



**Food and Agriculture Organization
of the United Nations**

Field Report

**Rapid scoping mission on agrifood systems and livelihoods in Benishangul
Gumuz regional State, December 2023**

Date of the report: February 2024

Acknowledgement

FAO would like to acknowledge with much appreciation the crucial role of all the partners both, regional authorities, international humanitarian organizations, and the UN who provided expert regional contributions and guided field execution of the scoping exercise. A list of all the partners consulted is attached as annex VI.

1. INTRODUCTION

A field mission led by the UN Resident Coordinator/Humanitarian Coordinator was made to Benishangul-Gumuz region around July 2023. As a result of the regional level stakeholders' consultation, the mission noted that currently agriculture and livelihoods programming in the region are very limited. Institutional and technical capacity of the government implementing institutions was not strong enough to deliver the required agrifood system services effectively and efficiently, due to various reasons. Further, the coordination mechanisms put in place are not strong particularly for the agriculture and food security sector.

In this respect, FAO was requested to assist the Regional Government and Development Partners to prepare an advocacy note for promoting agricultural and livelihood interventions in the region. The rapid scoping mission to Benishangul-Gumuz¹ was, therefore, conducted with the aim of assessing the overall status of the agriculture and livelihoods in the region, identify possible agriculture and livelihood interventions to be taken forward for implementation to enhance positive agrifood system outcomes in the region including food and nutrition security.

2. OBJECTIVE OF THE SCOPING MISSION

The main objective of the scoping mission to Benishangul-Gumuz was to conduct a rapid assessment on the current situation of agrifood systems with a particular focus on agriculture and livelihoods options in the region to generate evidence and to better understand the existing opportunities and to identify constraints that may need to be addressed as well as factors that may constitute a conducive and enabling environment for intervention. The findings will be taken forward and used as inputs to prepare an advocacy note to further create better awareness and get buy-in among interested partners that may provide support to strengthen agrifood systems particularly targeting agriculture and livelihood interventions in the region.

3. METHODOLOGY AND KEY ACTIVITIES UNDERTAKEN

The key field activities undertaken included conducting series of consultation meetings with various stakeholders of regional government institutions, UN Agencies, and international and national non-governmental organizations (INGOs and NGOs). In addition, site visits were conducted at private sector medium-scale poultry production, Regional Animal Health Diagnostic, Surveillance and Study Laboratory, and small-scale irrigation scheme at Amba 1 Kebele. These activities and information gathered were complimented by literature/desk reviews of key regional strategic documents and reports.

Secondary data was received from the various institutions. Focus group discussions (FGDs) and key informant interviews (KIIs) were conducted as appropriate. The key institutions consulted during the scoping mission include UN Agencies (UNHCR, unicef, WFP), INGOs (Norwegian Refugee Council),

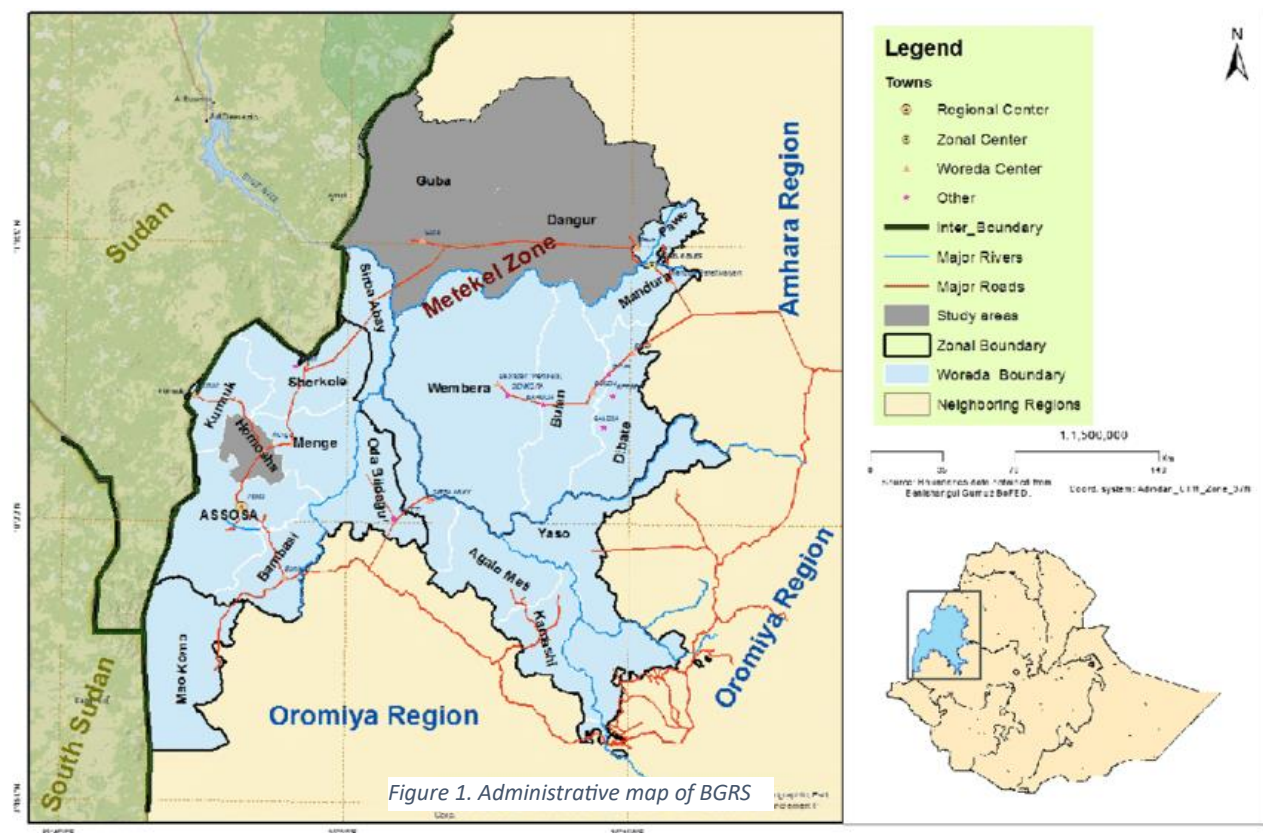
¹ The Scoping Mission Team was composed of Emergency Project Coordinator (Joseph Kirule), Climate Smart Agriculture expert (Hussein Kebede), Animal Production and Value Chain Expert (Tadele Mirkena), Agribusiness and Value Chain Expert (Firke Mulugeta), and Nutrition Policy Expert (Senait Zewde).

Government Bureaus (Bureau of Agriculture and Natural Resources (BoANR), Bureau of Trade, Bureau of Women and Social Affairs, Land and Cooperatives Promotion Bureau, Disaster Risk Management Bureau, among others).

4. KEY MISSION FINDINGS

4.1 General overview of the Region

Benishangul-Gumuz Regional State (BGRS), with its capital at Assosa, is one of the 12 National Regional States in Ethiopia. It is located in the western part of the country. It is located between the geographical coordinates 08°56'8" to 12°0'27' North Latitude and 34°3'53" to 36°42'8" East Longitude with an average altitude of 1570m (BoFED, 2011).



The region has a total land mass of 50,380 km² and has a population estimate of 1,219,000, consisting of 619,000 male and 600,000 female (Central Statistics Agency) and the population density is about 22.2 persons per km². BGRS shares borders with Amhara in the north and east, Oromia in the south and southeast, Sudan in the west, and South Sudan in the southwest. The main economic and livelihood activities of the region are rainfed crop agriculture and livestock production. There are other activities such as traditional gold mining, lowland bamboo and incense production on a relatively small scale. According

to key informants from the Women and child Women and children contribute labor to both agricultural activities and traditional gold mining though they hardly benefit from the proceeds equitably.

Of the total land mass of the region, about 3,224,682 ha (64 percent of the total area) is arable, of which 1,179,120 ha is currently cultivated (36.57%) by smallholder subsistence farmers and 10,087 ha of land developed by private commercial agroinvestors. Furthermore, the region has 189,534 to 240,000 of ha potential irrigable land (BoANR, 2023 and Awulachew et al 2007). Overall, the region exhibits high potential for agricultural development both for crop and livestock production systems. However, low yielding smallholder subsistence agriculture is predominantly practiced with limited commercial farming activities despite the region's potential. The major crops grown include maize, sorghum, soybean, teff, groundnut, and sesame. In mid and highland areas, wheat and finger millet are also grown. The region is well-endowed with natural resources including lowland forests, biodiversity, water and minerals such as gold, marble and coal. The region also hosts the Grand Ethiopian Renaissance Dam (GERD) whose primary purpose is hydropower generation both the country's own consumption and export to neighboring countries. The hydropower generation capacity is estimated to be 5.15 gigawatts, and the dam will be the largest hydroelectric power plant in Africa and among the 20 largest in the world when completed. The dam has also the potential of up to 7,000 tons for freshwater fish production which can contribute to livelihoods and nutrition improvements for rural households.

Most of smallholder farmers are mainly engaged in smallholder subsistence agriculture and limited commercial farming. The latter is practiced only in some parts of the region by commercial farmers. Maize, sorghum and teff are the major staple crops in the region. As the region falls in the lower Abay basin, it is endowed with a potential of surface and groundwater resources. The major rivers within BGRS include Abay, Dabus, Beles, Kokeb, Dhidhesa, Angar and Dindir, which have year-round water flows and whose tributaries have the potential for irrigated agriculture and livelihood improvements through freshwater fish farming. Abay River (the Blue Nile) crosses the region splitting it into two parts i.e., Metekel zone to the north, and Assosa and Kemeshi zones as well as Mao-Komo special woreda to the south.

Political administration: The BGRS is structured into three administrative zones (Assosa, Metekel, Kamashi), Mao-Komo Special Woreda, 22 rural woredas and 2 city administrations (Fig. 1). Metekel is the largest zone, followed by Assosa and Kamashi. The region has a total of 522 kebeles, of which 10 belong to Assosa City Administration and the remaining being in rural areas and woreda centers.

Demographic characteristics of the region: Based on basic data provided by ESS, the total population of the region is estimated to be 1,219,000, consisting of 619,000 male and 600,000 female populations. Further, the region hosts an estimated 79,000 refugees from Sudan and South Sudan (WFP, December 2023, personal communication). The refugees reside in three camps (Bambasi, Sherkole and Kumruk) located in Assosa zone. Refugee influx is increasing from time to time, particularly from Sudan, due to the current conflict in the country resulting in 16,000 asylum seekers being kept in a temporary settlement in Kumruk. The increased refugee population brought increasing pressure on the natural resources aggravating deforestation, and increasing food demand which has adversely affected grain prices in the local market particularly for staple crops.

Traditionally, the indigenous people practice subsistence agriculture predominantly using hoe and oxen cultivation. Relatively, the highlanders following more or less advanced farming practices, even though it is also based on traditional way of farming. Majority of the population lives in areas adjacent to forests and practice shifting cultivation for sorghum and maize production. Furthermore, the indigenous societies also actively engage in traditional mining activities particularly gold. Women and children actively contribute labor to mining but men control marketing and the income thereof.

Average household and land sizes: The demographic characteristic of the region indicates that the average household size is high at 4.5 persons per household (3.6 in urban areas and 4.7 in rural areas). As indicated earlier the total population density is 22.2 persons/km². This is still very low compared to the country-wide average population density, which is 83 persons/km² (World Bank, 2015). Pawe Woreda has the highest population density (92.3%) followed by Assosa (54.3%). According to data obtained from BoANR, there were 203,116 households, and of these, 198,023 were farming families. Proportion of women and youth engaged in agriculture was 35% (69,308) and 37% (73,269), respectively. Average farm size per household is 8.5 ha with the lowest holding ranging between 0.5 – 1.0 ha.

Security situation: Currently, the overall security situation within the region remains calm following negotiation and agreement reached between armed groups and the Regional Government. However, there are still security concerns due to active conflicts in neighboring districts of Amhara and Oromia Regional states which blocked road transport to and out of the region. The region currently hosts many refugees coming mainly from the Sudan and South Sudan. The deterioration of the security situations mainly in neighboring regions has restricted movement and access by humanitarian and development partners to smoothly support vulnerable rural communities.

Food security and livelihoods: Currently, the livelihood of the region is mainly derived from subsistence agriculture both crop and livestock production systems. The region has a large area of land suitable for both staple and high value horticultural crop production. It also has suitable agro-ecology and adequate rainfall for supporting needed improvements in farm production and productivity that would support the livelihoods of rural communities. Livestock production is an important source of livelihood in the region next to crop production. It is an important source of food, cash income, and assets to buffer against shocks. Other livelihoods options such as traditional gold mining, petty trade, forestry, and lowland bamboo production contribute to food security and incomes of the households though practiced on a lower scale. Mixed crop-livestock farming system is widely practiced in the region. Small-scale poultry production has the potential to be expanded through capacity building support and start-up capital financing of organized youth and women.

Furthermore, the region has abundant potential for apiculture and incense production and is endowed with minerals including gold, copper, and marble. Women and children of indigenous communities engage in traditional gold mining activities primarily to meet immediate household needs. Moreover, fish production by households residing along the major rivers including Blue Nile, Dabus, Dhidhesa, Anger, Diga and Daka offers an opportunity for potential interventions in improving nutrition and income security. This is in addition to wood, clay, iron, and bamboo handcraft production largely involving women.

However, agriculture in the region is largely rainfed and subsistence oriented. The region is not self-sufficient in grain crops production and as a result, grain crops and vegetables consumed locally come from the neighboring highlands. The current production and productivity level of major crops in the region remains low and far below the potential and the national averages. To address such gaps, the Region has set forth a ten-years perspective plan adopted from the national ten-year perspective plan, which is assumed to serve as a guiding framework for crop production and productivity enhancement.

4.1 Weather and agroclimatic conditions

The climate of Benishangul-Gumuz region is characterized by high rainfall during May to October wet season and has low rainfall during the dry period from November to April. The region has suitable agroecology and adequate rainfall for supporting increased farm production and productivity. The temperature and rainfall regimes also play an important role in soil formation, influence land use options / land cover changes and determine the major crops grown.

4.2.1 Rainfall

The region is characterized by monomodal high rainfall in the wet period mid-May to October accounting for 85% of the rain with the peak occurring in July. During the dry season that spans from November to April, the region receives little rain. According to BoFED (2011), the annual rainfall for the region ranges between 500 mm and 1,800 mm. In recent years, the rainfall has been erratic in nature especially in the lowland parts of the region around Guba, Sherkole and Kumruk where it rains for about 3 months.

The rainfall distribution pattern of Benishangul-Gumuz is usually classified in four categories namely, moderately moist (900-1,150 mm), moist (1,151 – 1,400 mm), moderately wet (1,401 – 1,900 mm) and wet pattern (1,901 – 2,400 mm) as reported by BoANR. The moderately moist rainfall regime is confined to Assosa and Metekel zones. Furthermore, parts of the Assosa and Metekel Zones and the whole of Mao-Komo Special Woreda exhibit a moist rainfall regime, which is suited for agricultural development activities.

4.2.2 Temperature

The mean annual temperature of the region ranges from 20°C to 25°C (BoFED, 2011) with the hottest months being January to May where maximum temperatures reach up to 28°C-34°C. The region's climate is hot and humid with maximum absolute day temperatures reaching around 34°C, which occurs around mid-March and the minimum temperature is 11 °C and occurs in the month of August. These temperature regimes are favorable for meeting the growing requirements of a diversity of cereals, pulses, oilseeds, and horticultural crops.

The average relative humidity of the region is 47% and increases during the wet season, abruptly diminishes in the dry season. From May through October (wet season), mean monthly relative air humidity vary between 68 and 80% and ranges between 41 and 44% from December through April (dry season, <https://en.climate-data.org/africa/ethiopia/benishangul-gumz>).

The prevailing winds blow from the south-east carrying humidity from the Indian Ocean. Mean annual wind velocities are as low as 1-2 m/sec. while the maximum wind velocities reach 30 m/sec and are observed in periods of transition from the dry to wet season and vice versa. The wind tends to get stronger where the area is higher and changes smoothly within the year, although it increases slightly in March through April.

4.2.3 Agroecological zones

BGRS has diverse topography and climate, which are bases for the region to have different agro-ecological zones. Its altitude ranges from 580 to 2731 meter above sea level (m.a.s.l, BoFED, 2007). The highest peak is the Belaya Plateau in Dangur Woreda whereas the lowest point occurs at Ethio-Sudan border of the Blue Nile crossing. The region's climate is grouped in to three zones: Kolla, Woynadega and Dega. About 75% of the region is classified as lowlands (Kolla) with an altitude below 1500 m.a.s.l. It is hot for most of the year with average temperature being >27.50C with about 860 – 1240 mm of annual rainfall. The midaltitude (Weynadega) zone is found between 1,500 - 2,500 m.a.s.l and accounts for 24% of the region while the highland (Dega) zone lying above 2,500 m.a.s.l accounts for only 1%.

Length of the growing period (LGP), mainly determined by prevailing temperature and water (rainfall) but also altitude, is conducive for crop growth. LGP for the area south of Abay River is usually between 180 to 211 days while it ranges between 168 and 190 days for areas north of Abay. Specifically, western parts of Metekel and eastern parts of Kamashi administrative zones have an average LGP of 160 days while Assosa zone has LGP ranging from 160–180 days. The region is one of the highest resource potential areas among lowland regions located in the west and northwestern part of the country but is relatively less developed.

4.2.4 Topography of the area

Topography is an integral part of the land surface characteristic and influences soil formation, drainage, run-off, erosion, exposure, accessibility, etc. Hence topographic information such as altitude and rainfall conditions are essential for prioritization of land use types and to determine which crops are more suited to a given area. The region is characterized by flat plain with minor sloping lands in the east which covers 60 % of the land with slopes of 2 % suitable for irrigation. Mountainous landscapes are predominantly found in Metekel and Kamashi Zones, which are covered by relatively dense vegetation that protects the soils from erosion. The vegetations enable a higher rate of soil formation thus minimizing degradation and maintaining soil fertility.

The flat topography of the region is suitable for mechanized irrigated farming however, to date, irrigation development in the region is at its infant stage, mainly due to lack of financial capital for investment and low technology adoption even among commercial investors. The high intensity of rains at the onset of the main rainy season when the land is almost barren creates soil erosion that degrades the land. The flat topography together with the morphological, pedological and physico-chemical soil properties makes the land capability class of the region suitable for agricultural development. Most of the soil is classified as humic-dystric nitisols (Bakala, 2022).

4.2.5 Climate-induced hazards in the region

The BGRS is one of the most vulnerable regions in Ethiopia to climate variability and climate change impacts. The region has experienced increased temperature, erratic rainfall, drought, and flood in some parts of the region. The major weather events affecting agriculture and livelihoods are briefly discussed below.

Increased temperatures: As a result of climate change, the temperatures of BGRS like other parts of the country is constantly increasing and the hot season lasts for about five months, which is from January to May and the annual temperatures could reach up to 28°C-34°C. The hottest month of the year in BGRS is March with an average high temperature of 34 °C and low of 11°C. The cool season lasts for 4.3 months from end of May to mid-October with an average daily high temperature below 25 °C and the coldest month is August with an average temperature of 11 °C. Increased carbon dioxide concentration that can be further aggravated from increased deforestation, intensive soil cultivation practices and improper fertilizer application increase the temperature and greatly contribute to increased crop water need. The increasing temperatures not only reduces the efficiency of photosynthesis, but also results in a faster development of the crop and this shortened the length of the crop growing period, which leads to a shorter life cycle resulting in smaller crop plants, shorter reproductive duration, and consequently lower crop yields. The crop yield reduction, due to increased temperatures will have pronounced effects, particularly for crops growing in the lowland parts of the region.

Erratic rainfall: Generally, drought is a protracted period of precipitation deficiency resulting in extensive damage to crops and loss of yield. However, the BGRS is characterized with adequate amount of rainfall but sometimes it becomes erratic and may affect growing crops.

Drought: The BGRS region is categorized under moderate drought area as 80% of its area is affected by agricultural drought. Temporal drought occurs every year with different time scale due to rainfall variability and seasonal shifts. However, unlike other parts of Ethiopia, this region is less vulnerable to drought. Rather erratic rainfall in some parts of the region affects crop and livestock production.

Flood: Flooding is one of the major natural hazards in Ethiopia aggravated due to the undulating and mountainous topography of the country including BGRS. Flooding usually occurs following the natural drainage systems formed by the major river basins. Flooding is one of the major natural hazards in BGRS, even though the magnitude of the problem is not as such significant compared to other flood prone areas in Ethiopia such as Gambella, South Omo, Afar and Somali regions. In the case of BGRS, excessive rain in the region and the surrounding regions (highland areas) cause the major perennial rivers (Dabus, Beles, Dinder, Anger and Daka) to overflow and flood areas along the major riverbanks during the main rainy season. Given that the region is predominantly characterized by flat topography, the lowlands are highly exposed to flooding.

5. DISCUSSION ON PRIORITY INTERVENTION AREAS

5.1 Agricultural production systems

5.1.1 Land and water resources

Land and water are key resources for agriculture-based livelihood interventions. BGRS is endowed with diverse natural resources such as land, water, forests, fisheries, rich biodiversity, mineral resources (gold, copper, and marble), apiculture and economically important tree species such as frankincense and bamboo trees. Despite the potential resources and opportunities, agriculture and livelihoods are still characterized by subsistence agriculture with low input-output production systems both for crop and livestock. Taking into consideration the vast land resource suitable for agricultural investment, the region has an open policy both for domestic and foreign investors who are interested to invest in agriculture. However, most agricultural investments mainly focus on commercial crop production predominantly based on rainfed agriculture with limited mechanization services.. About 10,087 hectares of land was developed by private investors in 2023, which is only 24.9 percent of the cultivated land. Pastureland is very small (only ~161,605 ha) while roughly 1.3 million ha of land is either already degraded or saline/problematic.

The natural resources make the region potentially ideal for expansion of both commercial and smallholder farming. The government of Ethiopia (GoE) has identified Benishangul-Gumuz region as one of the regions suitable for agricultural investment and has classified most parts of the region as under-exploited. Despite its huge natural resource potential and opportunities, the region is relatively one of the poorest in the country and food insecurity and poverty constitute its outstanding challenges. BGRS is the region with the highest presence of lowland bamboo (*Oxytenanthera abyssinica*) in Ethiopia. This species is particularly adapted to dry land conditions, poor and shallow soil, and degraded landscapes. It is important to note that bamboo forests play a crucial role as a buffer to desertification that is expanding from neighboring Sudan. However, bamboo production is not effectively linked with market. Therefore, to further expand bamboo production there is a strong need to effectively link with the market and to lobby and advocate private sector engagement and investment. However, the challenge is that in the last decade, bamboo in the region has been highly degraded to unsustainable agricultural practices (e.g., use of fire both man-made and wild for bush clearing), land conversion for commercial investments. Moreover, mass bamboo flowering occurred, which was then followed by subsequent death, contributing to increased bamboo degradation in the region.

As indicated above, BGRS is crossed by the Blue Nile which divides it into two. The river enters the region from the east, turning then to the north-west and leaving the Ethiopian border around Sirba Abay and Guba Woredas towards the Sudan. The region has potentially rich surface (major rivers) and sub-surface water resources, which provide some potential for fishing and irrigation development. However, little has been done to utilize these potential resources, due to lack of technology and limited investment capacity. Despite the region's vast water resources, the overall sanitation and water supply situation indicates that the whole region has underdeveloped potable water supply. Springs and perennial rivers are the major

water sources for majority of the region's population. It is important to note that even though, no major threats for water bodies are reported, precautionary measures should be taken to protect the region from introduction of water hyacinth (*Eichornia crassipes*), and other alien species such as *parthenium hysterophorus* and *Lanthana camara*, *Hyptis suaveolens*, *Senna obtusifolia* and *Solenostemon species* that have been already reported around Guba Woreda². The last three species have become a problem in the region, particularly in Dibatie, Dangur, Pawe, Mandura and Sherkole and threaten native ecosystem and pose risks to grazing areas and along the roadsides.

5.1.2 Soil characteristics

The soil types of the region are broadly categorized into heavy black soil types and humic Nitosols mainly found along the major riverbanks and the upland soils derived from granite with some rocky outcrops transported by the seasonal floods and deposited in adjacent areas along the main rivers. In most cases the soil organic matter is gradually declining due to limited soil management capacity and poor cultivation techniques such as limited recycling of dung and crop residues to the soil, intensive cultivation which accelerates the decomposition rate of soil organic matter, deforestation, overgrazing and inappropriate application of external sources of nutrients, and limited crop rotation.

In Assosa zone, because of heavy rainfall in the area, the soil nutrients are leaching, and the soil is becoming more acidic and requires application of improved soil management practices. According to the Woody Biomass inventory Map, the soil loss rate of the region, ranges from less than 3.125 to equal to 200 tons/ha/year. Degradation of the environment has severe repercussions for rural populations through lowering household income, damaging the environment and agricultural economy, and hindering the general development.

5.2 Overview of agricultural production systems

5.2.1 Rainfed agriculture

Of the total land mass of the region, 3,224,682 ha is arable land (63.6%) as indicated in the basic data received from the BGRS Bureau of Agriculture. The major food and horticultural crops grown in the region include cereals (maize, sorghum, wheat, barley, rice, and finger millet), oil crops (groundnut and sesame), pulses (soybean), fruits and vegetables (mango, banana, papaya, melon, citrus species, avocado, sugarcane, tomato, pepper, watermelon, okra), root crops (sweet potato and cassava), and spices (turmeric, ginger, cardamom) according to BoANR. More than 43.64% of the total annual cultivated land is covered by maize (28.09%) and sorghum (15.55%), the main staple crops of the region. Areas with potential for mango growing include some parts of Kumruk and neighboring woredas of Mengie, Homosha, Assosa, Belojejanfay as well as Dibatie and Mandura in Metekel zone.

The communities in the region predominantly practice mixed farming systems which are subcategorized into four (USAID FEWS NET): sorghum, maize and finger millet producing areas (central kolla), teff and coffee producing areas (mid-altitude), sorghum, maize, and mining areas (western dry kolla and cereals

²Mosissa D, Agajie M, Reda D, Kefiyalew A (2018) Status and Impact of Newly Invading Alien Plant Species in Metekel Zone, Benishangul Gumuz Regional State Northwest of Ethiopia. Int J Plant Biol Res 6(6): 1107

and pulses growing area (Metekel highland). The average farmland size is 1.12 ha compared to 0.84 ha national average landholding size of Ethiopia.

BGRS is characterized and endowed with highly diversified natural resources, and untapped surface and groundwater potential, which renders the region best suited for both rainfed and irrigated agricultural development. Despite this potential however, the livelihoods of people in the region are solely based on rainfed subsistence smallholder agriculture. In most cases, traditional farming systems characterized by low input-low output production system that is highly vulnerable to climate change predominates. As a result, food insecurity and poverty are serious challenges facing the region affecting a large segment of the society. Overall, the agriculture sector performance in the region is suboptimal in terms of output and there are limited efforts toward value addition (Market Assessment and Value Chain Analysis Report, 2010). There are different contributing factors to the region's low performance in the agricultural sector including low adoption of improved technologies and practices, weak institutional and technical agricultural extension services delivery, limited context specific research outputs supporting agricultural development, weak market infrastructure and information system and prevalence of crop pests and animal diseases, due to climate change and weak farmer-research and extension linkage (more details in section 5.1 *Constraints*).

Even though the economic development pathway of the region is mainly dependent on expansion of rainfed agriculture, suited both for smallholders and commercial agriculture, irrigated agriculture for production of high value horticultural crops can also play significant role. However, it is important to give due emphasis for sustainable natural resources management, which are serving as basis for ensuring sustainable agricultural production intensification and resilience building. Experience in the region thus far shows that agricultural lands have been expanding by deforesting valuable forests for cultivation of crops, particularly for expansion of commercial farms. This conversion of forested land into non-suited land uses has resulted into, soil and land degradations are becoming serious problems nowadays in the region.

Maize is one of the major staple crops grown in BGRS consisting of 28.09% of the grain cropped area and 43.52% of the total grain crops production (CSA, 2021/22). According to CSA (2021a) report, the productivity of maize in the region under smallholder farms was estimated at 4.2t/ha, which is same as the national average. This indicates that the provision and/or use of maize production technologies is very limited in the region, and thus, there is a strong need to tap the potential to boost maize productivity by adopting improved technologies. Sorghum is the second crop (covers 15.55% of total grain crops land) and is important for household food security. BGRS has also the potential for soybean production. However, the challenge has been that soybean is practically being produced for export and as raw materials for industries but suffers from underdeveloped market linkages. This seriously hindered its production and smallholder farmers are losing interest to actively engaged in its production. Given its significance, it is important to effectively link producers with market outlets both locally and abroad. To boost domestic soybean production, processing and marketing should be given due emphasis with an aim of replacing imported soybean-based products.

Further, it is important to mention that even though the region has the potential and ideal agroecology for banana and mango production, productivity enhancement by adopting improved technologies and management practices is critical. Mango is the first (most vast) among fruit crops being produced in the

region in terms of cropland areas covered followed by banana. Both the mango and banana production in the region is concentrated in Assosa zone along the major rivers and irrigated agriculture is widely being practiced. According to CSA (2021a), about 1,440.0 ha of land was covered by mango and 102.5 thousand households were engaged in its production.

Agricultural development in the region, therefore, requires interventions in a more coordinated and harmonized manner to address development challenges mentioned above and ensure sustainable natural resources management through people-centered and technology-assisted sectoral transformation that could result in increased and sustained agricultural production and productivity for improved food and nutrition security as well as poverty reduction. To realize the transformation of the regional agriculture sector, priority crops have been identified, which have significant importance in terms of food security, job creation, industrial values, and export earnings including maize, sorghum, finger millet for home consumption whereas haricot bean, groundnut, sesame, and soybean for marketing. Among fruit crops mango, banana, papaya, and avocado should be produced for home consumption and to a certain extent for local markets to get cash for industrial goods and services.

Major crop pests: The major crop pests in the region include stalk borer, fall armyworm (FAW), armyworm, aphids, white mango scale and storage pests. These are widespread and damage crops at field and storage stages. These crop pests have economic importance and significantly contribute to crop yield losses, unless and otherwise, control measures are taken in a timely manner by applying integrated pest management (IPM) approaches. IPM offers effective and efficient control with reduced impact on the environment and people. In particular, the white mango scale is the key insect pest and is critically affecting mango plantation in the region. It originated in Asia and spread to mango producing countries all over the world including Ethiopia. In Ethiopia, it was introduced recently in 2010 through a private farm “Green Focus Ethiopia” located in east Wolega Oromia region. The introduction was done through infected cultivar brought from India. Then in a very short period the insect quickly spread in main mango growing regions in Ethiopia due to the weak quarantine system in the country. The spread of the disease in a region which is the major mango growing area in the country is a serious issue. Furthermore, as indicated above, invasive alien species including *parthenium hysterophorus*, *Lanthana camara*, *Hyptis suaveolens*, *Senna obtusifolia* and *Solenostemon* species have already been reported in the region, particularly in Guba, Dibatie, Dangur, Pawe, Mandura and Sherkole and threaten native ecosystems and posing risks to grazing areas and along the roadsides.

Overall, the pest management support service in the region is not strong enough and facing constraints in terms of limited trained manpower with plant protection training backgrounds, weak institutional capacity, and shortage of financial and logistic support for field operations. Moreover, the pest surveillance capacity of the BoANR is very limited and the pest control strategies are not properly applied in a more integrated manner. Supply of personal protective equipment (PPE) to be used effectively when chemical control is required as an option is also critically lacking. Because of this, field practitioners are exposed to unsafe pesticide management.

Agricultural extension system: The provision of agricultural extension services is fully the responsibility of the BoANR which has cascaded structures up to kebele level – the lowest administrative unit. There are 522 Kebeles in the region and a total 2,873 agricultural development agents deployed (a maximum of seven staff assigned in each Kebele) while there are a total of 198,023 smallholder farmers who receive or need to receive agricultural extension services.

Fundamental practical actions that need to be taken to increase crop production, productivity, and marketing may include the following:

- (i) The region has a tremendous potential to increase nutrition sensitive, and marketable commodities production through improved agricultural mechanization, proper use of agricultural inputs, crop rotation and conservation agriculture (through applying reduced tillage, permanent soil cover using crop residues as mulching, cover crops, crop diversifications through crop rotation and/or intercropping using lowland pulses such as haricot bean, mungbean, soybean, etc.
- (ii) expansion of croplands to wider areas, and
- (iii) expansion of small-scale irrigation and application of more efficient irrigation water management practices can be considered as potential entry points for enhancing agricultural production, productivity in the region,
- (iv) group production and selling as bulk with better quality through cooperative model approach. It is also important to note that integrated pest management should be considered as an integral component of improved and integrated crop management practices.
- (v) Furthermore, enhancing crop-livestock integration and marketing scheme is also an important vehicle to be taken forward to complement each other in improving food, nutrition security as well as increasing incomes for the improved livelihoods and wellbeing of rural households engaged in agriculture.

5.2.2 Irrigation potential

BGPRS has rich water resources, which include perennial and seasonal rivers, community ponds and the GERD as surface water sources, which is suitable for irrigation and hydropower generation. With major including Abay, Dabus, Beles, Kokeb, Dhidhesa, Angar and Dindir, which have all year-round water flows and with tributaries have the potential for irrigated agriculture and livelihood improvements through freshwater fish farming. In most cases, the major rivers originate from the highlands situated in the South, east and north of the region and flow to the west of the region bordering with Sudan. Of the total arable land, the irrigation potential of the region is 240,000 ha (Awulachew et al, 2007) while data obtained from the BoANR indicates that the irrigable area is 194,607 ha (BoA, 2023). In addition, GERD has also significant importance for promoting freshwater fishing for livelihood improvements food and nutrition security among rural households engaged in agriculture.

Furthermore, it was reported that the region has groundwater resources, which can be used for irrigated agriculture of high value horticultural crops. Despite the vast potential for development of irrigated agriculture both for smallholders and large-scale commercial investment, irrigation infrastructure is

critically lacking in the region. In most cases, the major rivers are crossing to the Sudan. Of the total irrigation potential mentioned above 35,780 ha is currently being cultivated under small-scale irrigation (14.91%), of which 1,329 ha is under modern irrigation, 31,600 ha under traditional and the remaining 2,851 ha are under micro and household irrigation (Assessment of Irrigation Potential and Irrigated Area, MoA, 2022).

5.3 Agricultural investment

Considering the vast potential of arable land and suitability of the region for agricultural development, the region is entertaining medium and large-scale commercial farming. In most cases, the investors are mainly concentrated in Metekel and Kamashi as well as to a certain extent in Assosa around Bambasi. The main investment activities include agricultural production focused on export crops, livestock feed processing, Bamboo plantation and processing (currently not operational) and maize seed multiplication. Unfortunately, most investors are not wisely investing in their leased farmlands, instead leaving them bare or uncultivated. Moreover, large-scale commercial farmland expansion threatens the land rights and livelihoods of indigenous communities in taking over their farmlands for investment. In BGRS commercial investors are not following crop diversifications rather depend on monocropping giving priority to export crops. Similarly, as observed in Gambella, skill and technology transfer to smallholder farmers are also limited in region.

As observed in Gambella, Environmental Impact Assessments (EIA) are not getting adequate emphasis as a prerequisite for signing large-scale land lease agreements in Ethiopia. Practically, all land lease agreements in the region do not consider the environmental concerns and possible negative environmental impacts on the indigenous communities. As a result, most significant adverse environmental impacts were observed including deforestation, due to charcoal production resulting in loss of wildlife populations and habitat, and loss of biodiversity.

Constraints and challenges associated with commercial investment activities include:

- Limited technology adoption by investors and predominantly using extensive farming practices,
- Limited financial capacity for launching large-scale commercial investment (limited financial support for investment from Ethiopian Development Bank),
- Inadequate mechanization support services and commercial farmers are largely dependent on traditional farming practices, due to poor technology transfer as expected.
- No effective linkage between commercial investors and smallholder farmers,
- Poor coordination among stakeholders and lacking transparency in transferring land to investors,
- Inadequate awareness and commitment among decision-makers,
- Poor road infrastructure to the main investment areas and linking with national road networking,
- Weak monitoring and evaluation as well follow up support, due to limited logistic capacity,

- Investors once received loans not directly invested for the intended purpose rather reallocated for other purposes, not initially sought for investment,
- Low agricultural inputs supply and utilization even under commercial farms level,
- Security situation in the region and surrounding regions significantly affected and even completely interrupted the investment activities,
- Seasonal labor scarcity at peak agricultural operations,
- Increased wildfire widely observed and resultant damages to forest resources are critically affecting the natural resources base and the biodiversity,
- Increased pre- and postharvest losses, due to crop pests both in the field and at storage,
- Increased deforestation, due to unregulated investment activities in the region and
- Environmental impact assessment (EIA) is not strictly applied as a basic requirement for entering into full-fledged agricultural investment activities.

5.4 List of completed and/or ongoing projects supported by different donors.

The Refugees and Returns Service (RRS), Regional Government and UNHCR are working together to identify opportunities to contribute to the economic growth of the region and to serve as main areas of engagement and investment. In the past joint assessments collaboratively undertaken by UNHCR, UNDP and the World Bank (WB) and identified potential projects and community development priority areas that would benefit both host and refugee communities to improve social inclusion for social basic services and livelihoods improvement.

In BGRS, there are different projects being implemented and supported by different donors. However, it is important to note that in most cases, the projects are designed and inclined to support refugee communities with minimal support to host communities. Efforts to facilitate the coherence and integration of refugee communities with hosts are still low. The following list are either completed and/or ongoing projects designed and being implemented in the region:

Development Response to Displacement Impact project (DRDIP): Five-year project (2023 – 2027) and funded through the World Bank and hosted and being implemented with Ministry of Agriculture. The project is designed to ease the pressure on host communities and the natural environment in the three refugee-hosting woredas of Benishangul-Gumuz region. Currently, the project is in its second phase which started in 2023 building on success stories, registered by local communities and government officials during the first phase of the project. A 'Community Driven Development (CDD)' approach is employed both for the first and the second phases of the project with refugee-hosting communities as the primary beneficiaries. The second phase included the refugee communities. The main intervention areas include education, health, infrastructure, water, and agriculture including livestock. In particular, and regarding education the focus areas are school expansion and rehabilitation including for refugee communities while in the agriculture sector main emphasis include construction of shallow wells and rehabilitation of water schemes (Public taps); rehabilitation of a diversion canal; Spring development for irrigation / drinking and strengthening farmer training centers (FTC); construction of rural road and bridges, animal health posts.

Building Self-Reliance Programme (BSRP): This is a UK-funded programme implemented by UNICEF through its partners with the GoE (including RRC), NGOs (IRC and PIE) and communities in the three (3) refugee hosting woredas and all the three camps. The main objectives target improvements in WASH, Education, Nutrition, Health and Child Protection, both for refugees and hosts.

Qualifications and Employment Perspectives for Refugees and Host Communities in Ethiopia Program (QEP): QEP is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) and implemented by Deutsche Gesellschaft für International Zusammenarbeit (GIZ) GmbH. Considered a flagship for the Global Compact on Refugees/Comprehensive Refugee Response Framework (GCR/CRRF) in Ethiopia with its proactive focus on the integration of refugees into national educational systems, QEP also aims to train host communities to build their overall resilience. Expected outcomes are improved employment perspectives for both through three (3) output levels: i. Improved quality of TVET colleges in selected areas; ii. Improved training for refugees and host communities; iii. Expanded offers of job orientation and entrepreneurship advice – including links to ongoing businesses, such as the hotel and catering services for practical learning and beyond as employees.

Education Cannot Wait (ECW): ECW is a key component of Ethiopia's focus on inclusion and empowerment for refugees as outlined in the CRRF and pledges. Refugees study and learn with their fellow 'host' Ethiopian students. The Ethiopian curriculum has been adopted but language of instruction has been agreed with the refugee community as diverse languages are being spoken.

Students are provided with full scholarship, which includes fees, room, and board, as well as transport between college and refugee camp areas once they qualify to join tertiary education through the two available scholarship programs, DAFI and RRS/Government programs. Regional governments support with training, learning and UNICEF, UNHCR and RRS coordinate, finance and manage the project which operates in BGRS and Gambella regions.

Sustainable Solutions for Refugees and Hosts (KfW Water): In refugee hosting areas in Gambella and Benishangul-Gumuz Regional State, the program supports capital investments (optimization, design, supervision, and construction) in water supply and sanitation infrastructures and building water utility capacity, with local authorities and communities in refugee-hosting areas. Existing camp water schemes are being upgraded to ensure sufficient, potable water to both refugees and hosts. Sanitation master plans, including for schools and health facilities, are being developed for latrines and household waste management with collection by community / private operators.

In addition to the above, the following projects are implemented and/or being implemented in the region:

- Second Agriculture Growth Program (AGP-II), which is finalizing the small-scale irrigation infrastructure activities and will be closed in June 2024,
- Food Systems Resilience Program (FSRP), the third generation of AGP (2022 – 2029) and funded by the World Bank,
- Lowland Resilience Program, which is a five-year project (2021-2026) and supported primarily by the World Bank, IFAD, and the Government of Ethiopia,

- Resilience Landscape and livelihood Project, which a five-year project (2019-2024) and supported by the World Bank and the Ethiopian Government.

5.5 Overview of livestock production systems

BGRS has a huge potential for livestock production. Availability of vast land and natural feed throughout the year, except in two districts, renders the region fit for livestock production. Traditional low input-low output livestock production is prevalent with mixed crop-livestock production system being the dominant one with a small proportion of pastoral and agro-pastoral systems; all keep almost entirely indigenous breeds/ecotypes. Livestock production is considered an important economic activity to the livelihood of the smallholder farmers and the ever-growing population. Current estimate of the number of livestock population is 486,697 cattle, 341,505 goats, 34,178 sheep, 27,884 equine, 1.01 million chicken and 101,081 beehives (ESS, 2022, Figures 2-4). The livestock population grew steadily between 2011 and 2018 by ~44% for cattle and chicken, 10.5% for goats, 63% for goats, 26% for equine, and 95% for bee colonies; however, a dramatic drop was recorded after 2018 as seen from Figures 2 – 5 (rate of decline ranged from ~39% for cattle and chicken to ~78% for sheep and bee colonies). The decline was attributed to the conflict that was active in the region. About 479,412 livestock with an estimated worth of 7,445,065,850 ETB were robbed or lost due to the conflict.³

Prevalence of animal diseases especially trypanosomiasis is the main constraint to livestock production in the region. Other major livestock diseases include those which are transboundary in nature [e.g., Peste des Petits Ruminants (PPR), Contagious bovine pleuropneumonia (CBPP), Contagious caprine pleuropneumonia (CCPP), shoat pox, New Castle disease (NCD), Foot and Mouth Disease (FMD) and those with that are classified as priority zoonotic diseases such as Rabies, Anthrax, Brucellosis, etc.

Communal grazing lands, forestlands, and crop residue (straw, maize, and sorghum leftover) are the major livestock feed sources in BGRS. Poor management of rangelands, inappropriate grazing management, rangeland fires, and seasonal droughts, limit the availability of fodder in the communal areas (Wondimu et. Al., 2018)⁴. Quality and availability of natural pastures are usually highly influenced by seasonal variations with crude protein dropping below 8% in dry mature tropical grasses, especially during the dry season.

³Assessment of conflict related damages and loses from November 2020 to August 2022 in Benishangul Gumuz Region, Northwest Ethiopia, Assosa University, April 2023.

The assessment estimated a staggering cost of rehabilitation amounting 90,255,079,136 Birr for the overall damages and/or loses caused due to the conflict. Severely affected zones were Metekel and Kamashi with losses of 45,380,542,184 and 23,473,193,464 Birr, respectively. The conflict displaced a total of 475,384 population in 18-conflict affected woredas over a period of 2 years. The conflict also caused overall 16,805,317 quintal crops loss with an estimated worth of 42,240,413,301 Birr due to either land not cultivated, cultivated crops not harvested (most burned on farm), or crops robbed/burned after harvested. Moreover, 161 FTCs with an estimated cost of 589,000,000 Birr and 149 animal health posts with an estimated cost of 303,000,000 Birr were damaged. Moreover, about 992 Development Agents left their work due to the conflict.

⁴Wendimu B., Oumer, S., and Habtamu, A. 2018. Characterization of the indigenous goat production system in Asossa zone, Benishangul Gumuz region, Ethiopia. *Afr. J. Food Agric. Nutr. Dev.* 18(3).

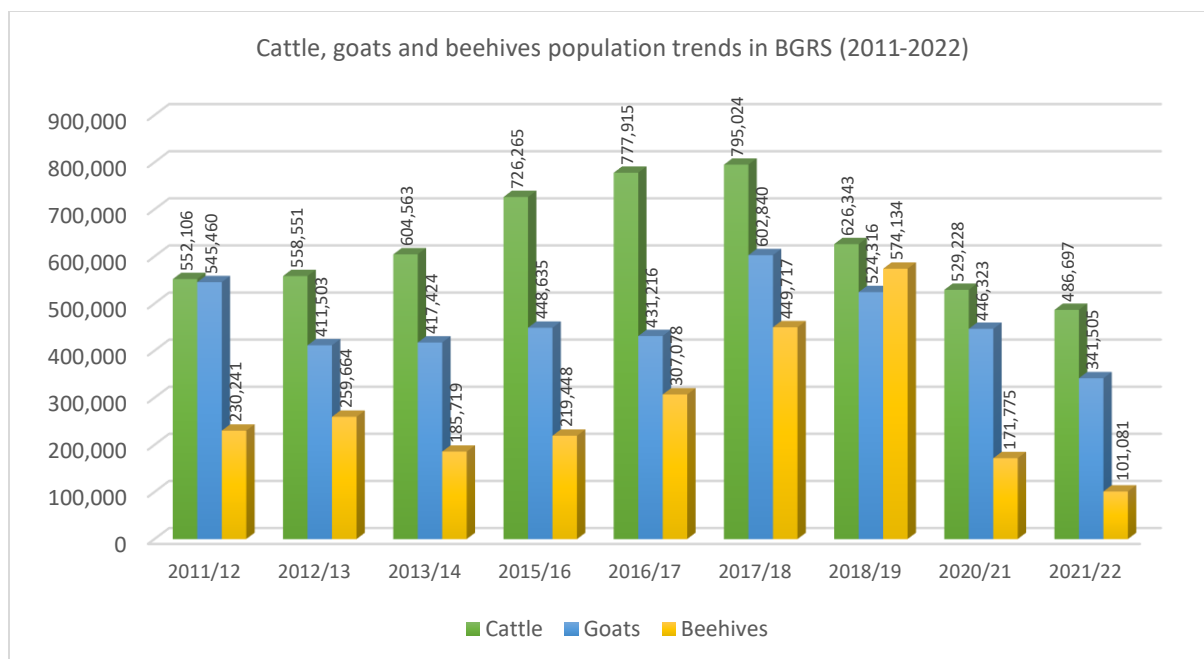


Figure 2. Cattle, goats, and beehives population estimates for BGRS (2011-2022).

Source: ESS annual agricultural sample survey reports

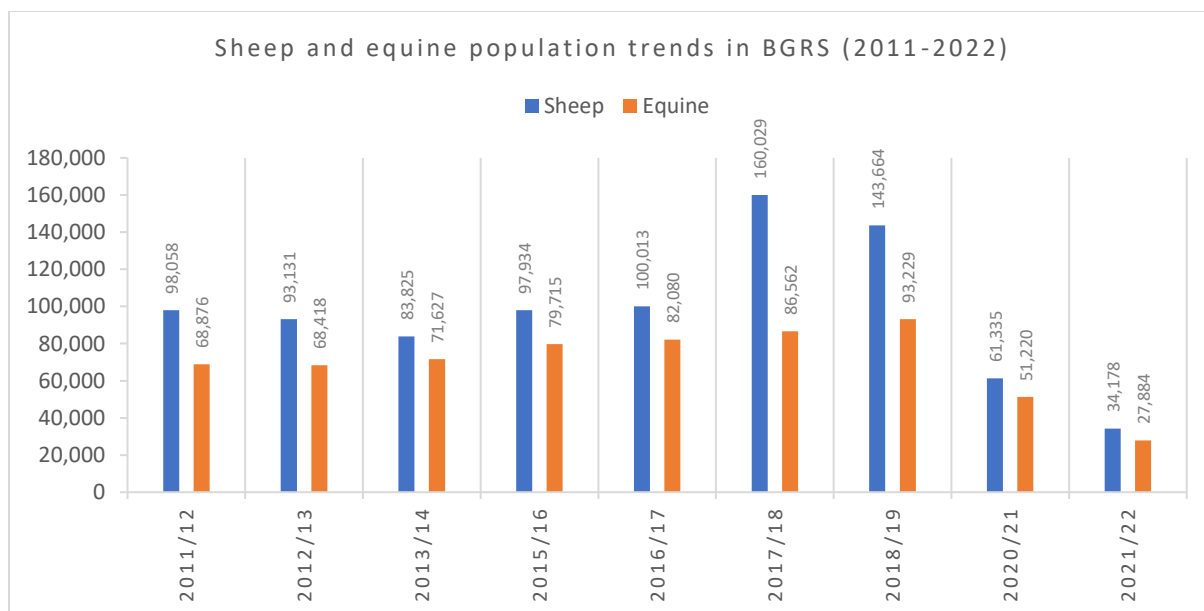


Figure 3. Sheep and equine population estimate for BGRS (2011 - 2022).

Source: ESS annual agricultural sample survey reports

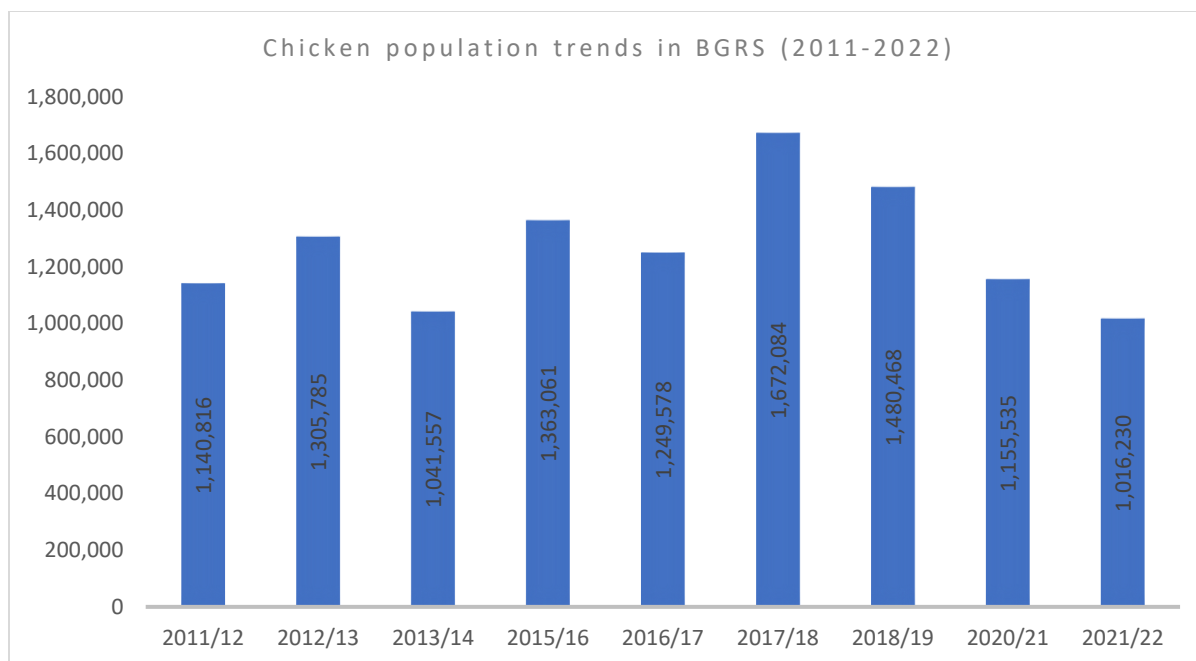


Figure 4. Chicken population estimate for BGRS (2011 - 2022). Source: ESS annual agricultural sample survey reports

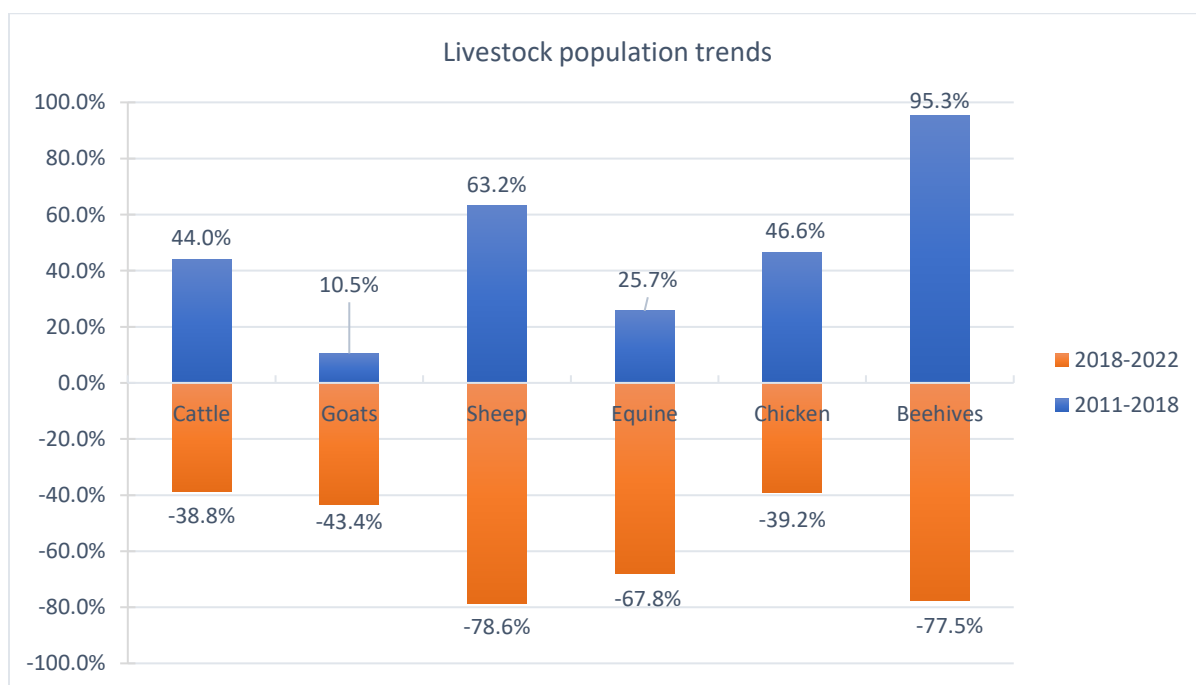


Figure 5. Trends in livestock population growth rate for BGRS.

Due to the constraints listed above, overall production and productivity of the sector is unsatisfactory as it is elsewhere in the country. Milk yield per cow per day is only 1.5 and 12 liters per cow per day from indigenous and crossbred cows, respectively. Lactation length is short (7 months for indigenous cows and 8 months for the crossbred) much below the desirable lactation period of 10 months; carcass yield from a slaughtered adult animals is low at 108 kg, 12 kg, and 10 kg for cattle, sheep and goats, respectively;

market age of small ruminants is slightly delayed (7 months on average); and extremely low egg production per hen per year (50 eggs per year and 8 eggs per clutch).

However, the Regional Government has made a remarkable investment to ensure sufficient human power and animal health infrastructure such as health posts and clinics (see Annexes III and IV) distributed throughout the region. Assosa Regional Veterinary Laboratory is also better equipped to do disease surveillance and diagnostic activities though consumables, especially reagents and kits, have been in short supply. Three feed processing and one liquid nitrogen plants are under construction. One Health taskforce has already been established at a regional level with endorsed terms of reference and MoU. Active members include relevant sectoral bureaus and institutions (Bureau of Health, BoANR, Assosa Regional Veterinary Lab, Assosa University, Assosa Hospital, Wildlife Conservation Authority, and Assosa Municipality). There are 328 Farmers' Training Centers and 29 additional farm level demonstration sites.

Moreover, the Regional Government identified priority livestock commodities including cattle rearing (dairy and meat), river fishery using the major rivers in the region, small-ruminants production and fattening, small-scale poultry production and apiculture integrated with conservation of forest resources and coffee plantations to a certain extent in the highland areas.

5.6 Nutrition situation in the region

The nutritional status of under five children in the region is indicated as stunting 42% and wasting 9%. 17% of women of reproductive age were underweight (BMI < 18.5 kg/m²). 38% of children aged 6-23 months had severe food poverty (consumed < 2 food groups a day). Fruit/vegetable consumption was generally low. 61% of children aged 6-23 months did not consume any fruit/vegetable per day. (Food and Nutrition strategy baseline survey March, 2023). The Ethiopian Food Based Dietary Guidelines (FBDG) recommend that adults consume six food groups in a day.

Underweight prevalence for under five children in the Region is 32%. In addition, only 47% and 30% of under two children consumed vitamin A and iron rich foods respectively (EDHS 2019).

There is a high potential of small ruminant and poultry production but, there is no poultry multiplication center and continuity of production is challenged which could also affect nutrition security. Implementation of *yelema tirufat* is practiced in the region which aims to increase productivity and production of dairy, eggs, chicken, and honey and related products as well as intensify efforts to achieve food self-sufficiency and ensure nutritional requirement at the family and community levels. This practice should be strengthened and scaled up to reach the needy. There are some small-scale irrigation schemes supporting in production of tomato, onion, kale, pepper, banana, avocado, mango, papaya, etc. which could be strengthened and supported. The price of fruit and vegetables is high and has an impact on dietary diversity at a household level.

Government is leading different coordination platforms like (health, nutrition, protection etc.) but capacity and regular based meeting is lacking.

Promoting nutrition sensitive agriculture through improved agriculture along the food system could bring better nutrition practices. Nutrition must be incorporated into all aspects of the value chain starting with

nutrient-rich soils that will improve the quality of the crops and extending across the food system to other elements like food safety, food processing, food fortification and proper food preparation and consumption in households.

5.7 Condition of agribusiness and value chain development

The mission noted that, to enhance the marketing potential of small holder farming households in Benishangul Gumuz region there will be a need to design contextualized strategies with a focus on agribusiness and value chain approaches with the aim of to addressing the current commercialization constraints as identified during the discussion with key informants. Key issues are presented in sub section table 6.1.4.

6. CONSTRAINTS AND OPPORTUNITIES

6.1 Constraints

In most cases, the agricultural production systems in the region are characterized by low input output production and marketing systems, which are predominantly based on traditional farming systems for both crop and livestock husbandry. The following are the key production constraints for the region (BoANR, 2008 E.C).

6.1.1. Crop related constraints.

Constraint category	Description
Limited technology and extension	• Low adoption of agricultural technologies and inputs, due to limited agricultural extension services and low awareness of smallholder farmers and agro-pastoralists. • Limited availability of locally developed agricultural technologies and seeds of improved crop varieties suitable to the various agro-ecological zones. • Lack of responsible body for improved technology multiplication, supply and quality regulation and low involvement of the private sector in technology multiplication and dissemination, • Largely dependent on backward farming systems using traditional hand cultivation practices. • Limited knowledge and skills of agricultural extension staff for extension services delivery. • Limited tailored made capacity building training to agricultural extension staff. • Agricultural technology packages are not well designed based on farmers real needs and context specific to local farming systems, due to resulted in low adoption of improved technologies. • High pre and post-harvest losses, due to poor crop management practices and postharvest handling techniques and increased prevalence of crop pests and diseases, due to climate change.
Climate change	• The erratic rainfall and its uneven distribution during the crop growing period contributed to low crop productivity and production.
Weak Agribusiness support	• Inadequate market infrastructure and poor market linkage to local and central market outlets, • Inadequate agricultural mechanization services, due to increased service charges, which are not affordable by resource poor smallholder farmers, • Inadequate financial resources and limited capacity for irrigation facilities development, • Weak capacity of agricultural commercialization and linkages across the key value chain actors.

Constraint category	Description
Weak policy and coordination efforts	- Weak coordination and collaboration among the various humanitarian assistance and development actors effectively managing potential conflicts and promoting harmonized approaches, - Lack of land use policy and legal framework on the modalities of land-use planning and implementation framework at both regional and national levels, - Recently, developed Integrated Rural and Urban Land Use Plan (ILDP) not being taken up for wider scale implementation to serve a guiding framework to ensure proper land use in the region.
Cross cutting issues	- Agricultural expansion not well integrated with sustainable natural resources management, - Cross-cutting issues poorly addressed such as climate-smart agriculture, nutrition-sensitive agriculture, and gender-sensitive interventions and women inequality.

6.1.2. Livestock related constraints

Constraint category	Description
Lack of production inputs	- Inputs especially genotypes, liquid nitrogen for artificial insemination are limited and sometimes not available. - Widespread animal diseases especially trypanosomiasis and anthrax - Unavailability of mixed ration/concentrate diets and these are currently transported from Addis Ababa. - Ever increasing feed costs, e.g., poultry and dairy feed prices have reached 5500 and 5000 Birr per quintal, respectively. - Practice of feed conservation from natural pasture during periods of plenty or forage/fodder cultivation is lacking. - Day old chicks are sourced from outside the region and there is currently no production in the region. Construction of a hatchery center in the region is completed but it has not started operating due to the conflict. Currently, only EthioChicken supplies day old chicks in monopoly and often refuses to cross beyond West Wollega. - Boiler operation is nonexistent mainly because of security and poor infrastructure even though there is demand for poultry meat. Interethnic conflict decimated cattle and small ruminant population, there was a livestock raid and rebel groups killed and ate livestock. - With regards to honey production, modern beehives are in short supply. Honey harvesting and processing equipment are inadequate. Indiscriminate pesticide application has reduced bee population. - Skin and hides are thrown away. Only few abattoirs exist and operate in the region (e.g., only 1 in Assosa).

Constraint category	Description
Diseases	- Transboundary diseases: PPR, CBPP, CCPP, sheep pox, New Castle disease (NCD), FMD. - Zoonotic diseases: Rabies, Anthrax, Brucellosis. - Herds of cattle, sheep and goats owned by refugees come with diseases. This is in addition to Fulani nomads who cross through Gambella. - With respect to refugees, animal theft is on the rise among host communities.
Weak institutional and human capacity	- Human resource and skills on fisheries are very limited. There is only one fish expert in the region: lack of fishing materials such as nets and gears. Poor fish post-harvest handling as there is no cold chain. - Grazing land is being encroached by farming and invasive and unpalatable grasses and vegetation. There is complete lack of improved forage seeds because natural forage is in abundance therefore there used to be low demand. - Poor animal husbandry (animals are left to free range for days). - Shortage of budget resulting in the lack of logistics further resulting in the low quality of service provision.

6.1.3. Nutrition

Constraint category	Description
Knowledge and skills gap	- Inadequate knowledge on NSA national policies and strategies - Inadequate awareness and limited technical capacity on NSA. - Lack of practical guidelines for NSA intervention demonstration at community level which could create awareness gap and appropriate technology transfer and use. - There is weak documentation and information sharing system. - Inadequate Behavioral change communication (BCC) integration in technology adaptation and use.
Institutional	- Weak coordination and networking observed at all levels. - Poor institutionalization of NSA intervention at all levels which hindered project sustainability and long-term success. - Inadequate budget for monitoring and supervision at woreda level became one of the problems for weak supportive supervisions and reporting system. - Repeated staff turnover is a challenge for timely project implementation and capacity gap for new staff. - Inadequate staff (nutrition experts). - Inadequate skill and knowledge on NSA and dietary diversity - Inadequate nutrition corner at FTCs - Poor women empowerment - Conflict/displacement
Food production and consumption	- Low diversified food production - Low availability of nutrient dense crops (QPM, iron rich bean, orange fleshed sweet potatoes etc).

Constraint category	Description
	• Low dietary diversity practice due to limited food group consumption • High price of fruit, vegetable, and animal source foods • Lack of locally available complementary food for children

6.1.4. Agribusiness and value chain development related constraints

Constraint category	Description
Institutional and coordination	• Inadequate focus on agribusiness and value chain approach • Weak efforts on addressing commercialization. • No efforts and focus on improving market access and market linkages • Limited to no financial access by farmers • Weak capacity building efforts in business skills development. • Weak support towards diversified and specialized product development. • Poor know how and efforts in training and capacity building in improving postharvest losses management.
Business development and farmer organization	• Difficulties in cooperatives' access to credit. • Limited technical and resource capacity for corporative extension support and cooperative promotion. • Low capital availability limits output market by cooperatives for key commodities including cereals, oilseeds, pulses. • Warehouse is a huge issue for cooperatives both for input and output storage where most cooperatives do not have warehouses due to capital shortage. • Transportation facility is the most challenging one for cooperatives to aggregate their product from farm to stores and to market. • Marketing is challenging due to absence of market information technology facilities like servers, skilled labour, and computer infrastructures (laptops and desktops) • Poor efforts and capacity enhancing the Cooperative promotion • No promotion women's participation into cooperatives

6.2 Opportunities

The region has the following potential opportunities for agricultural development:

- The region has diverse natural resources base (land, water, rich biodiversity and suitable agroecological zones), which are suitable for diversified and sustainable agricultural development.
- The region has huge untapped cultivable land, which can serve as basis for expansion of both smallholder agriculture and commercial investment.
- The water resource potential of the region is an opportunity for development of irrigated agriculture (240,000 ha) both under smallholders and commercial scales.
- Huge potential (livestock population, land, and water) for livestock production.
- The water resource potential is the basis for freshwater fish farming.
- The region is characterized with a large area of lowland plains, which is suitable for agricultural mechanization and expansion of large-scale commercial investments.
- The rainfall and climatic conditions of the region allows and suitable for diversified crop production systems, mainly cereals (maize, sorghum, finger millet, rice), lowland pulses (soybean, haricot bean, mungbean), oil crops (sesame and groundnut) and high value horticultural crops such as vegetable (annual vegetables) and fruit crops (mango, banana, papaya), in particular the region has huge potential for mango production, which serve as basis for establishing processing plants and
- The large-scale commercial farming could be used as a learning ground for learning new technologies, transfer knowledge and skills to smallholder farmers.

7. CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

In conclusion, it is well established that BGRS is endowed with highly diversified natural resources, particularly vast untapped fertile lands suitable for agricultural expansion both for smallholder and commercial farming. In addition, the region is rich in water resources potential (both surface and groundwater resources) suitable for expansion of small-scale and commercial irrigated agriculture that could potentially contribute to improved food and nutrition security and diversified incomes. Despite the untapped potential of diversified natural resources, the region is still food insufficient with food production and the agriculture sectors facing multifaceted challenges. The region, therefore, requires a more comprehensive and coordinated support to enhance institutional and technical capacity for effective and efficient agricultural extension services delivery in order to sustainably realize better agrifood systems outcomes for the populace.

7.2 Recommendations

Taking into consideration constraints and opportunities for agricultural development both under smallholder subsistence farming and commercial investments, the following measures are recommended:

- **Strengthen both formal and informal seed systems:** In the region, the majority of smallholder farmers are using seeds of local crop varieties and limited outdated improved crop varieties of maize and sorghum without varietal maintenance and crop varieties have lost their desired quality characteristics, due to segregation. The seed supply and distribution system for improved crop varieties is very weak and improved crop varieties seeds are critically lacking. Therefore, to alleviate the seed shortage, it is highly important to strengthen community-based seed multiplication schemes in the short-term and establishing of the Regional Seed Enterprise in the long-term. The establishment of the regional seed enterprise should be based on detailed study to determine the need and workout the appropriate institutional arrangements that need to be taken forward for the realization of this target.
- **Establish and operationalize demonstrations of agricultural technologies and practices:** Agricultural technologies and improved crop and livestock management practices can be demonstrated in strategically selected farmers training centers (FTCs) and interested smallholder farmers' fields to demonstrate these technologies and practices to familiarize them and increase their awareness and gradually build the knowledge and skills through experience sharing events. This will increase adoption of agricultural technologies and practices for wider scale implementation.
- **Strengthen the institutional and technical capacity of agricultural extension services delivery:** The agricultural extension system is not as such effective and efficient in delivering extension services to smallholder farmers. Moreover, the commitment, the knowledge and skills are not adequate to provide the required technical support in promoting context specific good agricultural practices. Therefore, it is highly important to give due emphasis to strengthening both the

institutional and technical capacity of agricultural extension system for effective and efficient service delivery.

- **Strengthen climate change adaptation efforts and options of the farming communities:** The adaptation efforts and options of the farming communities should be given due emphasis and integrated with the macro development strategies of the regional government plan to reduce the adverse effects of climate variability and change on the agriculture sector and livelihoods. Moreover, it is important to note that the implementation of adaptation strategies should be context and culture specific, and demand driven.
- **Support agricultural and livelihoods diversifications:** Government and development partners should have a more coordinated efforts to effectively provide the required support towards prioritized agricultural and livelihoods diversifications and to build adaptive capacity of smallholder farmers and agro-pastoralists. This should be through endorsing policies that ensure sustainable agricultural development and enable vulnerable communities to gain access to necessary agricultural extension services and resource bases for better applications of adaptation strategies in response to climate change and weather extremes. The region has the potential to diversify agricultural production systems and livelihood options provided effective and timely support is put in place. These include cereal-based lowland pulses production, nutrient-dense crop production, irrigated agriculture with particular emphasis on high value horticultural crops production targeting not only local markets but also distant central markets as well, cattle and small ruminants fattening, fisheries and aquaculture production, commercial and backyard poultry production, small-scale agro-processing plants, and small business activities.
- **Strengthen agricultural research and development:** Working relationship between research and development has been weak and, as a result, needs-based technology development, dissemination and feedback mechanisms are not well established. Therefore, it is crucial to strengthen the capacity of both research, development partners, and farmers linkage to enhance needs-based technology generation, dissemination, and demonstration of released technologies to create awareness, increase adoption and wider scale implementation.
- **Set up appropriate institution responsible for technology multiplication and dissemination:** Although some research outputs exist at regional level, responsible institution for technology multiplication and distribution is lacking. It is, therefore, highly important to identify or set up an institution to be responsible for technology multiplication and distribution to easily reach out to smallholder farmers and this can be integrated with the establishment of Regional Seed Enterprise.
- Promote integration and institutionalization of nutrition sensitive agriculture (NSA) through all possible avenues including capacity building/training/advocacy (cooking demonstration) at all levels for increased access to adequate, safe, and diversified food.
- Provide agriculture input like fruit and vegetable seeds and seedlings for better dietary diversification practice.
- Strengthen coordination within the agriculture sector and with other non-agriculture sectors for information sharing and strengthen partnership.

- Strengthen monitoring and supervision of nutrition sensitive agriculture interventions including establishment of a reporting structure.
- **Marketing skills:** Provide training and workshops on marketing strategies, digital marketing, branding, and customer relationship management. Equip small-scale households with the necessary skills to effectively promote their products and engage with customers.
- **Business management:** Offer training programs on business planning, financial management, and market analysis. Strengthening overall business management skills can improve the competitiveness and sustainability of small-scale households.
- **Cooperative Marketing:** Encourage small-scale households to form cooperatives or associations to collectively market their products. Pooling resources, sharing costs, and coordinating marketing efforts can increase efficiency and market reach.
- **Joint promotions:** Plan joint promotional activities such as exhibitions, fairs, or marketing campaigns. This can attract a larger customer base, generate more sales, and create a stronger market presence.
- **Identify target markets:** Conduct research to understand the demographics, purchasing power, and preferences of potential customers. Determine the specific market segments that align with the products or services offered by small-scale households.
- **Competitor analysis:** Analyze competitors to identify their strengths, weaknesses, and market positioning. This can help small-scale households differentiate themselves and identify unique selling points.

Annex I: Area, production, and yield of crops for smallholder farmers for 2021/22 Meher season, BGRS

Crop	Area (ha)	Production (quintals)	Yield (qn/ha)
Grains crops	255,589.87	7,097,770.88	
Cereals	178,857.41	5,698,681.84	
Teff	22,021.32	344,445.20	15.19
Barley	*	*	*
Wheat	*	*	*
Maize	71,802.87	3,089,091.88	43.02
Sorghum	39,742.10	*	*
Finger millet	23,553.74	525,376.30	22.31
Oats "Aja"	*	*	*
Rice	*	*	*
Pulses	30,703.30	702,510.61	
Faba bean	733.64	13,271.73	18.09
Field peas	812.44	12,211.37	15.03
White chickpeas	*	*	*
Red chickpeas	*	*	*
White haricot beans	774.73	*	*
Red haricot beans	1,556.01	25,602.34	16.45
Lentils	*	*	*
Soybeans	26,305.20	630,257.26	23.96
Fenugreek	*	*	*
Mungbean	*	*	*
Lupin "Gibto"	*	*	*
Oil seeds	46,029.15	696,578.43	
Neug	9,326.01	89,769.64	9.63
Linseed	380.36	2,452.82	6.45
Groundnut	28,898.73	554,054.95	19.17
Safflower	*	*	*
Sesame	7,246.38	48,931.88	6.75
Rapeseed	*	*	*
Root crops	1,372.72	349,799.97	
Taro	27.02	29,933.27	107.82
Sweet potato	437.17	175,551.76	401.56
Yam	*	*	*
Vegetables	2,523.69	32,165.28	
Head cabbage	*	*	*
Kale	73.46	3,070.29	41.80
Tomato	*	*	*
Green peppers	11.36	257.00	22.62
Red peppers	2,410.09	26,958.72	11.19
Okra	*	*	*
Fruits	2,376.28	379,728.21	
Mango	1,440.27	86,389.95	59.98
Banana	557.75	280,978.34	503.77
Papaya	76.25	5,940.89	77.91
Lemons	28.74	923.04	32.12
Oranges	162.43	5,495.99	33.84
Coffee	729.51	3,909.48	5.36
Sugarcane	18.80	3,550.21	188.84
Chat	723.60	4,813.81	6.65
Total			

Source: CSA, 2021 Report on Area and Production of Major Crops for Private Peasant holdings, Meher Season

Annex: II: Status of existing small-scale irrigation schemes

No	Zone	Woreda	SSI Scheme	Com man d Area (ha)	Benefi ciaries	Budget Source	Total Budget	Completion Year	Major Irrigated Crops
1	Assosa	Ura	Hoha	200	540	MDG	12,533,829.45	20/09/2006	Onion, Tomato, Pepper, Maize
2		Assosa and Bambasi	Afa	200	800	MDG	15,481,417.01	06/10/2007	Maize
3		Abrahamo	Golda	92	368	MDG	12,235,222.31	3/9/2009	Onion, Tomato
4		Abrahamo	Megele 39	45	800	Own Budget	1,882,098.05	20/09/2011	Tomato
5		Ura	Bulnegro	80	320	JICA	NA	NA	Onion, Tomato
6		Abrahamo	Goltseha	25	100	ASSP	NA	NA	Onion, Tomato
7		Abrahamo	Goltseha 40/44	10	40	SDG	7,697,185.75	10/03/2016	
8		Ura	Amba 7/9	25	100	World Bank	NA	NA	Onion, Tomato
9		Ura	Tsentsehal	170	256	MDG	5,366,422.01	20/9/2006	Onion, Maize
10		Homosha	Upper Tumet	40	160	DRDIP	7,299,397.07	15/03/2014	Onion, Tomato
11		Homosha	Gumu	37.5	120	SHIDEP	8,435,328.59	12/09/2013	Onion, Tomato
12		Bambasi	Upper Sonka	180	720	DRDIP	19,384,578.24	15/09/2014	
13		Bambasi	Middle Sonka /Mender 40	100	400	DRDIP	28,271,928.01	11/09/2014	Onion, Tomato
14		Bambasi	Ashen Almetema	50	200	DRDIP	12,253,587.84	1/05/2015	
15		Homosha	Lower Tumet	62	248	DRDIP	16,080,806.20	05/08/2014	Onion
16		Bambasi	Mender 4	35	140	DRDIP	8,563,994.45	1/03/2013	Onion, Tomato, Pepper
17		Bambasi	Mender 51/45	62	163	SDG	33,141,074.84	10/01/2016	
18		Oda Buldiglu	Durbatse	79	316	SDG	11,890,682.85	7/01/2007	Okra
19		Sherkole	Mekezen	24	96	GCFP	8,650,036	21/08/2015	
20	Metekel	Dibatie	Kudo	55	220	World Vision	NA	NA	Onion
21		Wembera	Gorshi	40	160	AGP	NA	NA	Onion, Potato
22		Mandura	Lebit	188.5	754	MDG	10,312,521.83	9/7/2007	Onion
23	Mao-Komo	Mao-Komo	Kokeb	189	756	MDG	14,905,456.15	22/11/2007	
24	Kamashi	Midga	Anger Shenkora	80	320	ASSP	NA	NA	Onion
25		Sedal	Diza	20	80	FHI	NA	NA	Onion, Pepper
26		Midga	Fuafuatie	60	240	SDG	2,749,913.46	22/02/2009	Maize
Total		-	-	2,149	8,317	-	-	-	-

Annex III: Existing and required animal health workforce in BGRS as of 2015 EC (2022/23).

№	District	Existing Human Power					Required Human Power			No of kebeles covered	No of kebeles not covered
		Qualification					Qualification				
		MSc	DVM	BSc	Dip.	Certif.	DVM	BSc	Dip.		
1	Aburamo			24	28	1	1		3	39	2
2	Ura		1	21	34				6	37	4
3	Bambasi		1	22	42	1				43	1
4	Homosha		1	14	7				4	13	3
5	Menge		1	6	21	0	1	3		19	2
6	Kurmuk	1	1	3	26					19	-
7	Sherkole		-	1	5		1	2		19	-
8	Undulu		-	2	11		1	2		10	-
9	Assosa Town			14	7		1			10	
10	Bilidiglu			3	30						
11	Mao-Komo			9	33		1		2	23	9
	Total	1	5	119	244	2	6	7	15	232	21
1	Dangur	1	2	7	36	1	5	12	40	30	-
2	Pawe		3	5	35					24	
3	Dibate	1	1	4	34	3	1	3	2		
4	Bulen	-	-	3	3	-	1	2		18	3
5	Wombera	1	2	2	34	1		3		20	13
6	Mandura		1	6	28	2	3	10	15	16	10
7	Guba	-	2	2	22					17	
	Total	3	9	29	192	7	10	30	57	125	26
1	Kamashi	-		1	18	1	1	1	2	12	3
2	Dambe	-		3	24	-	-	-	-	16	-
3	Mijiga	-		1	22	-	-	-	-	14	-
4	Sadal	-		3	19		-	7	5	16	3
5	Zaye	-		3	28			7	5	6	3
	Total			11	111	1	1	15	12	64	9
	Grand total	4	19	259	547	10	31	49	72	366	62
	BoANR	2	2	4	1						
	Zonal Office		3	3	2						
	Laboratory	1	4	9	2						
	BGRS Total	7	28	275	552						

Annex IV: Number of animal health clinics or health posts in BGRS as of 2015 EC (2022/23).

№	District	Type of building material				
		Bricks	Plastered mud-house	Mud-house	Tatch-house	Container
1	Kamashi	7	5	1	2	-
2	Dambe	10	4	-	1	-
3	Mijiga	12	2	-	-	-
4	Sadal	8	-	-	-	-
5	Zaye	6	-	-	-	-
8	Aburamo	8	2	28	1	-
9	Ura	14	2	21	-	-
10	Bambasi	27	1	17	2	-
11	Homosha	14	-	2	-	-
12	Menge	4	4	5	4	-
13	Kurmuk	11	-	6	-	-
14	Sherkole	8	-	5	7	-
15	Undulu	3	-	-	7	-
16	Assosa Town	2	-	-	-	-
17	Bulidiglu	16	-	-	-	-
18	Mao-Komo	14	5	4	-	-
19	Dangur	18	-	12	-	-
20	Pawe	5	-	15	-	5
21	Dibate	17	4	3	-	-
22	Bulen	10	3	2	-	-
23	Wombera	10	2	13	3	-
24	Mandura	13	1	-	-	-
25	Guba	11	-	1	-	-
Regional Total		248	35	135	27	5

Annex V. Detailed recommendations on Agribusiness actions

Market Research

Identify target markets: Conduct research to understand the demographics, purchasing power, and preferences of potential customers. Determine the specific market segments that align with the products or services offered by smallholder farming households.

Competitor analysis: Analyze competitors to identify their strengths, weaknesses, and market positioning. This can help smallholder households differentiate themselves and identify unique selling points.

Market trends: Stay updated on market trends, consumer behavior, and emerging opportunities. This information can guide product development and marketing strategies.

Product Development

Quality improvement: Focus on improving the quality and consistency of products or services. This can involve enhancing production techniques, sourcing high-quality materials, and ensuring adherence to quality standards.

Diversification: Explore product diversification by introducing new variants or expanding product lines. This can cater to different customer preferences and increase market share.

Market Linkages

Partnerships: Collaborate with larger businesses, institutional buyers (contract farming), retailers, or distributors to access their existing distribution networks. Establish mutually beneficial partnerships that provide access to wider markets and increase visibility.

Market intermediaries: Work with local market intermediaries such as wholesalers, agents, or cooperatives who can facilitate market access, negotiate favorable terms, and provide market insights.

Export opportunities: Explore opportunities for exporting products to regional or international markets. This may involve complying with export regulations, identifying potential buyers, and building relationships with trade organizations.

Digital Marketing

Online marketplaces: Utilize online marketplaces such as e-commerce platforms or specialized marketplaces to reach customers beyond geographical limitations. Leverage their built-in customer base and marketing capabilities.

Training and Capacity Building

Marketing skills: Provide training and workshops on marketing strategies, digital marketing, branding, and customer relationship management. Equip smallholder farm households with the necessary skills to effectively promote their products and engage with customers.

Business management: Offer training programs on business planning, financial management, and market analysis. Strengthening overall business management skills can improve the competitiveness and sustainability of small-scale households.

Cooperative Marketing

Collaboration: Encourage small-scale households to form cooperatives or associations to collectively market their products. Pooling resources, sharing costs, and coordinating marketing efforts can increase efficiency and market reach.

Joint promotions: Plan joint promotional activities such as exhibitions, fairs, or marketing campaigns. This can attract a larger customer base, generate more sales, and create a stronger market presence.

Government Support

Policy advocacy: Engage with relevant government agencies and organizations to advocate for policies that support small-scale households. This can include access to credit facilities, infrastructure development, market information dissemination, and capacity-building programs.

Financial assistance: Seek government grants, subsidies, or loans that are specifically designed to support small-scale enterprises. This financial assistance can be used for marketing initiatives, product development, or upgrading production facilities.

Customer Engagement

Personalized interactions: Foster strong relationships with customers through personalized interactions, such as addressing their specific needs and preferences. This can be done through direct communication channels, customer surveys, or feedback mechanisms.

Social responsibility: Engage in community initiatives or social responsibility programs that align with the values and interests of the target market. This can enhance the brand image and attract socially conscious customers.

Networking and Collaboration

Industry networks: Encourage small-scale households to participate in industry associations or networks. These platforms facilitate knowledge sharing, collaboration, and access to market information and resources.

Supplier collaborations: Foster collaborations with other local suppliers or producers to offer bundled products or complementary services. This can increase the value of offerings and attract a larger customer base through cross-promotion.

It's important for smallholder farm households to assess the feasibility and suitability of these strategies based on their specific resources, capabilities, and target market. Regular monitoring, evaluation, and adaptation of marketing strategies are necessary to ensure their effectiveness and alignment with changing market dynamics. Additionally, leveraging the support of business development organizations, NGOs, or industry-specific associations can provide valuable guidance and resources to enhance the marketing potential of small-scale households in Benishangul region.

Annex VI. List of persons met/consulted and their designation and contacts

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