively expressed by IGAD Member States invest in the second phase of the recently concluded Drought Resilience and Sustainable Livelihoods Program (DRSLP). The feasibility study was to determine the technical, economic, social and environmental feasibility of the proposed program.

RATIONALE

Kapoeta Area was identified as intervention areas in South Sudan due to its location within semi-arid lands and its huge dependence on livestock resources though it is re-enforced with a few other agricultural activities. The area is faced with severe drought particularly in the eastern part as witnessed by the Team of Experts during the visits and therefore, it needs water reservoirs / hafirs (dams) and boreholes to reduce the runoff and store that water for agro-pastoral activities during the dry/harsh seasons. The water reservoirs/hafirs (dams) can store water for irrigation, domestic use and livestock. The area also experiences floods and inter-communal conflict (insecurity) associated with pasture and water sources. This information is shown in the diagram below.

Figure Map showing Kapoeta Area



The Team of National Experts comprising of a Team Leader, two members and a government representative who are professionals in Environment, Gender, Livestock Development and Water Resources visited different government departments and sectors (such as Water and Sanitation, Agriculture, Livestock and Gender), UN Agencies and local organizations in the three Kapoeta Counties. The team collected information and data on: (i) communities in the three Kapoeta Counties, with further discussions held with stakeholders to identify potential target areas / populations; (ii) discuss activities that generate income in the three counties (what has been done, what has worked, what has not worked and why, etc.).

Key informant interviews were held with key local government staff, paramount chiefs, community members, project beneficiaries, impacted people, donors and non- governmental organizations to collect available data on watershed ecosystems, information on agriculture and livestock production systems and the impacts of climate change, as well as other information related to capacity gaps in communities and in governmental institutions. As consultations with stakeholders involved key government departments, paramount chiefs and organizations, the elaboration of the project strategy will ensure a strong national ownership, a fast agreement on Program activities, as well as a smooth approval process by IGAD and AfDB.

Furthermore, information and data was collected on gender to determine gender disparities that can influence the feasibility and the success of the program. At the same time, the needs and possibilities for women to participate and benefit from the Program were identified. On the other hand, the project design will have to include a full risk analysis, with a focus on climate risks for water, agriculture and livestock resources management, and ecosystems management in arid and semi-arid lands in the three Kapoeta Counties. The findings and costing of the project from the field are summarized in the tables below.

LIST OF INFRASTRUCTURES (SOUTH SUDAN: EASTERN EQUATORIA STATE – KAPOETA COUNTIES)

Kapoeta South County – estimated costs of the activities related to construction of water reservoirs and livestock services

S/N	Components	Unit	Capacity (m ³)	Targets	Unit cost (USD)	Total Cost (USD)	Sites	Beneficiaries (HH)	Remarks (Total HH)
1	No. of water infrastructures								
a)	New construct								
(i)	Dam (hafir)	Hafir	40,000	4	400,000	1,600,000	1 hafir in each of Logoyo, Lokatepan, Naleimor and Natipus	397 for Logoyo, 351 for Lokatepan, 346 for Naleimor and 364 for Natipus	1,458
(ii)	Hand pump boreholes	BH		5	20,000	100,000	1 BH in each of Kapoeta Town, Longeleya, Machi I, Machi II, and Pwata	2883 for Kapoeta Town, 2733 for Longeleya, 2809 for Machi I, 2424 for Machi II, and 2786 for Pwata	13,635
(iii)	Boreholes with elevated tank	BH		5	30,000	150,000	1 BH in each of Kapoeta Town, Longeleya, Machi I, Machi II and Pwata	2883 for Kapoeta Town, 2733 for Longeleya, 2809 for Machi I, 2424 for Machi II, and 2786 for Pwata	13,635

(iv)	Water quality and quantity monitoring	WQ		1	35,000	35,000	1 for Kapoeta South County		13,635
2	Rehabilitation								
(v)	Dam (hafir)	Hafir	40,000	2	200,000	400,000	Nakorongomo and Longoleya	2883 for Nakorongomo (Kapoeta Town), 2733 for Longeleya	5,616
(vi)	Hand pump boreholes	BH		53	10,000	530,000	5 in Kapoeta Town, 4 in Longeleya, 24 in Machi I, 16 in Machi II, and 4 in Pwata	577 for Kapoeta Town, 683 in Longeleya, 117 for Machi I, 152 for Machi II, and 697 for Pwata	2,226
(vii)	Boreholes with elevated tank	BH		3	10,000	30,000	1 BH in each of Mango Camp, Lodingding and Longeleya	1320 for Mango Camp (Kapoeta Town, 1563 for Lodingding and 2733 for Longeleya	5,616
3	Stock routes								
(viii)	Construct/rehabilitate animal stock routes	Km		1,100	500	550,000	300 km in Kapoeta Town, 200 km in Longeleya, 200 km in Machi I, 200 km in Machi II, and 200 km in Pwata	2883 for Kapoeta Town, 2733 for Longeleya, 2809 for Machi I, 2424 for Machi II, and 2786 for Pwata	13,635
4	Veterinary services								

(ix)	Construct/rehabilitate veterinary hospitals	LS		5	96,000	480,000	1 vet. hospital in each of Kapoeta Town, Longeleya, Machi I, Machi II and Pwata	2883 for Kapoeta Town, 2733 for Longeleya, 2809 for Machi I, 2424 for Machi II, and 2786 for Pwata	13,635
(x)	Construct/rehabilitate checkpoints	LS		4	25,000	100,000	1 check point in each of Longeleya, Machi I, Machi II and Pwata	2733 for Longeleya, 2809 for Machi I, 2424 for Machi II, and 2786 for Pwata	10,752
(xi)	Construct/rehabilitate slaughter houses	LS		5	50,000	250,000	1 slaughter house in each of Kapoeta Town, Longeleya, Machi I, Machi II and Pwata	2883 for Kapoeta Town, 2733 for Longeleya, 2809 for Machi I, 2424 for Machi II, and 2786 for Pwata	13,635
(xii)	Disease surveillances, quarterly livestock vaccination and treatment	LS		5	30,000	150,000	Kapoeta Town, Longeleya, Machi I, Machi II and Pwata	2883 for Kapoeta Town, 2733 for Longeleya, 2809 for Machi I, 2424 for Machi II, and 2786 for Pwata	13,635
(xiii)	Capacity building training for community animal health workers (CAHWs)	Pax		25	500	12,500	5 CAHWs in each of Kapoeta Town, Longeleya, Machi I, Machi II and Pwata	5 CAHWs in each of Kapoeta Town, Longeleya, Machi I, Machi II and Pwata	25
5	Specific feasibility study (Topographic survey, geotechnical investigation,	LS		1	250,000	250,000	Kapoeta South County		13,635

	hydrological study, environmental and social impact assessment)								
	Total					4,637,500			134,773

Kapoeta East County – estimated costs of the activities related to construction of water reservoirs and livestock services

S/N	Components	Unit	Capacity (m ³)	Targets	Unit cost (USD)	Total Cost (USD)	Sites	Beneficiaries	Remarks (Total HH)
1	No. of water infrastructures								
a)	New construct								
(i)	Dam (hafir)	Hafir	40,000	2	400,000	800,000	2 of them in Nadapal	2,291	2,291
(ii)	Hand pump boreholes	BH		23	20,000	460,000	5 in Narus Payam, 7 in Katodori Payam, 5 in Kauto Payam, 2 in Moruarangan Payam and 2 in Jie Payam	785for Narus Payam, 683 for Katodori Payam, 855 for Kauto Payam, 1988 for Moruarangan Payam and 1,072 for Jie Payam	5,383
(iii)	Boreholes with elevated tank	BH		2	30,000	60,000	1 in Nadapal and 1 in Jie	4582 for Nadapal and 1,072 for Jie Payam	5,654

(iv)	Water quality and quantity monitoring	WQ		1	35,000	35,000	1 for Kapoeta East County		13,666
2	Rehabilitation								
(v)	Dam (hafir)	Hafir	40,000	2	200,000	400,000	2 of them in Narus Payam	2,291	2,291
(vi)	Hand pump boreholes	BH		6	10,000	60,000	4 in Natinga Payam and 2 in Kasingor Boma	442 for Natinga Payam and 271 for Kasingor Boma	713
(vii)	Borehole with elevated tank	BH		2	10,000	20,000	1 in Narus and 1 Nadapal	785for Narus and 4582 for Nadapal	5,367
(viii)	Arus spring	Spring		1	50,000	50,000	Narus	785for Narus	785
3	Stock routes								
(ix)	Construct/rehabilitate animal stock routes	Km		1,050	500	525,000	150 km in Narus 150 km in Lotimor, 150 km in Katodori, 150 km in Natinga, 150 km in Mogos, 150 km in Kauto and 150 km in Jie	785for Narus Payam, 683 for Katodori Payam, 442 for Natinga Payam, 189 855 for Kauto and 1,072 for Jie Payam	4,026
4	Veterinary services								

(x)	Construct/rehabilitate veterinary hospitals	LS		7	96,000	672,000	1 vet. hospital in each of Narus, Lotimor, Katodori, Natinga, Mogos, Kauto and Jie	785for Narus Payam, 683 for Katodori Payam, 442 for Natinga Payam, 189 for Mogos, 855 for Kauto and 1,072 for Jie Payam	4,026
(xi)	Construct/rehabilitate checkpoints	LS		7	25,000	175,000	1 checkpoint in each of Narus, Lotimor, Katodori, Natinga, Mogos, Kauto and Jie	785for Narus Payam, 683 for Katodori Payam, 442 for Natinga Payam, 189 for Mogos, 855 for Kauto and 1,072 for Jie Payam	4,026
(xii)	Construct/rehabilitate slaughter houses	LS		7	50,000	350,000	1 slaughter house in each of Narus, Lotimor, Katodori, Natinga, Mogos, Kauto and Jie	785for Narus Payam, 683 for Katodori Payam, 442 for Natinga Payam, 189 for Mogos, 855 for Kauto and 1,072 for Jie Payam	4,026
(xiii)	Construct/rehabilitate livestock quarantine centers	LS		2	250,000	500,000	1 in Nadapal Border post with and 1 in Jie area bordering Ethiopia	4582 for Nadapal and 1,072 for Jie Payam	5,654
(xii)	Disease surveillances, quarterly livestock vaccination and treatment	LS		7	30,000	210,000	To be implemented in each of Narus, Lotimor, Katodori,	785for Narus Payam, 683 for Katodori Payam, 442 for Natinga Payam, 189 for Mogos,	4,026

							Natinga, Mogos, Kauto and Jie	855 for Kauto and 1,072 for Jie Payam	
(xiv)	Capacity building training for community animal health workers (CAHWs)	Pax		47	500	23,500	To be implemented in each of Narus, Lotimor, Katodori, Natinga, Mogos, Kauto and Jie	8 CAHWs in each of Narus, Lotimor, Katodori, Natinga, Mogos, Kauto and Jie	47
5	Specific feasibility study (Topographic survey, geotechnical investigation, hydrological study, environmental and social impact assessment)	LS		1	250,000	250,000	Kapoeta East County		13,666
	Total					4,590,500			75,647

Kapoeta North County – estimated costs of the activities related to construction of water reservoirs and livestock services

S/N	Components	Unit	Capacity (m ³)	Targets	Unit cost (USD)	Total Cost (USD)	Sites	Beneficiaries	Remarks (Total HH)
1	No. of water infrastructures								
a)	New construct								

(i)	Dam (hafir)	Hafir	40,000	2	400,000	800,000	1 in Lokwamor Payam and 1 in Lomeyen Payam	3,042 for Lokwamor Payam and 3,519 in Lomeyen Payam	6,561
(ii)	Hand pump boreholes	BH		21	20,000	420,000	3 BH in each of Paringa, Lokwamor, Chumakori, Najie, Lomeyen, Naakwa and Wokobu Payams	1,347 for Paringa, 1014 for Lokwamor, 1021 for Chumakori, 1,223 for Najie, 1,173 for Lomeyen, 727 for Naakwa and 1,203 for Wokobu Payams	7,708
(iii)	Borehole with elevated tank	BH		7	30,000	210,000	1 BH in each of Paringa, Lokwamor, Chumakori, Najie, Lomeyen, Naakwa and Wokobu Payams	2,694 for Paringa, 3,042 for Lokwamor, 2,042 for Chumakori, 2,446 for Najie, 2,346 for Lomeyen, 1,454 for Naakwa and 2,406 for Wokobu	16,430
(iv)	Water quality and quantity monitoring	WQ		1	35,000	35,000	1 for Kapoeta South County		16,430
2	Rehabilitation								
(v)	Dam (hafir) (40,000 m ³)	Hafir		2	200,000	400,000	1 BH in each of Chumakori and Wokobu Payams	2,042 for Chumakor and 2,406 for Wokobu	4,448
(vi)	Hand pump boreholes	BH		20	10,000	200,000	9 BH in Paringa, 3 in Lokwamor and 8 in Lomeyen	299 for Paringa, 1014 for Lokwamor and 293 for Lomeyen	1606

(vii)	Borehole with elevated tank	BH		4	10,000	40,000	1 BH in Chumakori, 1 in Najie, 1 in Naakwa and 1 in Wokobu	2,042 for Chumakori, 2446 for Najie and 2,406 for Wokobu	6,894
3	Stock routes								
(viii)	Construct/rehabilitate animal stock routes	km		1,050	500	525,000	150 km in Paringa, 150 km in Lokwamor, 150 km in Chumakori, 150 km in Najie, 150 km in Lomeyen, 150 km in Naakwa and 150 km in Wokobu	2,694 for Paringa, 3,042 for Lokwamor, 2,042 for Chumakori, 2446 for Najie, 2, 346 Lomeyen, 1454 for Naakwa and 2,406 for Wokobu	16,430
4	Veterinary services								
(ix)	Construct/rehabilitate veterinary hospitals	LS		7	96,000	672,000	1 vet. hospital in each of Paringa, Lokwamor, Chumakori, Najie, Lomeyen, Naakwa and Wokobu Payams	2,694 for Paringa, 3,042 for Lokwamor, 2,042 for Chumakori, 2446 for Najie, 2, 346 Lomeyen, 1454 for Naakwa and 2,406 for Wokobu	16,430
(x)	Construct/rehabilitate checkpoints	LS		7	25,000	175,000	1 check point in each of Paringa, Lokwamor, Chumakori, Najie,	2,694 for Paringa, 3,042 for Lokwamor, 2,042 for Chumakori, 2446 for Najie, 2, 346 Lomeyen, 1454 for	16,430

							Lomeyen, Naakwa and Wokobu Payams	Naakwa and 2,406 for Wokobu	
(xi)	Construct/rehabilitate slaughter houses	LS		7	50,000	350,000	1 slaughter house in each of Paringa, Lokwamor, Chumakori, Najie, Lomeyen, Naakwa and Wokobu Payams	2,694 for Paringa, 3,042 for Lokwamor, 2,042 for Chumakori, 2446 for Najie, 2, 346 Lomeyen, 1454 for Naakwa and 2,406 for Wokobu	16,430
(xii)	Disease surveillances, quarterly livestock vaccination and treatment	LS		7	30,000	210,000	To be implemented in each of Paringa, Lokwamor, Chumakori, Najie, Lomeyen, Naakwa and Wokobu Payams	2,694 for Paringa, 3,042 for Lokwamor, 2,042 for Chumakori, 2446 for Najie, 2, 346 Lomeyen, 1454 for Naakwa and 2,406 for Wokobu	16,430
(xiii)	Capacity building training for community animal health workers (CAHWs)	Pax		28	500	14,000	To be implemented in each of Paringa, Lokwamor, Chumakori, Najie, Lomeyen, Naakwa and Wokobu Payams	2,694 for Paringa, 3,042 for Lokwamor, 2,042 for Chumakori, 2446 for Najie, 2, 346 Lomeyen, 1454 for Naakwa and 2,406 for Wokobu	16,430
5	Specific feasibility study (Topographic survey, geotechnical investigation, hydrological study, environmental and	LS		1	250,000	250,000	Kapoeta North County		16,430

	social impact assessment)								
	Total					4,301,000			175,087
	Grand Total for the 3 Counties					13,529,000			385,507

Key: BH= Borehole; LS= Lumpsum; HH= Household; WQ= Water Quality

ENVIRONMENTAL EXAMINATION CHECKLIST

For the Proposed Construction of the Water Reservoirs/Hafir/dams and Veterinary Services in Kapoeta South, Kapoeta East and Kapoeta North Counties, Eastern Equatoria State, RSS

Date: 14th -17th July, 2021

Initial Environmental Examination Checklist

Parameters	Yes	Maybe	No
BIODIVERSITY			
Will the project require the acquisition or conversion of significant areas of Land?			√
Is the project located in proximity of protected areas or other classified as vulnerable?			√
Will the project affect protected or endangered ecosystems or species (e.g. natural forests, wetlands, endemic species, endangered species)			√
Is the project located in area prone to recurrent natural disasters? (e.g. floods, drought)	√		
Can the project introduce, accidentally or intentionally, alien species or GMOs?			√
Will the project result in introduction of barriers to movement of any resident or migratory wildlife species?			√
Will the project result in deterioration of existing fish or wildlife habitat?			√
Will the project result in the introduction of any factor (light, fencing, noise, human presence and/or domestic animals) that could hinder the normal activities of wildlife?			√
LAND DEGRATION			

Is the project likely to cause soil erosion or degradation?			√
Is the project located directly on river embankment?			√
Will construction, operation or decommissioning of the project involve physical changes such as topography or land use (e.g. construction camps, housing, etc.)?	√		
Will the project require accommodation or services for the workforce?	√		
Will the project results in adverse physical or aesthetic impacts on a structure or property at least 50 years old and and/or of historic or cultural significance to the community?			√
Will the project results in beneficial impacts to a historic resource by providing rehabilitation, protection, conservation, etc.?	√		
NATURAL RESOURCES			
Will the project require (during or after construction) significant amount of water, energy, materials or other natural resources?	√		
Will the project involve extraction, diversion or containment of surface groundwater?	√		
Are the needs of the project likely to exceed the capacity of existing water supply, sanitation systems, transport or other infrastructure?	√		
Does the project involve harvesting or depletion of natural resources (forest, fisheries, wildlife, etc.)?			√
Will the project involve natural forest harvesting or plantation development without an independent forest certification system for sustainable forest management?			√
Will the project result in changes in the course or direction of water movements?	√		
Will the project result in changes in percolation rates, drainage patterns or the rate and amount of surface water runoff?	√		

Will the project result in change in the amount of surface water in any water body?	√		
POLLUTION (From routine, non-routine or accidental sources)			
Will the project result in the production of solid wastes? (directly by the project or by workforce)		√	
Will the project result in the production of toxic or hazardous wastes? (used oils, inflammable products, POPs, ODS)			√
Will the project produce air pollution (e.g. dust emissions, and other sources)?		√	
Can the project affect the surface or groundwater in quantity or quality? (discharges, leaking, leaching, boreholes, etc.)			√
Will the project result in discharge into surface waters or alteration of surface water quality, including but not limited to temperature, dissolved oxygen, turbidity, solids, etc.?			√
Will the project result in exposure of people or property to water related hazards such as flooding or accelerated runoff?			√
Will the project results in the substantial degradation of groundwater quality?			√
Will the project results in substantial reduction in the amount of water otherwise available for public water supplies?			√
Will the project require use of chemicals? (e.g. fertilizers, pesticides, paints, etc.)			√
Is there any risk of accidental spills or leakage of materials?			√
Will the project produce significant noise pollution, disturbing nearest settlement?			√
Will the project result in the generation of air pollutants, a contribution to an existing or projected air quality violation or exposure of sensitive receptors to substantial pollutant?			√
Will the project result in the creation of smoke, ash or odors?			√

SOCIAL			
Will the project be located in a densely populated area?			√
Will the project lead to displacement of population?			√
Will the project lead to significant population density increase, affecting environmental sustainability?			√
Will the project lead to an increase in population movement and (interregional) traffic?			√
Will the project lead to an increase in HIV/AIDS transmission?			√
Will the project be located in or close to a site of high natural or cultural value?			√
Is the project located in a contented or conflict area?			√
Will the project result in the loss of open space?			√
Will the project result in disruption or removal of human remains?			√

ACTION		
	If All answers are “No”	No Environmental Assessment necessary
√	One or more answers are “Yes” or “Maybe”	<p>A Preliminary Environmental Assessment is necessary</p> <p>It is recommended to complete the Environmental Review including:</p> <ul style="list-style-type: none"> i. The Environmental Assessment ii. The Environmental Management Plan

Observation:

1. The construction of the proposed project (infrastructures) will be in harmony with South Sudan National Environmental Regulations and AfDB procedures

2. The land where the project will be implemented has no conflict and it's the land allocated by communities in the project area for these projects (water reservoirs & vet. Services). Hence, the acquisition of the land is legal and accepted by communities along the project areas
3. The project type is water reservoirs (hafir/dams) and boreholes with the purpose of mitigating and adapting to climate change scenarios.
4. The Socio-economic activities of the communities (project beneficiaries) in the proposed project sites are Agro-pastoralism and are Environmentally friendly communities.
5. The proposed project areas are drought prone areas
6. The number of livestock's in the proposed project areas outnumbered **(10 times the population of the project areas "according to the executive director of Kapoeta South county")**

Conclusion:

The current information has been sufficiently reliable to conclude that implementation of the proposed Construction of Water Reservoirs (Hafir/dams, boreholes, veterinary services) Project along the lines of the South Sudan and AfDB ESIA study will cause no major impacts to the environment and to communities; neither at the project location sites nor beyond. It will not result into community displacement.

Based on the above-mentioned points, the consultants/team of experts hereby testifies that no factor can prevent the proposed project activities to go ahead with its plans.

N.B: Project specific Environmental and Social Impact Assessments (ESIA) and Environmental Management (EM) should be conducted upon approval of the proposed project by the client (AfDB).