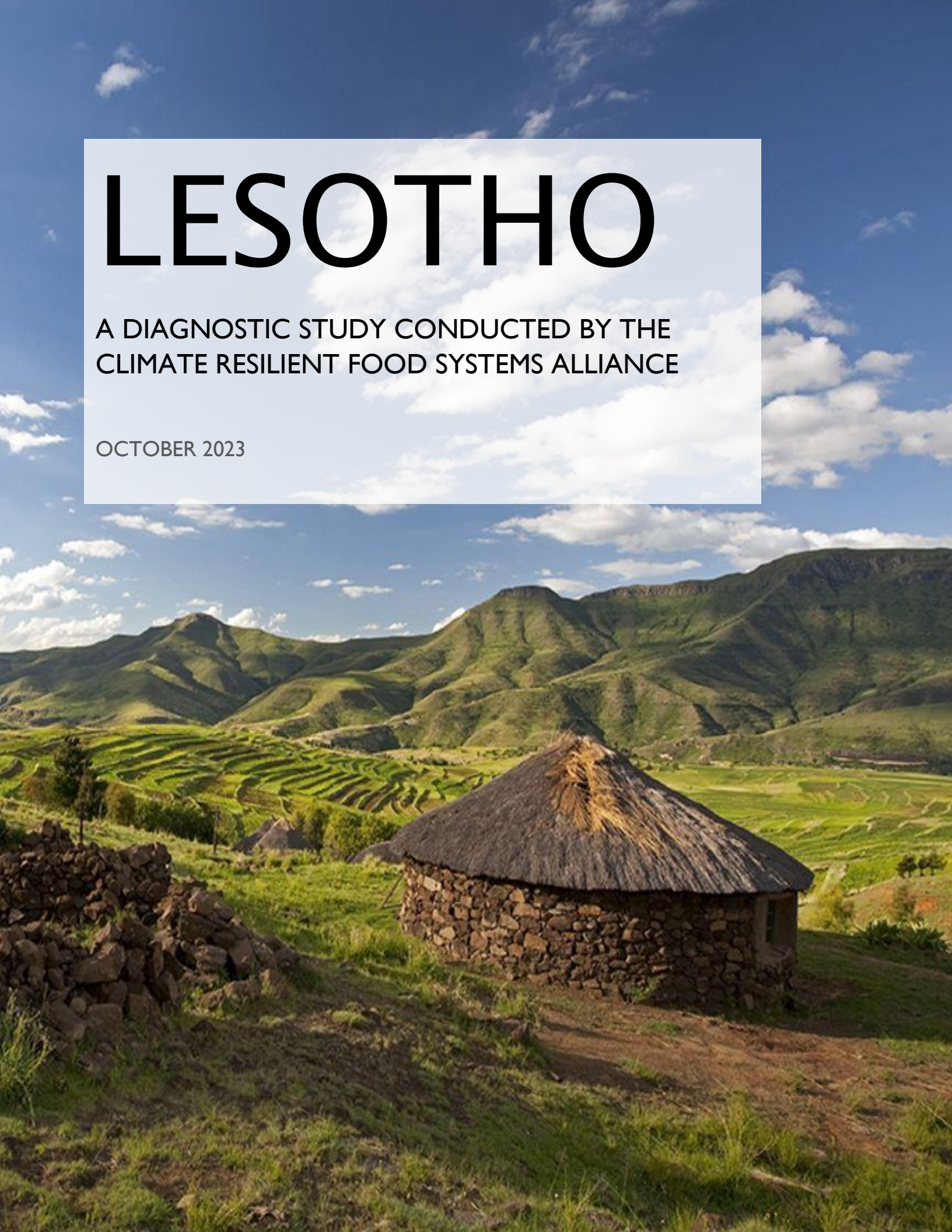

LESOTHO

A DIAGNOSTIC STUDY CONDUCTED BY THE CLIMATE RESILIENT FOOD SYSTEMS ALLIANCE

OCTOBER 2023

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LESOTHO: SCALING UP FOOD SYSTEMS RESILIENCE

1. Geography and Economy

1.1 Socio-economic context

Lesotho, a small landlocked nation in Southern Africa, is entirely surrounded by the Republic of South Africa. It operates as a lower-middle-income country under a constitutional monarchy, guided by a parliamentary democracy. Lesotho's economy is intricately linked to South Africa and the broader Southern African regional economy. The Maloti, Lesotho's currency, is pegged one-to-one to the South African Rand. The Southern African Customs Union (SACU) agreement serves as a crucial source of revenue for public expenditure, contributing an average of approximately 22% between 2015/16 and 2019/20[1]. Furthermore, a significant portion of the country's income is derived from remittances sent by migrant citizens primarily employed in South Africa. However, Lesotho's produced commodities must compete with those of South Africa, which enjoys a more extensive resource base and economies of scale[2].

With a population of 2.14 million people in 2020, Lesotho experiences an annual demographic growth rate of 0.8% in 2020. Projections indicate that the population may reach 2.3 million by 2030 and 2.6 million by 2050. The proportion of the population residing in urban areas is estimated to rise from 28% to 34% by 2030 and 46% by 20503. In 2020, Lesotho's Gross Domestic Product (GDP) was $1.844 billion, though the economy has faced fluctuating growth rates, including a current annual rate of -0.4% in 2019 and -11.1% in 2020. These economic challenges can be attributed to political instability and prolonged periods of sluggish growth in South Africa. While unemployment remains high, ranging from 24% to 28%, there has been a decline in the national poverty rate, from 56% in 2002 to 49% in 20174. Food poverty rates and the poverty gap have also shown improvement over the same period. The second phase of the Lesotho Highlands Water Project, alongside an expansion in mineral mining, is expected to have positive impacts on Lesotho's economy and water resources[5].

1.2 Geography and topography

Lesotho's landmass encompasses 30,355 square kilometers and features rugged terrain with elevations ranging from 1,388 meters to 3,482 meters. Only 10% of the land area is deemed arable. Lesotho's

[1] World Bank (2018). Kingdom of Lesotho, Public Expenditure Review: Improving Expenditure Efficiency for Inclusive Development and Growth, Report no. 127317.
[2] Imani Development International Ltd (2021). Agricultural Finance Scoping: An Agriculture Finance Scoping Exercise in Lesotho
[3] World Bank Open Data, Data Retrieved September 2023. Data Bank: Population Estimates and Projections, Lesotho.
[4] World Bank Open Data, Data Retrieved September 2023. Data Bank: World Development Indicators, Lesotho.
[5] World Bank (2020). Lesotho – Overview. URL: https://www.worldbank.org/en/country/lesotho/overview.

geographical location exposes it to climatic influences from both the Indian and Atlantic Oceans, leading to significant temperature variations[6].

Topographical variability and microclimatological influences define the wide range of ecological zones of the country: the Lowlands (17% of the territory), Foothills (15%), Mountains (59%), and the Senqu River Valley (9%). Each of these zones possesses unique climatic and ecological characteristics. Notably, the northern lowlands tend to receive higher annual rainfall compared to the southern regions.

Nevertheless, both areas experience major year-to-year variations in rainfall. The Senqu River Valley offers the most favorable conditions for irrigation. The mountains and foothills are primarily suited for livestock farming. Consequently, most socio-economic activities are concentrated in the Lowlands, Foothills, and the Senqu River Valley, with around 70% of the population residing in these regions[7].

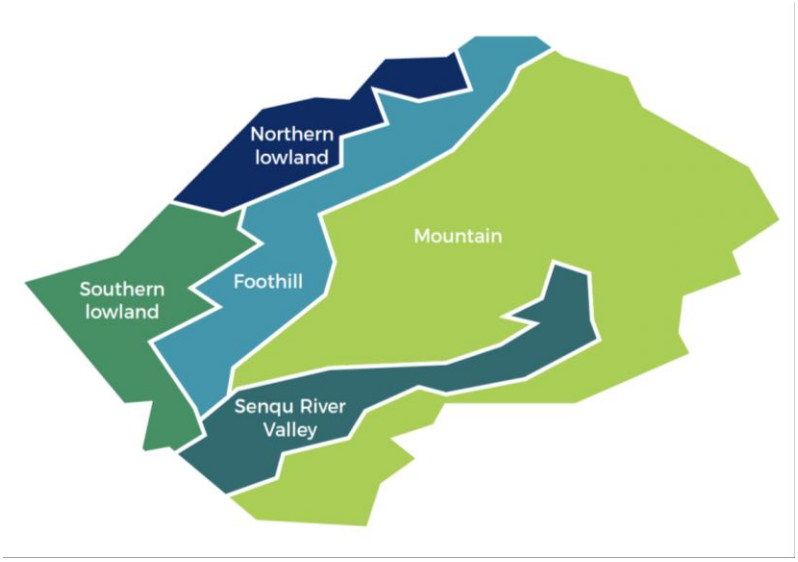

Figure 1. Lesotho's agro-ecological zones. Source: FAO, Lesotho Country Programming Framework, 2013-2017

1.3 Climate outlook

Climate plays a crucial role in determining Lesotho's agricultural potential, alongside topography and soil conditions. Recent weather patterns have brought about extreme events, such as droughts and floods. Projections also suggest an increasing likelihood of higher temperatures and fluctuations in rainfall. Lesotho's vulnerability to climate change is exacerbated by the country's already challenging climate,

[6] Ministry of Energy, Meteorology and Water Affairs (2013). Lesotho's Second National Communication to the Conference of Parties of the UNFCCC.
[7] World Bank (2021). Lesotho Climate Risk Country Profile.

which predominantly relies on rainfed agriculture. This vulnerability is further compounded by issues of poverty and land degradation[8].

Lesotho's geographic characteristics and socio-economic conditions, particularly within rural areas, position it as one of the most vulnerable countries to the effects of climate change. The nation's high dependence on rain-fed agriculture and reliance on regional energy imports further heighten its vulnerability[9]. Lesotho's topography and location contribute to its temperate climate, characterized by alpine features, which, in turn, increase its susceptibility to climate variability and long-term changes[10].

Lesotho is already witnessing the adverse impacts of climate change, including heightened frequency of extreme events, such as droughts, increased rates of soil erosion and desertification, and diminishing soil fertility. Projections indicate that Lesotho will generally experience hotter and drier conditions in the future, alongside an ongoing presence of extreme events like droughts and floods, as well as other climate-related hazards[11]. These changes are likely to result in adverse environmental impacts, including soil erosion, deforestation, recurrent droughts, desertification, land degradation, and biodiversity loss, including wildlife.

Key sectors, including agriculture and livestock, health, water resources, and tourism, face increasing vulnerability to these climate-related challenges. The agri-food systems in Lesotho, in particular, bear significant vulnerability to the negative impacts of climate variability and change. Agriculture in Lesotho shoulders a substantial portion of socio-economic diversity and is undergoing considerable strain[12]. With an increasing number of former South African mine workers from rural Lesotho trying to make a living from the land, this shift coincides with growing climate volatility. The ability of the nation's budget to support agriculture is further constrained, with the added challenge of a complex political and public service environment in which donor programs for agricultural development must operate[13].

2. Overview of National Food Systems

The food system in Lesotho is an intricate and interconnected web of activities encompassing food production, distribution, consumption, and waste management. It holds a central role in shaping the nation's social, economic, and environmental landscape, impacting factors like food security, nutrition, and overall well-being. The functioning of this complex system is influenced by a multitude of variables, including agricultural methods, reliance on imports, climatic conditions, and socio-economic factors. A comprehensive understanding of Lesotho's food system is essential for addressing the critical challenges it faces in terms of climate and disaster risk.

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[8] Ministry of Energy, Meteorology and Water Affairs (2013). Lesotho's Second National Communication to the Conference of Parties of the UNFCCC.
[9] IFPRI (2013). Lesotho. In: Southern African agriculture and climate change- A comprehensive analysis.
[10] Ministry of Energy, Meteorology and Water Affairs (2013). Lesotho's Second National Communication to the Conference of Parties of the UNFCCC.
[11] World Bank (2019). Lesotho Climate-Smart Agriculture Investment Plan: Opportunities for Transitioning to More Productive, Climate-Resilient, and Low Carbon Agriculture. World Bank, Washington, DC.
[12] World Bank (2021). Lesotho Climate Risk Country Profile.
[13] World Bank (2019). Lesotho Climate-Smart Agriculture Investment Plan: Opportunities for Transitioning to More Productive, Climate-Resilient, and Low Carbon Agriculture. World Bank, Washington, DC.

2.1 Agricultural Production and Livestock

The agricultural sector in Lesotho has witnessed a gradual decline in its contribution to the Gross Domestic Product (GDP). This is in stark contrast with the approximately 80% it represented in the 1960s. By 2018 and 2019, this contribution had dwindled to a mere 4.38%[14]. Agricultural productivity in Lesotho remains low by international standards, with the value added per worker averaging around $400 annually[15]. Despite its relatively low share of GDP, agriculture occupies approximately 78% of the productive land area and engages around 40% of the economically active population[16]. This highlights the economic disparity between households relying predominantly on agriculture and those primarily involved in other sectors, especially services and industry. Notably, women constitute a majority, making up 57% of the economically active individuals involved in agriculture[17]. This data underscores the disproportionate representation of women in the economically vulnerable group of the population.

Lesotho heavily depends on imports from South Africa for almost all food items, with only 30% of the food consumed being locally produced. Lesotho largely operates under a food deficit and relies on South Africa for a substantial portion of its internal market supply. In years with good harvests, Lesotho can manage to meet approximately 30% of its annual cereal requirements. Overall, a considerable part of the population, particularly those in rural areas reliant on subsistence farming and other non-farm activities, faces persistent food and nutrition insecurity[18].

A significant proportion of the meat (90% of broiler meat) and vegetables (80%) available in Basotho's formal market are imported from South Africa. Lesotho's main agricultural focus centres on cereals, primarily maize. Average yields however remain relatively low, with cereals typically experiencing yields of 987 kg per hectare in 2017 and 468 kg per hectare in 2016. These yields are also susceptible to climate shocks[19].

The vast majority (91%) of crop production fields are operated by smallholder farmers for their own consumption. These smallholders often struggle to meet subsistence levels and often need to supplement their production with purchased commodities, leading to an overall household food deficit. The situation is expected to persist, partly due to external factors such as climate change, which is causing more frequent and severe droughts, as well as sub-optimal agricultural practices. Factors such as inadequate use of agricultural inputs like fertilizers and improved seeds, and the inefficient reach of government input subsidy programs to households with small landholdings, result in fewer smallholders utilizing these inputs to enhance productivity[20].

2.1.1 Crop production in Lesotho

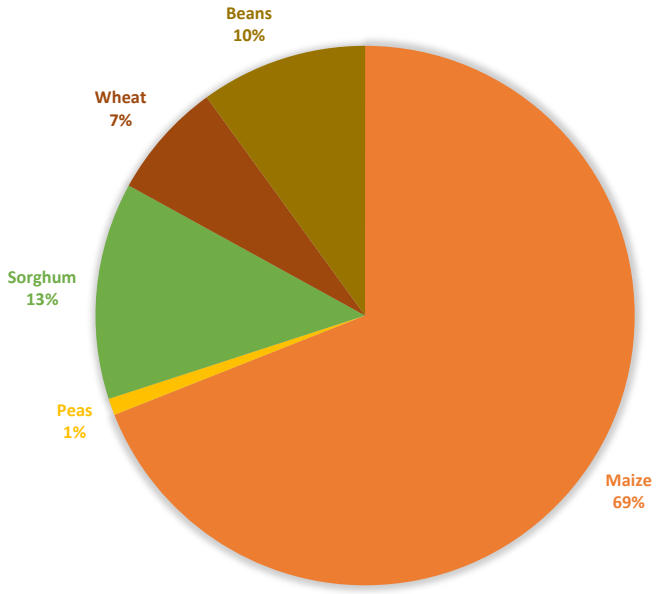
[14] World Bank (2019). Climate-Smart Agriculture in Lesotho.
[15] Imani Development International Ltd (2021). Agricultural Finance Scoping: An Agriculture Finance Scoping Exercise in Lesotho
[16] World Bank (2019) Kingdom of Lesotho Agriculture Public Expenditure Review
[17] Imani Development International Ltd (2021). Agricultural Finance Scoping: An Agriculture Finance Scoping Exercise in Lesotho

[18] IFAD (2020). Kingdom of Lesotho, Country Strategic Opportunities Programme, 2020-2025
[19] WFP (2019). Fill the Nutrition Gap Lesotho.
[20] Lesotho Ministry of Agriculture and Food Security (2023), Stakeholder consultation.

Cereal crop cultivation in Lesotho primarily relies on traditional low-input, low-output rain-fed systems. The primary crops, namely maize, sorghum, and wheat, account for over 85% of the cultivated area. Maize stands as the foremost staple cereal crop in Lesotho, followed by sorghum and wheat, respectively as evidenced by production level and area under which it is grown. Maize, sorghum, wheat, beans, and peas occupy about 70%, 12%, 7%, 10%, and 1% of the total area, respectively. However, yields fluctuate significantly, depending on rainfall, but typically remain low, contributing to elevated poverty levels in rural areas[21].

Limited quantities of high-value crops such as asparagus, garlic, and paprika are also cultivated. Maize production, in particular, is predominantly carried out by individual smallholders using limited amounts of fertilizer and hybrid seeds. However, government interventions in the form of 'block-farming' crop-share programs have successfully produced maize and wheat under standard commercial practices in several districts in the northern lowlands. These government initiatives, although beneficial, involve a substantial level of subsidy[22].

Figure 2. Share of acreage of major crops grown in Lesotho (Source: FAOSTAT, 2023)



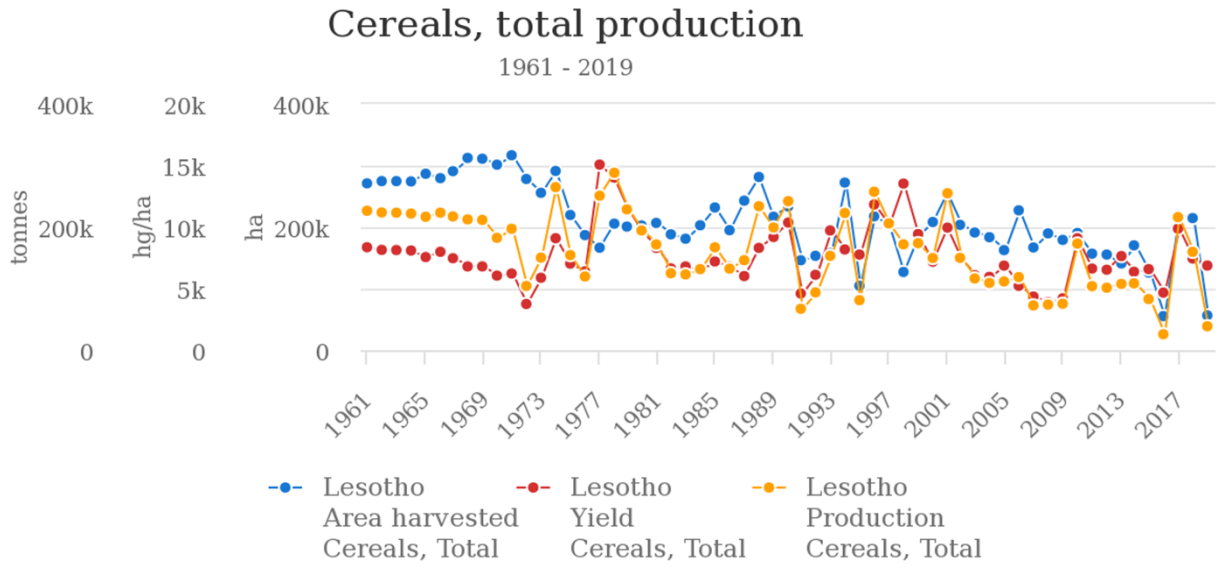
Productivity is generally low across cereal crops. Maize yields, for example, average only about three-quarters of a ton per hectare, which is significantly lower than the regional average of approximately 4.2 tons per hectare. Sorghum and bean yields are approximately a quarter of the regional average, while wheat fares slightly better at about a third of the regional average[23]. The mountainous terrain, challenging agro-climatic conditions, poor soils, economies of scale, and mechanization required for commercial grain cultivation in the region present challenges for Lesotho's competitiveness in cereal cultivation. Moreover, there has been a consistent decline in cereal crop production, area harvested, and yields across the major

[21] Government of Lesotho, Lesotho Review, Agriculture, lesothoreview.com/contents/agriculture
[22] IFAD (2020). Kingdom of Lesotho, Country Strategic Opportunities Programme, 2020-2025
[23] FAOSTAT, 2023

crops in Lesotho. Over time, the area harvested for cereal crops has dropped from 271,059 hectares in 1961 to 56,475 hectares in 2017, with yields falling from 8,362 hg/ha to 6,873 hg/ha, and production decreasing from 226,648 tons to 38,818 tons[24].

Maize production in Lesotho has experienced fluctuations over the past six decades, decreasing from 130,000 tons in 1961 to 70,000 tons in 2020. This inadequate production necessitates the importation of supplementary maize grain from other countries, primarily South Africa[25].

Figure 3. Trends in cereals production in Lesotho, 1961 – 2021 (Source: FAOSTAT, 2023)



2.1.2 Horticulture production in Lesotho

Among the crops produced in Lesotho, horticultural annual crops, such as potatoes and vegetables, exhibit relatively better performance, achieving yields slightly above half of the regional average. This is notable since most horticultural production is carried out in home gardens. Additionally, many households grow horticultural perennial tree crops, primarily peaches, mainly for their own consumption. Despite the favourable climate for deciduous fruits, there is limited production primarily for commercial purposes[26]. This inadequacy contrasts with the growing demand for vegetables, with consumption rising from a mere 15,000 tons in 1961 to 59,000 tons in 2018[27]. Several factors contribute to the gap between domestic supply and demand, including population growth, higher costs of domestically produced vegetables compared to imports, inconsistent quality, and a shift in consumption toward healthy and nutritious foods, particularly vegetables and fruits[28].

[24] FAOSTAT, 2023
[25] IFAD (2020). Kingdom of Lesotho, Country Strategic Opportunities Programme, 2020-2025
[26] FAO, Lesotho Country Programming Framework, 2013-2017
[27] FAOSTAT, 2023
[28] World Bank (2019). Kingdom of Lesotho, Agriculture Public Expenditure Review

2.1.3 Livestock production

At 52%, livestock production is the dominant contributor to agricultural GDP by value, followed by crops (28%) and – surprisingly, given the very small percentage of land under forests – forestry at 20%. In the early 2000s, when agriculture still contributed more than 6% of GDP, livestock production accounted for about for 4,8% of GDP and crops for about 1,9%[29].

Livestock, both small and large, play a vital role in ensuring food security, complementing annual crops, and, in some cases, for commercial purposes, especially in the mountainous and foothill regions. Cattle, horses, and donkeys additionally serve as essential transportation and draught power for crop production. Sheep and goats dominate the livestock herds, with recent numbers averaging approximately 1.3 million for sheep, 800,000 for goats, and 500,000 for cattle. Wool sales reached R192 million in 2012/13, with mohair grossing R29 million[30]. Lesotho stands as the second-largest mohair producer globally, following South Africa. Wool and mohair jointly account for about 95% of Lesotho's agricultural exports by value. A significant portion of these two products is exported in greasy form, along with skins, with limited value added domestically. Smallholder farmers rear nearly all sheep, goats, and cattle on extensive commonage rangeland, which is generally overstocked, estimated at between 40% and 80%. This has led to progressive land degradation, including soil erosion and nutrient depletion, resulting in low production and reproduction rates and limited yields. A substantial government program now concentrates on rangeland restoration and maintenance[31].

Cattle represent a crucial part of the country's livestock, but a significant portion of meat is informally slaughtered and consumed within the communities owning the animals. This pattern is also observed with pigs and poultry. Nonetheless, the World Bank's Smallholder Agricultural Development Project Phase II recognizes the potential value in small-scale piggeries and poultry production and supports these endeavors[32]. An in-depth study by the African Development Bank suggests that developing a competitive red meat industry would require substantial government support and a radical enhancement of rangeland management[33]. Interestingly, reports indicate that the Lesotho National Development Corporation is planning a large integrated piggery, presumably for marketing purposes, in collaboration with a South African firm. Dairy production is comparatively limited, with insufficient locally produced milk to support a sustainable local dairy industry. Imports from South Africa dominate the dairy market[34].

2.2 Seed System in Lesotho

In Lesotho, the seed system encompasses both formal and informal channels, with farmers relying on a mix of these systems to secure their seed needs. In the formal seed system, the majority of seeds are imported from neighbouring South Africa and distributed by local traders. Importantly, these imported seeds constitute more than 70% of the total seeds purchased within the country. The formal seed system

[29] IFAD (2020). Kingdom of Lesotho, Country Strategic Opportunities Programme, 2020-2025
[30] IFAD (2020). Kingdom of Lesotho, Country Strategic Opportunities Programme, 2020-2025
[31] Imani Development International Ltd (2021). Agricultural Finance Scoping: An Agriculture Finance Scoping Exercise in Lesotho
[32] World Bank (2023) Smallholder Agriculture Development Project - II
[33] African Development Bank (2019), Red Meat Production Feasibility Study in Lesotho – Detailed Feasibility Study Report and project Implementation Plan.
[34] Imani Development International Ltd (2021). Agricultural Finance Scoping: An Agriculture Finance Scoping Exercise in Lesotho

is primarily administered through the Government input subsidy program, although it has yet to attain the required standards. Many agro-input dealers distribute their products through this subsidy program. Furthermore, only a limited number of smallholder farmers engage in the production of certified seed on a small scale. Typically, smallholder farmers resort to selecting seeds from their previous harvests. However, endeavours aimed at enhancing local seed production face considerable challenges[35].

An effective seed system is one that adeptly combines both formal and informal channels to efficiently cater to farmers' needs for high-quality seeds of appropriate crop varieties. In Lesotho, the seed sub-sector is not well-established, and heavy reliance on seed imports has rendered seed accessibility a challenging issue, often coupled with high costs. Private sector involvement in this domain remains minimal, with just one private seed company registered for seed production within the country. The bulk of seed production is undertaken by individual farmers, roughly 70 smallholders, predominantly focusing on maize and beans while neglecting other crucial crops like sorghum and peas. A few farmers in the Maseru district are engaged in seed potato production[36].

According to the Food and Agriculture Organization (FAO) in 2016, sorghum and wheat seeds were relatively affordable, whereas maize and bean seeds were considerably expensive for the majority of households in Lesotho. Although there exists a Government input subsidy scheme, many farmers, particularly those with limited financial resources, do not participate in the program. Consequently, most farmers continue to rely on traditional seeds that have been passed down through generations. This, in turn, results in decreased productivity. Within the formal seed system, the range of available crop varieties is quite limited[37].

Concerning seed germination, a significant number of households reported that bean seeds exhibited good germination rates. This positive result could be attributed to the majority of bean seeds being sourced from formal market channels. However, for the seeds of other crops, including maize and beans, germination rates were perceived to be poor. Seeds obtained through seed aid programs generally exhibit good germination rates and are considered clean by the recipients. Moreover, a substantial proportion of households regard both their own saved seeds and seeds obtained from neighbours as clean. Unfortunately, the Government input subsidy program offers limited seed varieties from which farmers can make their selections[38].

2.3 Imports and Exports

Lesotho's agro-food trade balance is characterized by substantial disparities, with imports surpassing exports by more than tenfold. During the period spanning 2014 to 2016, the country's exports averaged a mere $36 million, whereas imports reached an average of approximately $385 million. It is estimated that roughly 80% of the food consumed in Lesotho is imported, with cereals comprising the largest share.

[35] FAO (2016). Seed Security Assessment – Lesotho. FAO, Rome
[36] CIAT, World Bank (2018). Climate-Smart Agriculture in Lesotho. CSA Country Profiles for Africa Series. International Center for Tropical Agriculture (CIAT)
[37] FAO (2016). Seed Security Assessment – Lesotho. FAO, Rome
[38] FAO (2016). Seed Security Assessment – Lesotho. FAO, Rome.

Even in years with favorable harvests, Lesotho can only meet about 30% (equivalent to 110,000 tons) of its annual cereal requirements, whereas the actual need stands at 360,000 tons[39].

According to FAO, wheat flour constituted Lesotho's largest export by value in the same period, contributing $12.5 million (43%). Following wheat flour, wool accounted for $9.8 million (27%), with maize and maize flour making up 13% and 17%, respectively, and dried fruit contributing 3%. In 2015, the Ministry of Agriculture and Food Security recorded exports of 5 million kilograms of wool and 600,000 kilograms of mohair, with a total value of $39.5 million[40]. Notably, none of these products are exported in their fresh form, a strategy that enables flexibility in addressing the numerous logistical challenges and delays associated with exports from Lesotho, especially in the agricultural sector.

When it comes to imports, maize and maize flour feature as the most substantial categories, amounting to 42% and 10% respectively. Wheat and wheat flour together constitute an additional 10% and 8%. Chicken and pork products make up only 7% of imports, with the remaining share encompassing various products in relatively small quantities[41]. It is important to note that beef and lamb can solely be imported in the form of live animals, rendering them exempt from classification as agri-food products. Nevertheless, it is estimated that Lesotho sources approximately 60% of its beef and lamb meat through live animal imports from South Africa[42].

Throughout the COVID-19 lockdown period, agricultural production in South Africa largely proceeded without major disruptions. Consequently, any food supply constraints in Lesotho were primarily linked to delays at border crossings. Wool and mohair exports may have encountered similar challenges, yet the majority of stockpile accumulation due to shipping constraints and lockdowns in China, a significant importer of these commodities, appeared to be concentrated at South African ports.

2.4 Food Value Chain Systems in Lesotho

In Lesotho, agricultural markets span a spectrum, ranging from small local markets where farmers directly sell to local consumers to globally integrated modern markets, where thousands of farmers supply millions of tons of produce to mass consumer markets, as seen in the wool and mohair sectors. These markets can be categorized as informal markets, farm gate markets, informal assembly markets, informal wholesale markets, informal retail markets, and formal markets, including more regulated platforms like Pick-n-

Pay and Shoprite, which deal in well-defined products[43].

Through a comprehensive evaluation of agricultural value chains in Lesotho, it becomes evident that these chains often appear fragmented and disjointed within the country, with many of them functioning in isolation. The primary drivers behind the weakened state of agricultural value chains in Lesotho include limited access to agro-inputs and livestock materials, excessive susceptibility to unpredictable weather

[39] IMF (2022). Kingdom of Lesotho: Selected Issues
[40] IBRD, World Bank (2019). Kingdom of Lesotho Agriculture Public Expenditure Review
[41] Ibid.
[42] IBRD, World Bank (2019). Kingdom of Lesotho Agriculture Public Expenditure Review
[43] IMF (2022). Kingdom of Lesotho: Selected Issues

patterns, overreliance on rainfall, inadequate irrigation resources, insufficient knowledge regarding high-value products, limited exposure to high-yield practices, fragile market linkages, and inefficient supply chain mechanisms.

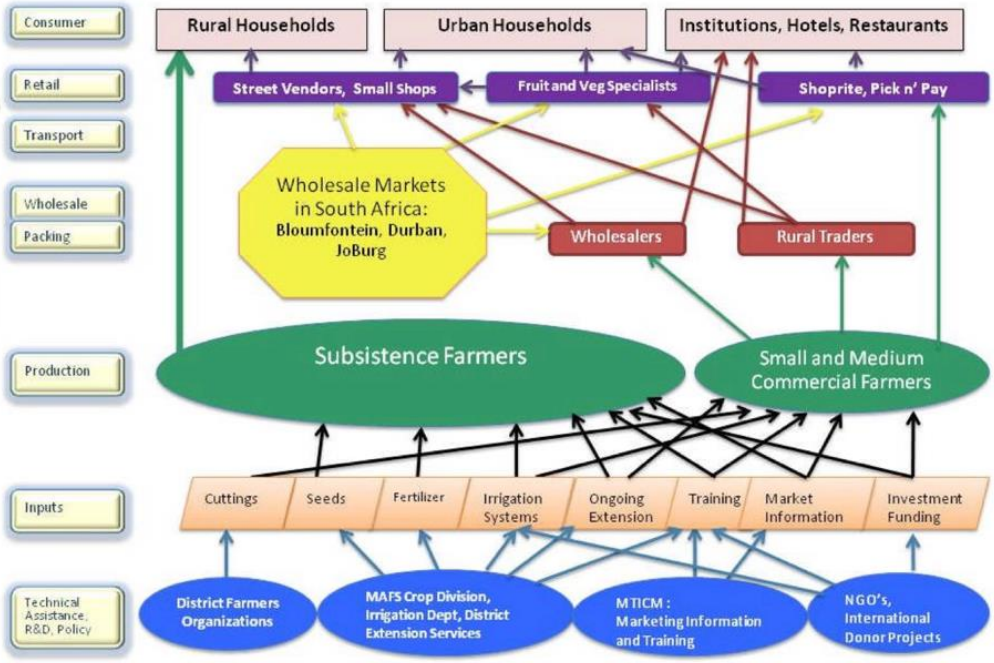
Zooming in on Value Chains: Fresh Fruits and Vegetables (FFV) Value Chain in Lesotho

Concerning Lesotho's horticulture value chain, approximately three-quarters of all horticultural products, including potatoes, are cultivated domestically—differentiating them from imports and distinguishing them as products grown locally rather than being store-bought. Nonetheless, as most domestically grown horticultural produce does not reach formal markets, the commercial horticulture value chain remains largely dominated by the import trade[44].

The schematic representation of Lesotho's horticulture value chain (Figure 4) reveals the primary stakeholders and processes responsible for bringing fruits and vegetables to consumers. In the current Lesotho value chain, the system is overwhelmingly controlled by importers and their distribution networks. They supply street vendors, small-scale retailers, institutions, and supermarkets. Local horticultural production primarily caters to subsistence farmers and urban gardeners, with limited emphasis on commercial production[45].

[44] IMF (2022). Kingdom of Lesotho: Selected Issues
[45] FAO (2013). Lesotho Country Programming Framework 2013 - 2017

Figure 4. Lesotho Horticulture Value Chain Source: FAO, 2016



2.5 Financial Services

Following the collapse of the Lesotho Agricultural Development Bank and its extensive rural branch network, the role of providing financial services to low-income households in rural and peri-urban areas has been taken up by micro-lenders such as cooperative societies and other non-formal financial institutions. However, access to farmer credit remains a challenging issue within Lesotho's agricultural sector. Several initiatives are currently in progress to address rural finance matters[46]. The Rural Financial Intermediation Programme by IFAD is assisting the Lesotho Postal Bank in serving farmers and supporting member-based financial organizations, financial cooperatives, and savings and credit groups. Furthermore, various NGO programs are actively promoting savings and credit groups in rural areas.

2.6 Agricultural Extension Services

The Ministry of Agriculture and Food Security (MAFS) of Lesotho operates an extension service that covers all districts in Lesotho. While the primary focus has traditionally been on cereal and livestock production, efforts are increasingly directed towards horticulture. A critical component of extension and training support is provided by the sixty-seven Agricultural Resource Centers (ARC) spread across Lesotho. These centers offer technical assistance and serve as a gateway for farmers to convey their concerns to experts. Additional platforms include periodic farm visits and annual agricultural exhibitions[47].

The Ministry of Trade and Industry, Cooperatives, and Marketing (MTICM) provides weekly market information. However, the price data mainly pertains to imported vegetables, which might be misleading

[46] IFAD (2016) Kingdom of Lesotho Rural Financial Intermediation Programme.
[47] Ministry of Agriculture, Food Security and Nutrition (2023), stakeholder consultation

for commercial producers and irrelevant for subsistence farmers. Recent initiatives by MTICM and MAFS have aimed at promoting business skill training for farmers. The Food and Agriculture Organization (FAO) is actively engaged in delivering international guidance and training to government officials and extension staff as part of capacity-building programs. It is worth noting that the impacts of these business "trainings for trainers" are yet to be fully realized among active farmers[48].

2.7 Wholesale

The wholesale horticultural trade in Lesotho, responsible for supplying products to retailers, is predominantly controlled by importers, with the majority of produce being imported from South Africa. In the commercial landscape, it is estimated that imports constitute 80% or more of the value of horticultural products. Many of these imports are items that may not be commercially viable for local production, including tropical products brought in through South Africa from other countries, such as bananas. Notably, cabbage, which is also cultivated on a large scale in Lesotho, ranks as the most substantial import[49].

Three primary types of wholesale importers operate in the country. These include supermarket chain distributors like ShopRite and Pick n' Pay, specialists in fresh fruits and vegetables (FFV), such as Fruit and Veg City in Maseru, and a few additional FFV specialists in regions like Leribe, Berea, and Mafeteng. Additionally, traders engage in procuring produce from South Africa and resell it in cartons and large bags to street vendors and other consumers[50].

2.8 Marketing

A significant proportion of FFV farmers in Lesotho prefer selling their produce to street vendors and at informal community markets, as these avenues often offer more favourable prices compared to formal buyers. Notably, Lesotho lacks packing houses, aggregators, or agro-processing facilities in any of its crop value chains, with the exception of Lesotho Flour Mills, which largely imports raw materials from South Africa[51].

2.9 Food Security and Nutrition

Lesotho's status as a major net deficit food producer at the national level underscores its significant food insecurity. Government interventions, particularly the considerable subsidies for annual crop farming inputs, aim to reduce the country's reliance on food imports. These subsidies absorb a large portion of public agricultural expenditure.

Despite its trade deficit in food products, Lesotho's currency, the Maloti, is pegged to the South African Rand, meaning the trade balance has no direct influence on exchange rates. Given that the private sector pays for almost all food imports, public sector programs designed to stimulate economic growth and generate employment appear more suitable for enhancing national food security, especially when public

[48] Ibid.
[49] IMF (2022). Kingdom of Lesotho: Selected Issues
[50] Ibid.
[51] Ministry of Agriculture, Food Security and Nutrition (2023), stakeholder consultation

funds are scarce[52]. It is worth noting that these interventions often benefit individual farmers, particularly those with larger land holdings.

Food insecurity is most significant at the household level due to its adverse effects on health and, consequently, individual and national economic growth. In 2017, nearly half of the population (49.7%) lived in poverty, with an additional 25% at risk of falling into poverty. Of those classified as poor, more than 60% reside in rural areas, with the Senqu River valley particularly affected[53].

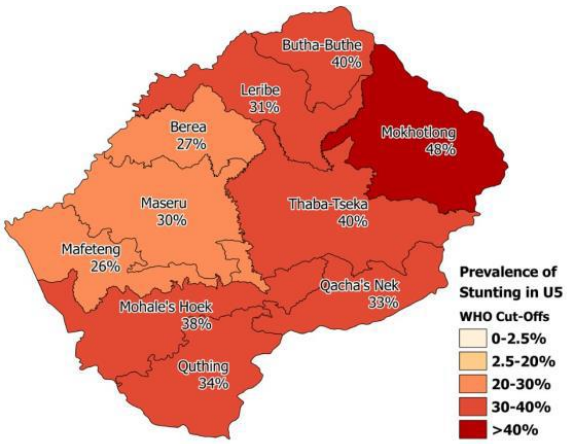
Meeting nutrient requirements costs a household approximately LSL 71 per day, which is nearly four times the cost of meeting energy requirements (LSL 18). A nutritious diet in Lesotho necessitates access to up to eight food groups, including dairy, leafy greens, fruits, eggs, meat, fish, and pulses. Food prices vary across the country, with the lowlands and foothills having relatively lower prices compared to the more expensive mountainous regions. Rural areas are typically 10% or more expensive than urban areas[54].

Malnutrition is widespread in Lesotho, with little progress made in addressing undernutrition and the emergence of overnutrition as a significant concern. This double burden hampers the country's social and economic development and is estimated to cost the economy $200 million annually. Approximately 33% of children under five are stunted, with a high overall prevalence according to World Health Organization (WHO) standards. Overweight and obesity rates among adult women have sharply increased over the past two decades, contributing to significant public health challenges[55].

Lesotho faces challenges including high stunting rates in children, micronutrient deficiencies in different age groups, overweight and obesity in certain population segments, and a growing incidence of diet-related non-communicable diseases (NCDs). These issues strain the health budget and impact public health significantly. Malnutrition results in an annual economic loss of USD 200 million, equivalent to over 7% of the country's GDP. More than half of Lesotho's population cannot afford a healthy, nutritious diet, and nearly one in ten households cannot even meet energy requirements[56].

Figure 5: Prevalence of Stunting Source: WFP, 2019

[52] World Bank (2019). Kingdom of Lesotho Agriculture Public Expenditure Review
[53] Food Nutrition Coordinating Office (2019). Lesotho Food and Nutrition Strategy and Costed Action plan.
[54] Ibid.
[55] WFP (2022). Lesotho Annual Country Report 2022
[56] Ibid.



Poor dietary diversity is a major concern in Lesotho. Only 20% of households with adequate overall food intake report having sufficiently diverse diets. Moreover, merely 11% of children aged 6 to 59 months meet this criterion. Staple cereals dominate most household diets, with fresh fruit and vegetable consumption falling far below the World Health Organization's daily recommendations. While poverty is a significant factor, limited local availability and a lack of awareness regarding good dietary practices also play vital roles. Lesotho has nearly 40% of its economically active population employed in agriculture, even though the sector contributes just 4% to the GDP57. To address this imbalance, government and donor interventions must focus on enhancing productivity and crop diversity while promoting sustainable community benefits. This can be achieved through investments in public infrastructure, research and extension services, financial support, and resource conservation.

2.10 Key challenges for the food system

Lesotho's agriculture faces persistent challenges, which are well-documented and of long-standing nature. In summary, the predominant farming model is smallholder farming, except for a few regions with arable potential. This involves cultivating staple crops on small plots, typically around 1 hectare. Maize is the primary crop, primarily grown for personal consumption, occasionally for sale, and often accompanied by small or large livestock for subsistence or occasional cash sales. In areas with limited arable land, communal pastoral production prevails, focusing on sheep and goats for wool, mohair, and occasional slaughter for personal consumption or cash income[58].

Low Productivity in Crop Production: Crop production in Lesotho suffers from low productivity and limited marketed surpluses due to various constraints. These challenges include an inability to benefit from economies of scale, significant areas of fallow land, partially due to land tenure insecurity. Other factors are the limited use of mechanical technology, deficient management practices, inadequate technical skills, and limited extension and research services. Additionally, there's restricted use of modern agricultural inputs such as hybrid seeds, fertilizers, and pesticides, soil nutrient depletion, poor public infrastructure, and related services. Moreover, poor access to markets and financial services, especially

[57] WFP (2019). Fill the nutrition Gap Lesotho – Summary Report
[58] Ministry of Agriculture, Food Security and Nutrition (2023), stakeholder consultation

credit, further exacerbates the situation[59]. These challenges have been amplified by climate volatility, the impact of HIV/AIDS, the COVID-19 pandemic, and institutional marketing issues, particularly in the wool sector.

Value Chain and Infrastructure Challenges: Challenges are particularly pronounced in the horticulture sector, where the potential lies in higher, more remote areas. Apart from the capital, expertise, and management requirements for producing fruits and vegetables for high-value export markets, logistical issues arise due to the distance from markets and inadequate road quality. This makes it challenging to compete both in terms of price and quality with South Africa's well-established horticultural sector. Previous efforts, with donor support, have made limited progress in this regard, with most successes seen in larger-scale private enterprises. Upcoming initiatives under the World Bank's programs offer new opportunities for success but must confront similar challenges.

Climate Change and Disaster Risks: Recent climate trends in Lesotho indicate rising temperatures, resulting in more frequent and severe climate-related events. These warming temperatures affect both daytime and nighttime conditions, which has implications for crop production. Changes in temperature and precipitation patterns have led to shifts in planting times and crop maturity, potentially resulting in reduced yields[60].

Climate change poses substantial challenges to Lesotho's food production system, especially because of its reliance on rain-fed agriculture, coupled with limited resources and adaptive capacity. This makes rural communities highly susceptible to extreme weather events like droughts, heavy rainfall, and hailstorms. These climate-induced challenges contribute to declining agricultural outputs, reduced economic productivity, increased poverty, and food insecurity, particularly among smallholder farmers.

Projections for the near and long term indicate a likelihood of decreased precipitation, which could impact planting schedules and crop yields. The dry conditions during autumn, in particular, pose a high risk to crop maturity as critical growth stages demand substantial water. Moreover, climate change impacts crop physiology by accelerating plant development due to higher temperatures, potentially leading to reduced yields in some crops[61].

3. Food Systems at Peril – Climate and Disaster Risk in Lesotho

3.1 Climate profile of Lesotho

3.1.1 Lesotho's Unique Climate

Lesotho's climate is characterized as temperate with alpine features, experiencing hot summers and relatively cold winters. The country's geographical position at high elevations results in significantly lower temperatures compared to neighbouring regions at similar latitudes. Lesotho observes four distinct seasons, each marked by wide-ranging temperature fluctuations and erratic rainfall patterns. Its location exposes the country to the influences of both the Indian and the Atlantic Oceans, with wide differences

[59] Imani Development International Ltd (2021). Agricultural Finance Scoping: An Agriculture Finance Scoping Exercise in Lesotho
[60] Government of Lesotho (2019), Lesotho Review – Agriculture
[61] World Bank (2019), Climate-Smart Agriculture in Lesotho

in temperature. The temperature in Lesotho exhibits high variability on a daily, monthly, and yearly level, typically fluctuating between 10°C and 30°C. The annual precipitation in Lesotho varies both temporally and spatially, ranging from 500 millimeters (mm) to 760 mm. Summer thunderstorms can bring high winds of up to 20 meters per second, further complicating the climatic conditions[62].

3.1.2 Fragile Ecosystems

Lesotho's ecosystem fragility is a consequence of its mountainous terrain, rainfall patterns, erodible soils, and land use practices. The country's landscape is characterized by sharp terrains with elevations that range from 1,460 meters above sea level in the western regions to as high as 3,400 meters in the north-eastern areas. Rainfall patterns are erratic, typically commencing in early spring with heavy, short-duration downpours and hailstorms, which can lead to soil movements and soil erosion. These typically last from November through March. Winters are mostly dry with no active vegetative growth, and therefore favourable conditions for erosive early spring rains. The soil types in Lesotho are derived from sandstone in the lowlands and basalt in the mountains, with the sandstone-derived soils being highly erodible. Lesotho boasts world-renowned high-altitude wetland habitats, which serve as crucial sources of water for southern Africa and forage resources for livestock.

Lesotho's high aridity and recurring droughts exacerbate the loss of biological diversity, rangeland deterioration, and diminished agricultural and livestock productivity due to desertification. Over recent years, significant reductions have been observed in the productivity of major crops and livestock due to adverse land and rangeland conditions. Lesotho's high evaporation rate and the near absence of permanent surface water sources in large parts of the country make water a scarce resource. Projections suggest that even without the impacts of climate change, water resources will face significant reduction. The primary challenges include water resource availability, shifting precipitation patterns, and increasing population demands. The climatic and socio-economic conditions in semi-arid areas of Lesotho render communities vulnerable to food insecurity, unstable livelihoods, unsustainable agroecological systems, crop failures, and unproductive rangelands.

3.1.4 Key Climate Trends

Lesotho has witnessed significant temperature variations over the years. While temperatures fluctuate annually, an overall warming trend has been evident since the 1960s. Mean annual temperatures in Lesotho have risen by approximately 0.76°C since 1960, with an average rate of increase of 0.20°C per decade. This warming trend has been particularly notable between 1970 and 2005, with minimum temperatures increasing more rapidly than maximum temperatures, with the most rapid warming occurring in the early 1980s[63]. The highland areas of Lesotho experience frost, snow, and hailstorms, which can effectively isolate the rural highland population by cutting them off from essential services.[64]

3.1.5 Key Trends in Precipitation

[62] World Bank (2021). Lesotho Climate Risk Country Profile
[63] World Bank (2021). Lesotho Climate Risk Country Profile
[64] Letsie & Grab (2015)

Lesotho has experienced significant changes in precipitation patterns over the years. Annual rainfall trends in the country have shown a decrease. While annual precipitation trends across southern Africa are generally weak, Lesotho has exhibited a reduction in annual precipitation. These changes are most noticeable in the summer season, which has witnessed a progressive increase in winter season precipitation (June to August), accompanied by a decrease in summer season precipitation in some regions. Consequently, traditional perennial springs have dried up, major rivers have experienced reduced flows, and many dams remain dry for most of the year[65]. Subsistence farming, which plays a critical role in rural areas, has been on a steady decline due to recurring droughts, leading to a substantial reduction in the production of key staples such as maize and livestock farming[66].

3.2 Natural Hazards & Disaster Risk

Lesotho is highly susceptible to a range of natural hazards, including droughts, floods, storms, snowfalls, hailstorms, strong winds, and early frosts. Among these hazards, drought stands out as the most frequent and impactful in terms of affecting the population and the wider economy. While drought conditions are generally a common phenomenon of the climate in Southern Africa, Lesotho has experienced increasingly frequent occurrences of drought in recent years. Data from the Emergency Events Database (EM-DAT) of the Centre for Research on the Epidemiology of Disasters (CRED) reveals that severe droughts have occurred in Lesotho in various years, including 1991/92, 2001/02, 2006/07, 2011/12, and 2015/17, each of which affected an average of approximately 603,000 people[67]. Lesotho's recent history bears the scars of a severe drought that spanned from 2015 to 2017, largely attributed to El Niño events affecting Southern Africa. This drought sent shockwaves through the nation's food security, necessitating international food assistance from global donors[68].

Climate change is expected to exacerbate the frequency and severity of weather-related disasters in Lesotho. An analysis of past precipitation and temperature trends indicates a decrease in precipitation and an increase in temperature over the period from 1981 to 2012[69]. Climate projections suggest that temperatures in Lesotho are likely to increase by an average of 2°C by 2050 and by as much as 2.4°C by 2070. The most significant temperature increase is projected for the lowlands along the northwestern border of the country, which is also the most drought-prone area in Lesotho[70].

Agriculture and livestock, alongside the water, tourism, and health sectors, stand as primary areas profoundly impacted by changing climatic conditions. The ramifications of extreme rainfall events reverberate through both public and private infrastructure, causing the need for substantial and often costly repairs. These events lead to road closures, cutting off access to electricity, and sometimes culminate in the catastrophic failure of sewage and stormwater systems. Concurrently, rising temperatures exert their influence on infrastructure sensitive to temperature extremes, particularly

[65] Red Cross Climate Centre (2021)
[66] Verschuur, J. et al. (2021)
[67] EM-DAT CRED (2023)
[68] UN OCHA (2017)
[69] World Bank (2019b)
[70] World Bank (2021). Lesotho Climate Risk Country Profile

roads. The changing patterns of rainfall and temperature exert significant pressure on agriculture and food security[71]. Extreme weather events have far-reaching implications on the tourism industry, and the livelihoods dependent on this sector bear the brunt of such upheavals. Tragically, these climatic events also result in human and livestock casualties, property damage, and crop losses[72].

Lesotho's mountainous regions, constituting a significant portion of the country, are particularly vulnerable to these natural hazards. Over 70% of the nation's population resides in these remote and ecologically fragile mountainous terrains. The importance of this topography is strikingly evident during the unprecedented rains, floods, and rock slides witnessed during December 2010 and January 2011. These calamities left a trail of destruction in their wake, decimating crops, livestock, and property. The economic toll was severe, with impacts reverberating through vital sectors such as agriculture, transport, health, and education. The total losses and damages were staggering, accounting for an estimated 3.2% of the country's GDP. The roads sector, livestock, education, and housing suffered the heaviest blow in terms of damages. The production losses were most acute in the crop, road transport, and commerce sectors[73].

These extreme rainfall events have far-reaching ecological consequences as well. They induce soil erosion, land degradation, the loss of ecosystems and their services, invasive species encroachment, salinization of groundwater, and contamination of flood trails with pesticides and fertilizers. Notably, more than 90% of the disasters that afflict Lesotho are linked to climate variability and change, encompassing drought, snowfall, hailstorms, strong winds, localized floods, early frosts, and pest infestations[74]. Recent episodes of hailstorms, heavy rains, and flash floods have caused significant harm to various aspects of life in Lesotho, impacting homes, vehicles, roads, schools, health facilities, and key crops like maize, beans, and sorghum[75].

3.3 Resilience Challenges in Lesotho

Lesotho stands at the forefront of climate vulnerability, with its water, agriculture, and health sectors in the crosshairs of climate variability and change. In the quest for resilience, Lesotho has conducted evaluations for a number of sectors regarding vulnerability and adaptation to climate change. These sectors span agriculture, soils, and land degradation, forestry, water resources, livestock and rangelands, culture, and health. As climate patterns shift, the repercussions are adversely felt, particularly within the agricultural domain, more pronouncedly in the Lowlands, Foothills, and the Senqu Valley—the country's most densely populated and agriculturally active regions. Rising temperatures and dwindling precipitation threaten to significantly curtail crop yields, creating multifaceted challenges that span agriculture, livelihoods, and food security. Moreover, environmental degradation, compromised water resources, and the erosion of biodiversity present formidable obstacles to Lesotho's ongoing development and poverty

[71] IMF (2022). Addressing Lesotho's Climate and Environmental Challenges

[72] World Bank (2021). Lesotho Systematic Country Diagnostic Update: Bridging Implementation Gaps To Accelerate Development

[73] World Bank (2021). Lesotho Climate Risk Country Profile

[74] World Bank (2021). Lesotho Climate Risk Country Profile

[75] Lesotho Ministry of Agriculture and Food Security (2023), Stakeholder consultation

alleviation efforts, emphasizing the critical importance of sustainable adaptation and resilience measures[76].

Lesotho's most vulnerable sectors concerning climate variability and change encompass water, agriculture, forestry, human health, and livestock. As intense precipitation events become more frequent, the risks of flooding, riverbank overflow, and flash flooding surge. These events also escalate the risk of soil erosion and waterlogging in crops, with a potential reduction in yields that could heighten food insecurity, especially for subsistence-scale farmers. Escalating temperatures exacerbate aridity, precipitating stress on livestock and diminishing crop productivity, thereby impacting economic and food security. The ominous specter of land degradation and soil erosion, exacerbated by recurring floods and droughts, further imperils agricultural production and the well-being of rural communities. Small-scale rural farmers are particularly susceptible to the impacts of disasters like floods and dry periods, given their limited resources to bolster their adaptive capacities[77].

The increasing temperatures bring forth a looming disaster risk that is poised to (i) intensify existing tensions between the demands of agriculture, livestock, and human populations for water, particularly during the dry season, (ii) alter the quality of available water from surface water and groundwater, and (iii) heighten the pressures on urban areas due to expanding urbanization. Shifting rainfall patterns are expected to play a pivotal role in agricultural production and harvest seasons, with delayed onsets likely to impede crop productivity and compromise livestock health. Droughts, consistent drivers of food insecurity, are poised to continue wreaking havoc, with increased aridity and drought causing crop damage, depletion of pastures and water sources, loss of livestock, hunger, disease outbreaks, asset erosion, malnutrition, and migration. The heightened temperatures and increased aridity also elevate the risk of wildfires[78].

These high levels of exposure and vulnerability to natural disasters pose a further fiscal risk and have the potential to disrupt Lesotho's development trajectory. Notably, data on the cost of disaster response are not systematically recorded in Lesotho, but records are available for two disasters: the El Niño-induced drought in 2015/17 and the floods in 2010/11. The resources required to respond to these calamities were estimated at approximately US$38 million (M 584 million) and US$67 million (M 462.7 million), respectively. These figures translate to around 1.7% and 3.2% of the country's GDP during the applicable years[79]. Notably, the Lesotho Poverty Assessment from the World Bank revealed that the El Niño-induced drought had a significant impact on poverty reduction. Without this shock, it is estimated that poverty in Lesotho would have decreased at twice the pace over the past 15 years[80].

3.4 Climate Change Impacts on Agriculture

The projected consequences of climate change on food production, agricultural livelihoods, and food security in Lesotho are of utmost concern at the national level. Among the most vulnerable to these shifts

[76] Lesotho Ministry of Agriculture and Food Security (2023) & Lesotho Disaster Management Authority, Stakeholder consultation
[77] Lesotho Ministry of Agriculture and Food Security (2023) & Lesotho Disaster Management Authority, Stakeholder consultation
[78] Lesotho Ministry of Agriculture and Food Security (2023) & Lesotho Disaster Management Authority, Stakeholder consultation
[79] IMF (2022). Addressing Lesotho's Climate and Environmental Challenges
[80] IBRD, World Bank. (2019). Lesotho Poverty Assessment: Progress and Challenges in Reducing Poverty

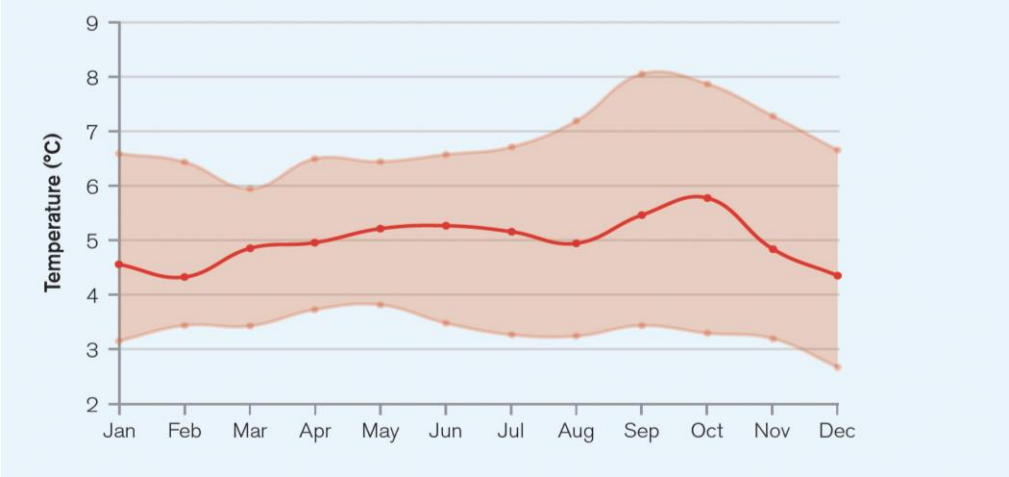
are subsistence dry-land farmers, while commercial farmers are relatively less affected. The ramifications for food production and food security are intricately linked to the anticipated constraints on water supply and the rising temperatures[81]. Projections indicate that changes in precipitation and temperature in the northern regions of Lesotho from September to May can enhance yields for crops like maize, sorghum, and wheat. However, this shift might unfavourably affect the growth of crops such as beans and gourds due to the combination of high temperature and high humidity. Fungal diseases may become more prevalent as a result of these conditions, offsetting the gains made from increased rainfall and temperature[82]. The reduction in precipitation during July and August, which commenced in 2010 and is expected to persist through the century, will diminish soil moisture reserves and hinder the growth of winter crops, particularly wheat. Southern parts of Lesotho are poised to bear the brunt of these adverse effects on crop yields and productivity, with increased temperatures and extended growing seasons causing stress on crops and potential shifts in the timing of the growing period[83].

Reduced water availability is projected to lead to yield losses, and decreased soil moisture could redefine suitable agricultural areas and affect the production of specific crops. The combination of elevated temperatures and water scarcity conditions is anticipated to increase evapotranspiration, further contributing to crop failures and overall yield reductions. The heightened risk of droughts and prolonged dry spells will continue to exacerbate soil erosion and land degradation. Rising temperatures may alter the prevalence of agricultural pests and heighten the risk of wildfires. Furthermore, more frequent and intense extreme events may lead to changes in species composition and alter crucial ecosystem services, including soil water regulation, base flows, and filtration[84].

Figure 6 illustrates the anticipated changes in average daily maximum temperatures across the seasonal cycle. These temperature variations are crucial for agriculture and livestock as extreme heat can damage plants, impact livestock health, and affect farm workers. Different crops have specific temperature requirements for optimal growth and yield, with high temperatures above crop-specific thresholds leading to rapid yield reductions. Lesotho expects an increase in maximum temperatures throughout the year[85].

[81] Lesotho Ministry of Agriculture and Food Security (2023), Stakeholder consultation
[82] Government of Lesotho (2019), Lesotho Review – Agriculture
[83] Verschuur, J. et al. (2021)
[84] World Bank (2021). Lesotho Climate Risk Country Profile.
[85] Ibid.

Figure 6. Projected change in average daily-max temperatures (RCP8.5, Reference Period 1986-2005) (Source: World Bank, 2021)



3.5 Climate Change Impacts on the Water Sector

Climate change is expected to alter patterns in precipitation and temperature, significantly affecting the water sector in Lesotho. The number of frost days in the country is projected to decrease, and the growing season is expected to lengthen, potentially creating opportunities for new crops, especially in the highlands. While the gradual warming is likely to enhance the productivity of most crops and livestock during the winter, it may also alter water demand for agricultural producers. Certain crops, like sorghum, which depend on sufficient soil moisture during early growth, may be adversely impacted as increasing temperatures reduce available soil moisture. Changes in precipitation patterns and evapotranspiration could intensify soil erosion, particularly in areas with erodible soils[86].

Alterations in evapotranspiration will impact the water balance, including runoff, soil moisture, water reservoirs, and the salinization of shallow aquifers. Changes in streamflow, dams, and wetlands capacity hinge on variations in the volume and timing of precipitation. Reduced precipitation during winter and summer is likely to result in hydrological drought, directly affecting water supply and sanitation. Water quality and availability will present major challenges for Lesotho. Variable rainfall patterns are expected to increase the incidence of droughts, floods, and waterborne diseases, further exacerbating water-related issues. Transboundary river basins, unevenly distributed water resources, and infrastructure developments aimed at safeguarding water supplies pose significant challenges for the region. Increased temperatures may decrease water availability, affecting streamflow and potentially compromising irrigation potential[87].

Rainfall and evaporation changes will also impact surface water infiltration rates and groundwater recharge, potentially reducing the reliability of unimproved groundwater and surface water sources. This

[86] World Bank (2021). Lesotho Climate Risk Country Profile.
[87] Ibid.

will put pressure on pump mechanisms and potentially lower water levels near wells and boreholes, particularly in high-demand areas[88].

4. Policy and Institutional Frameworks around Resilient Agri-Food Systems

The public institutional infrastructure governing both agriculture as well as climate adaptation, disaster risk reduction and resilience has a wide span and coverage in Lesotho. Yet, an in-depth stakeholder consultation process with key national stakeholders revealed that while the right institutional frameworks and policy documents are in place, all too often implementation lags behind and needs to be strengthened. Furthermore, policy and programme analytical work, including monitoring and evaluation, are facing data and capacity challenges that affect quality and effectiveness.

A list of public institutions governing and serving agricultural value chains in Lesotho is presented in Table 1 below. Each of these ministries is responsible for designing, enacting in the instance of legislation, and implementing laws, regulations and policies that govern the structure and functioning of agricultural value chains in Lesotho.

Table 1. Public institutions governing agricultural value chains in Lesotho

Ministry	Department	Public Entities
Agriculture and Food Security	• Crop Services • Livestock Services • Field Services • Agricultural Research • Planning and Policy Analysis	• Food and Nutrition Coordinating Office • Lesotho Agricultural College • Farmers' Training Centres • Lesotho National Dairy Board • National Agricultural Research Systems
Forestry, Range and Soil Conservation	• Soil and Water Conservation • Forestry • Rangeland Resources Management	• Lesotho Soil Information System
Water Affairs	• Water Affairs • Rural Water Supply	• Water Commission • Lesotho Lowlands Water Supply Scheme Unit
Energy and Meteorology	• Energy • Meteorology	• Lesotho Meteorological Services
Finance	• Budget • Economic Policy • Private Sector Development	• Central Bank of Lesotho (independent) • Lesotho Post Bank (independent)
Trade, Industry, Cooperatives and Marketing	• Livestock Products Marketing Services • Standards and Quality Assurance	• Lesotho National Development Corporation • Basotho Enterprise Development Corporation • (both corporations offer development finance services)

[88] World Bank (2021). Lesotho Climate Risk Country Profile.

4.1 Institutional Mandates for Adaptation

Lesotho's Ministry of Energy, Meteorology and Water Affairs (MEMWA), under the Department of Meteorology is responsible for the country's climate change strategies. MEMWA also serves as the national climate change focal point, tasked with ensuring the full implementation of the strategies and measures for curbing the adverse impacts of climate change and variability for all sectors, and to promote sustainable economic growth and development. Lesotho is also actively coordinating its climate change policies and strategies with stakeholders in the public and private sector organizations, including Non-Governmental Organizations (NGOs), civil society, the donor community, and local communities. The Lesotho Meteorological Service is responsible for the regular collection, processing, formatting, and management of data relating to weather, climate and climate change for the Government. It supports reporting on climate change to the UNFCCC and for managing applications for carbon trading through the Clean Development Mechanism respectively[89].

4.2 Policy Frameworks Guiding Climate Adaptation, DRR and Resilience

Lesotho submitted its Third National Communication to the UNFCCC in 2021[90] and its Nationally Determined Contributions to the UNFCCC in 2017[91]. These documents, in conjunction with the country's National Climate Change Strategy (2017)[92] provide the guidance and platform to integrate responsible environmental management with climate change adaptation strategies and economic development priorities. Other key documents such as Lesotho's National Vision 2020 and its Poverty Reduction Strategy Paper, National Strategic Development Plan, and the National Adaptation Program of Action all provide additional guidance in coordination with the development agendas and actions. Lesotho is focused on the preparation and strengthening of institutional frameworks for improved management of climate change impacts and to make available the necessary resources to support strategic adaptation activities and reduce the country's vulnerability.

The National Strategic Development Plan (NSDP II) (2018/19 - 2022/23) states that the country is experiencing a triple burden of malnutrition: under and over nutrition, and micronutrient deficiency, across all age groups. Stunting or chronic malnutrition level is high at 34.5% among children under the age of five years while the prevalence of obesity is 6.6% and overweight is 11%. The underlying factors include poverty, natural and man-made disasters, low consumer demand and purchasing power for nutritious food, and undiversified and low agricultural productivity[93].

The Government has shown commitment to food security and nutrition with the agriculture sector as one of the key priority sectors in NSDP II. The plan outlines the development of local food systems, agricultural value chains, and supplier development systems, to create opportunities for women, youth and other groups to aid national efforts to improve livelihoods and create jobs for smallholders or small-scale producers. However, due to limited production capacity, overdependence on rain-fed agriculture, market

[89] Lesotho Meteorological Service (2023), Stakeholder consultation
[90] LMS, 2021. The Kingdom of Lesotho's Third National Communication on Climate Change. Lesotho Meteorological Services.
[91] LMS, 2017. Lesotho's Nationally Determined Contribution to the UNFCCC. Ministry of Energy and Meteorology, Lesotho
[92] LMS 2017. Lesotho's National Climate Change Policy. Ministry of Energy and Meteorology, Lesotho.
[93] Government of Lesotho (2018) National Strategic Development Plan (NSDP II) (2018/19 - 2022/23).

underdevelopment, and low investments in the sector, the operations are at a small scale, with many at subsistence and smallholder farmer level. As a result, there is limited capacity in the sector to scale production and mitigate rising food prices.

The Government of Lesotho recognizes the importance of resilient livelihoods as a crucial first line of defense against disasters and stressors as well as a necessary condition for sustainable development. Furthermore, the Government realizes that there is a need to mainstream disaster risk reduction and/ or resilience in order for Lesotho to achieve sustainable development goals, in particular, SDG 1 and 2.

In the Lesotho National Resilience Strategic Framework (NRSF), the government of Lesotho recognizes the critical role of resilient livelihoods in addressing disasters, stressors, and sustainable development. The NRSF is designed to guide and coordinate resilience-building efforts, emphasizing the need to mainstream disaster risk reduction and resilience into sustainable development goals. The framework complements existing national plans, policies, and legislation related to resilience and offers a platform for harmonizing all resilience strategies and programs[94].

Moreover, the framework acknowledges the impact of natural hazards, especially drought, on food security, compounded by underlying risk factors such as poverty, high inequality, environmental degradation, HIV and AIDS, and unemployment.

The country has traditionally responded to vulnerability through humanitarian appeals and strategies focused on saving lives without restoring livelihoods. However, these responses have been fragmented and poorly coordinated, resulting in limited impact. The NRSF seeks to address this by promoting integrated planning and targeted assistance. The framework's objectives are to prevent, mitigate, and help communities recover from shocks, reduce vulnerability, and address underlying structural issues.

To achieve its objectives, the NRSF aligns with Lesotho's vision and national development plans, emphasizing principles like multi-stakeholder risk analysis, holistic programming, social capital and protection, and building national and local capacity. It also discusses targeting methods to ensure equitable assistance to the most vulnerable.

The NRSF is structured around 11 resilience pillars and outlines intervention areas to strengthen capacity. It provides tools and approaches for operationalization, including assessments, planning, and measuring resilience. As such, it introduces a conceptual framework that combines livelihoods, disaster risk reduction, and climate change approaches to address vulnerability. It identifies four key capacities (preparedness, absorptive, adaptive, and transformational) needed at different levels (individual, household, institutional, and community).

The framework further underscores the importance of governance structures at the national and local levels, emphasizing government leadership and ownership for its successful implementation.

[94] Government of Lesotho. (2019). Lesotho National Strategic Resilience Framework (2019-2030). Lesotho.

Table 2: Key development policy frameworks in Lesotho covering agri-food systems and resilience

Focus	Content
Economy-wide growth and development	• National Strategic Development Plan 2018/19-2022/23 (NSDP II): o Theme: Employment and Inclusive Growth: In Pursuit of Economic and Institutional Transformation for Private Sector-Led Jobs and Inclusive Growth o Emphasis on building commercial and climate resilient agriculture o Three main areas for strategic action: sustainable commercialization and diversification of agriculture; a well-functioning agri-food system; rehabilitation of rangelands and wetlands o Priorities for action include: improving technology and infrastructure, especially through irrigation and climate-smart agriculture; increasing the output of high-value crop and livestock products; developing institutional frameworks for producer and value chain organizations; building the capacity of farmers to benefit from these organizations; developing value chains and markets o outlines two key objectives for agriculture development: 1) to ensure sustainable commercial agriculture while remaining cognizant of climate change impacts, environmental degradation and disasters; 2) to increase agriculture production and its commercialization, scaling up management of range, water sheds, protection of the environment and biodiversity, and reversing alarming environmental degradation that has aggravated the food insecurity situation. • District Economic Strategies (DES): o Bottom-up approach to economic development o Grounded in districts' resource bases o Commercial agriculture one of four anchor growth sectors o District investment programs for agriculture built into the National Agricultural Investment Program (NAIP) • Legal Capacity of Married Persons Act: o Before the Act was passed in 2006, women were considered minors in the eyes of the law. The act revoked this status, increasing married women's rights to include entering into a contract and owning property. o It also legally established that married women hold equal powers in their marriage, allowing them, inter alia, to acquire and dispose of assets and contract debts using joint assets. • Lesotho Bank Savings and Development Act: o 2008 amendment gave all women, married and unmarried, the right to open and operate a bank account. • Constitution of Lesotho: o Despite the 2006 and 2008 improvements to their legal status, women are still underrepresented in ownership of small enterprises in Lesotho, and the majority of their businesses are regarded as 'survivalist,' rather than 'developmental.' This is seen as the result both of long-standing discrimination before the changes to the two acts and because the Constitution still allows customary law to take precedence. This has particular relevance in rural communities.
Agricultural development (regional, national levels)	• Agriculture Sector Strategy (2003): o Goals: food security, poverty reduction, sustainable environmental management and conservation, improved efficiency, improved income distribution, and increased share of agriculture in GDP • African Union (AU) Maputo Declaration:

    - Commits the government to spend at least 10% of the national budget on agricultural development, of which 3%+ should be on livestock, to help achieve 6% or more growth p.a. in agriculture's contribution to GDP
- SADC Regional Agricultural Policy (RAP) (2013):
    - Intended to give real effect to pragmatically implement existing declarations and frameworks
    - Develops a 'legally binding' instrument to stimulate sustainable agricultural development and food security in the SADC region
    - Defines common agreed objectives and measures to guide and promote actions at regional and national levels in support of regional integration
- National Agricultural Investment Programme (NAIP) (2015):
    - Part of Comprehensive Africa Agriculture Development Programme's (CAADP) 'investment compact' for Lesotho
    - Incorporates goals and strategies of NSDP II, DES, RAP
- National Action Plan for Food Security Policy (NAPFS) 2007 – 2017
    - contains five programs: commercial and household food security, natural resource management, safety nets and social protection, food supply stability and national availability of NAPFS support structures.
- Land Act (2010):
    - Establishes autonomous Land Administration Authority (LAA)
    - Improves security of tenure for all occupants by prohibiting arbitrary eviction; the World Bank does not consider insecurity of tenure a major constraint to the development of commercial agriculture
    - Enhances gender equality in land ownership and land transactions
    - In rural areas, local councils, in consultation with local traditional authorities, still have the power to allocate land.
    - Almost all extensive rangeland is subject to communal tenure and is held in trust by the King; the Act transfers the administration of communal land from traditional authorities to the LAA's Land Commissioner.
    - In addition to Lesotho citizens, title to land may now be held by Lesotho companies and foreign companies, provided the latter have a local shareholding of at least 20%.
- Lesotho Food Security Policy (2006): promotes
    - Conservation agriculture (CA) with aid from international development partners through the adoption of technologies suited to local circumstances, providing CA training and subsidies for innovative approaches to CA
    - Block farming
    - Home gardens, particularly organic approaches such as keyhole and trench gardens
    - Improved livestock production and rangeland management through combatting stock theft, encouraging small livestock and poultry production at the household level and intensive livestock and milk production in urban/peri-urban areas
    - Basis for institutional responses to food insecurity and vulnerability identified in Lesotho Zero Hunger Strategic Review (2018)
- Lesotho Food and Nutrition Strategy and Costed Action Plan (2016-2025): promotes
    - Adoption of climate-smart agricultural practices (e.g., conservation agriculture, crop rotation, rotational grazing, greenhouses, keyhole gardening)
    - Adoption of high-yielding plant - especially fruit tree/vine seedlings - and breeding materials, as well as organic farming
    - Manufacture, distribution, and adoption of improved post-harvest storage facilities and practices for field crops and vegetables (e.g., hermetic bags, metal silos, vegetable storage markets)
    - Local production, multiplication, distribution, and education about bio-fortified beans, sweet potatoes, maize, and underutilized indigenous vegetables

	○ Education about the importance of dietary diversity, prevention of micronutrient deficiencies, and food preparation ○ Viable livelihood projects, such as cottage industries producing poultry, pigs, fruit and vegetables for sale and offering catering services ○ Linking farmers to markets and training farmers on market structures and practices ○ Good agricultural practices (GAP) to increase food safety, e.g. re the use of chemicals, risks of consuming meat not inspected for diseases and organic farming ○ Strengthening food safety inspection systems for locally produced and imported foods ○ Veterinary services readily available to all livestock producers ○ Home gardening, particularly organic approaches such as keyhole and trench gardens
Agricultural development (sub-sectoral level)	• Intensive Crop Production Programme (ICP): ○ By far the largest public agricultural program by value; 27% of total MAFS expenditure ○ MAFS buys fertilizer (74%), seed (21%), pesticide (5%) packages in SA; sells them to traders at discounted prices; traders sell to producers at subsidized prices; about 24% recouped by MAFS ○ May only be sold to producers on a list prepared by MAFS for the district; no criteria for listing of producers disclosed, no transparency about selection; no limit on quantities purchased by individual producers; regressive because large producers benefit most ○ No evidence of improvement in crop yield; likely to crowd out the private sector; no exit strategy • Micro, Small and Medium Enterprise (MSME) Policy (2016): ○ (inter alia) identifies agro-processing as a priority for MSME establishment; seen as contributing to poverty alleviation and job creation for women and youth • Lesotho Livestock Policy (2016): ○ Vision: 'by 2030, Lesotho should have an efficient, sustainable, and competitive livestock sector that ensures food security at the national and household levels, with an increased sector contribution to GDP' ○ Objectives and issue-specific policies cover a wide range of topics, including commercialization, intensification of production, machinery and inputs, natural resource conservation, veterinary services, genetic material, breeding, marketing, international trade, farmers' associations, extension services, gender, and value chain activities ○ Informed by AU Inter-African Bureau for Animal Resources (I-BAR) Livestock Development Strategy for Africa (LiDeSA), 2015-2035 ○ Basis for Lesotho Livestock Development Strategic Plan (2018-2022) • Animal Health and Welfare Bill (draft) (2016): ○ Informed by LiDeSA, RAP ○ Objectives: protection, promotion of animal health, control of animal diseases and veterinary services, production, and welfare of animals ○ Many proposed interventions are laudable, but questions arise re practicality, affordability ○ Likely negative impact on the country's widespread, dominant informal red meat value chain
Climate change adaptation and disaster resilience frameworks	• National Environment Policy (1998): ○ Laid the basis for National Environmental Action Plan (1998) and for the Environment Act (2008) ○ Provides a framework for the conservation and sustainable utilization of natural resources • Disaster Management Act (1997): ○ Lays the legislative basis for reducing vulnerability to disasters, particularly regarding food security, caused by climate hazards ○ Provides for the Disaster Management Authority, which undertakes annual countrywide assessments of vulnerability through the multidisciplinary, multi-sectoral Lesotho Vulnerability Assessment Committee • Water Act (2008):

- Basis for the Water and Sanitation Strategy: sets out strategies, objectives, plans, procedures, institutional arrangements for the protection, conservation, development, management, control of water resources

- National Range Resources Management Policy (2014):
  - Guides the development of effective strategies that combat land vegetation degradation and motivates for improved legislation and implementation
  - Establishes grazing management structures at national, district, and community levels
- Lesotho Sustainable Land and Water Management Strategic Investment Programme:
  - Identifies the need for integrated land and small-scale water management through conservation agriculture, soil and water conservation interventions such as donga/gully stabilization, agroforestry, and restoration of degraded wetlands
- Lesotho National Climate Change policy (2017-2027):
  - Identifies the need for climate-smart practices
  - Integrates climate-smart agriculture into national policies
  - Basis for National Resilience Strategic Framework: eleven pillars, including strengthening preparedness for disaster and climate risks, environmental protection, sustainable natural resource management; identifies roles different organizations will play
  - Basis for National Climate Change Policy Implementation Strategy (2017)
- Water and Sanitation Policy (2007):
  - Provides strategic guidelines for sustainable water resources management and delivery of water supply and sanitation services, including irrigation
- Lesotho National Resilience Strategic Framework (NRSF)
  - Structured around 11 resilience pillars and outlines intervention areas to strengthen capacity
  - Provides tools and approaches for operationalization, including assessments, planning, and measuring resilience
  - Introduces a conceptual framework that combines livelihoods, disaster risk reduction, and climate change approaches to address vulnerability. It identifies four key capacities (preparedness, absorptive, adaptive, and transformational) needed at different levels (individual, household, institutional, and community)

5. Past and ongoing projects, programmes and initiatives geared towards climate resilient food systems

Table 3: Overview of selected past and ongoing projects, programmes and initiatives geared towards climate resilient food systems

Agency	Programme	Dates	Funding (USD)	Description
World Bank	Second Private Sector Competitiveness and Economic Diversification Project (PSCEDPII)	2007-2013	World Bank: $10.1m GoL: $2.0m	Overall objective to contribute to increased private sector investments, firm growth, and jobs in non-traditional sectors. Horticulture sub-component focused on fruit tree crop production, upstream activities, and downstream processing. Funding for transitioning from cereal production to tree crops.

IFAD	Rural Finance Intermediation Programme (RUFIP)	2008-2015	IFAD: grant $4.35m Concessional loan $4.35m GoL: grant $2.0m **Total: $10.7m**	Goal: To alleviate poverty, increase income, and contribute to overall economic development. Objective to enhance access to efficient financial services for the rural poor on a sustainable basis. Major components include member-based financial institutions, formal financial institutions, and an enabling environment.
IFAD	Wool and Mohair Promotion Project (WAMPP)	2015-2021	IFAD: Grant $12.8m Concessional loan $5.8m OPEC Fund for International Development: Grant $12.0m Lesotho National Wool and Mohair Growers Association: Contribution $1.5m GoL: Grant $3.9m **Total: $38.9m**	Objective: To address rural poverty and food insecurity in the context of climate change and increasing vulnerability of poor livestock producers. Strategies include developing integrated value chains, building support institutions, and improving risk management. Priority activities: » Produce high value crops and livestock products » Improve quality livestock breeding » Protect animal and plant health » Increase climate resilience120
World Bank/IFAD	Smallholder Agriculture Development Project (SADP)	2011-2020	World Bank: $10m IFAD: grant $5m Concessional loan $5m GEF: $4.33m GoL: $3.5m Beneficiaries: $1.0m	Objective: To increase marketed output in Lesotho's smallholder agriculture sector. Followed by Additional Financing phase (SADP II) with the same core objective, focusing on climate resilience.

			Total: $28.8m	
IFAD/GEF	Lesotho Adaptation of Small-Scale Agricultural Production (LASAP)	2017-2020	GEF: $4.33m	Core components: Reduced vulnerability of agricultural production and enhanced adaptive capacity to support agricultural production in the context of climate change. Integrated into SADP design and activities to address climate change challenges.
FAO	Emergency Response to El Nino-Induced Drought in Lesotho, 2016-2018; Emergency Assistance to Vulnerable Smallholder Households Affected by El Nino-Induced Drought, 2016-2017; Livestock Emergency Response to El Nino-Induced Drought in Lesotho	2016-2017	Unilateral Trust Fund/SADP: $1.1m FAO: $0.97 FAO: $0.5m EU: $1.123m USA: $1.0m	Objective: Improve food security and resilience of vulnerable households in Lesotho through sustainable livelihoods support. Activities included distribution of livelihoods and veterinary kits, vaccination of livestock, and MAFS staff training.
World Bank	Agricultural Productivity Programme for Southern Africa (APPSA)	2018-2025	World Bank: $20.0m	APPSA established to promote collaboration between Lesotho, Malawi, Mozambique, and Zambia in agricultural research and development to encourage technology generation and dissemination. Lesotho's focus is on horticulture, including fruit trees, potatoes, vegetables, beans, and a cereal crop, sorghum.
World Bank	Second Phase, Smallholder Agriculture Development Project (SADP II)	2019-2026	World Bank: $50.0m Japan Policy and Human Resources Development Fund: $2.0m Lesotho beneficiaries: $5.0m137	Objective: To support increased adoption of climate-smart agricultural technologies in Lesotho, enhance commercialization, and improve dietary diversity. Major project components include promoting climate-smart agricultural practices and advisory services, improving agricultural commercialization and nutrition.

6. Priority Actions in Climate Change and Food Systems

6.1 Climate change and food systems priorities

The Government has shown commitment to food security and nutrition with the agriculture sector as one of the key priority sectors in NSDP II. The plan outlines the development of local food systems, agricultural value chains, and supplier development systems, to create opportunities for women, youth and other groups to aid national efforts to improve livelihoods and create jobs for smallholders or small-scale producers. However, due to limited production capacity, overdependence on rain-fed agriculture, market underdevelopment, and low investments in the sector, the operations are at a small scale, with many at subsistence and smallholder farmer level. As a result, there is limited capacity in the sector to scale production and mitigate rising food prices.

To ensure sustainable commercial agriculture while remaining cognisant of climate change impacts, environmental degradation and other disasters, the NSDP II outlines specific areas of interventions to achieve positive results in agriculture and food security. To increase agriculture production and its commercialisation, the country aims to address issues related to management of range, watersheds, protection of the environment and biodiversity, and reversing alarming environmental degradation that has aggravated the food insecurity situation. The following table presents the strategic interventions as proposed in NSDP II.

Table 4: Overview of climate change and food systems priorities

Strategic objectives	Interventions
1. Improve Functioning of Land Markets	○ Organise land titling. ○ Conduct land capability assessment and create online database of land parcels suitable for agricultural production and responsible irrigation. ○ Market identified land parcels to potential investors.
2. Improve Genetic Resources	○ Promote improved animal breeds and use of plant germ plasm. ○ Enhance seed certification capacity. Enhance production and use of certified seeds (including plant propagating materials). ○ Promote research and dissemination of drought-tolerant crop varieties. ○ Promote conservation of gene banks, community seed banks, and zoological and botanical gardens to conserve biological diversity of valuable plant and animal species. ○ Promote management and conservation of indigenous breeds and enhance appropriate use. ○ Promote vertical integration in agricultural sector.
3. Build Sustainable Infrastructure for Agriculture	○ Provide access corridors and other supporting infrastructure (e.g., livestock sales yards) for agriculture. ○ Promote environmentally-friendly and energy-saving irrigation and water harvesting. ○ Promote climate smart and resource efficient infrastructure. ○ Develop irrigation policy and irrigation master plan. ○ Strengthen and promote integrated catchment management. ○ Promote development of private sector-led post-harvest and storage facilities. ○ Establish Lesotho Agri-Georeferenced Information System

4.	Improve Access to Finance and Risk Sharing in Agriculture	○ Provide financial and technical support services to farmers to facilitate access to finance. ○ Strengthen agricultural financial institutions. ○ Explore and establish agro-insurance in collaboration with private sector. ○ Finalise and operationalise collateral registry to allow use of land and other assets as collateral. ○ Develop capital market instruments for agriculture.
5.	Improve Technology and Use for Agriculture	○ Promote conservation agriculture. ○ Mechanise agricultural production. ○ Enhance integrated management of pests and diseases. ○ Strengthen national agriculture research. ○ Strengthen animal disease control through surveillance and risk assessment. ○ Enhance farmer access to veterinary services.
6.	Improve Production of High-Value Crops and Livestock Products	○ Support small-holder farmers in producing high-value crops. ○ Develop climate screening guidelines to reduce production risks and vulnerabilities. ○ Promote crop diversification with differing susceptibilities to droughts, pests, flooding, etc. ○ Review subsidy policy to include high-value crops and livestock. ○ Develop market responsive breeding programmes (both livestock and crops). ○ Promote intensive and commercial livestock production. ○ Promote production and use of quality feeds.
7.	Build Capacity of Farmers, Agricultural Institutions, and Associations	○ Organise producers and industry players into enterprise-based associations (system) in order to transform the Lesotho agri-food system. ○ Provide institutional framework and enforcement mechanisms for development of well-functioning producer organisations and industry associations. ○ Integrate environment and climate change into agricultural policies, strategies, plans, and regulatory frameworks. ○ Review Extension Services Model to incorporate outsourcing of extension service from private sector. ○ Raise awareness of farmers advocating for adoption of climate smart and conservation agricultural practices. ○ Strengthen capacity of extension agents, associations, and training institutions on climate smart and conservation agriculture. ○ Provide agriculture skills-based training for youth, women, and vulnerable groups.
8.	Develop Value Chains in Agri-Food Systems and Enhance Agricultural Markets	○ Promote aggregation of smallholder farmers into upgraded value chains. ○ Improve private sector-led distribution of input subsidies. ○ Develop community and enterprise-based value chain systems. ○ Develop and promote sanitary and phyto-sanitary regulatory framework systems and Codex-compliant food policy and food quality labels. ○ Develop and implement agricultural market strategy (e.g., resuscitate agri-products, exhibitions, and auction sales across.) ○ Promote agricultural value addition and processing.
9.	Improve Management of Range Resources	○ Promote active and inclusive participation of all stakeholders in rangeland resource management. ○ Improve range governance. ○ Rehabilitate rangelands and wetlands in collaboration with private sector, investors, and communities.

- Develop and implement conservation strategies to improve rangeland resource resilience to climate change.
- Improve existing guidelines and grazing control regulations for sustainable management of range resources.
- Develop national fire policy for rangeland management. Improve rangeland grazing capacity.
- Devise and implement mechanisms for mandatory compensation for utilisation of rangeland resources (e.g., environmental services and ecosystem services) for the grazing levy, etc.
- Manage alien and invasive vegetation species.
- Enforce key land use policies and acts (e.g., land, environment, range, water, climate change, etc.).

6.2 Synergies and trade-offs

The climate and disaster risk landscape in Lesotho presented thus far underscores the profound influence of Lesotho's national food systems on its socioeconomic development. Addressing food systems resilience through the angles of both climate change adaptation, DRR as well as sustainable development may necessitate making strategic choices. For instance, initiatives aimed at bolstering the livestock sector have the potential to encourage greater consumption of dairy, meat, and animal products. When consumed in a balanced manner, this could foster sustainability for both the population and the country's ecological balance. However, if not effectively managed, the burgeoning livestock sector may not only engender adverse environmental consequences but also jeopardize public health and well-being.

Similarly, endeavors to enhance the production of fruits and vegetables can contribute to improved dietary patterns. Yet, if such initiatives rely heavily on the increased use of pesticides, there is the potential for additional risks to human health and the environment.

Nevertheless, advancements in agricultural production through strategic planning, technology, and innovation have the capacity to promote diverse diets, enhance nutritional outcomes, and, ultimately, fortify the resilience of Lesotho's food systems. Achieving resilient food systems in Lesotho necessitates capitalizing on synergies while actively mitigating potential trade-offs.

6.3 Adaptation Options for Agriculture

The challenges posed by climate change are intricately intertwined with the existing issues in Lesotho's agriculture sector, including environmental degradation, disease outbreaks, rising input costs, and land rights inequality. Lesotho is currently grappling with extensive animal grazing and the expansion of croplands to meet the demands of a growing population[95]. The monoculture cropping system, predominantly maize, depletes the land's resources over time. To address these challenges and enhance adaptation, Lesotho can focus on the commercialization of crops that align with its comparative advantages, such as horticulture, potatoes, and aquaculture, while fully utilizing irrigation. Building linkages between smallholders and domestic and export markets, shifting towards traditional farming practices that conserve soil moisture and replenish soil fertility, and implementing climate-smart

[95] Lesotho Ministry of Agriculture and Food Security (2023), Stakeholder consultation

agriculture practices can bolster resilience. Moreover, the adoption of drought-resistant crops and the development of water harvesting techniques are essential measures to mitigate the impacts of climate change.

6.4 Adaptation Options for the Water Sector

Safeguarding the long-term management of its water resources is a priority for the Government of Lesotho, which is committed to improving water resource adaptation mechanisms through a variety of actions[96]. Rehabilitation of degraded wetlands has become a priority as a form of adaptation. The development of clear, environmentally sustainable policies will improve pastures and grazing land and would protect wetlands from persistent degradation and land use mismanagement. The encouragement of fodder production could lead to stall feeding. Decentralization can relieve urban centers of increasing population that exerts pressure on water resources. The movement of people from urban to rural areas can be promoted if services and jobs are created in rural communities. The government has committed to implementing integrated catchment conservation and management programs, expand rainwater harvesting, water storage and conservation techniques, water re-use, water-use, and irrigation efficiency. Support is also committed to expanding the construction of dams and to enhance water storage[97]. Planning and adaptation strategies for water resources should also be included within development strategies for agriculture, infrastructure, and energy sectors.

[96] Lesotho Ministry of Agriculture and Food Security (2023) & Lesotho Disaster Management Authority, Stakeholder consultation
[97] Lesotho Ministry of Agriculture and Food Security (2023) & Lesotho Disaster Management Authority, Stakeholder consultation

7. Needs and Gaps for implementation

7.1 Towards Strengthening Food Systems in Lesotho

A sustainable food system (SFS) is a pivotal component that underpins the overarching goal of delivering food security and nutrition for all, without compromising the economic, social, and environmental foundations required for future generations to achieve the same. This entails a multifaceted approach, where economic sustainability, broad-based societal benefits, and a neutral or positive environmental impact collectively define the sustainability of the food system. Aligning with the United Nations' Sustainable Development Goals (SDGs), these principles serve as a guiding compass for action to end hunger, attain food security, and enhance nutrition by 2030. Reshaping the Lesotho's food system to meet these aspirations demands heightened productivity, inclusivity for marginalized populations, environmental sustainability, resilience, and the ability to furnish nutritious diets to all. These challenges are intricate and systemic in nature, necessitating a web of interconnected actions at the national, sub-national and also regional level.

Lesotho, in its commitment to fostering climate-resilient agriculture and ensuring food security, has established robust climate resilience and agricultural strategies. Moreover, it has put in place essential structures to support the implementation of these strategies. Furthermore, the Government of Lesotho has highlighted that bolstering the agricultural sector while addressing climate change and disaster risk is of high national priority. Additionally, the presence of an extensive network of actors, including national agencies, LENAFU, the UN, International and Local NGOs, research institutions, and the private sector, actively engaged in climate resilience and agriculture projects augments Lesotho's potential in building climate-resilient food systems.

Notwithstanding these positive strides, critical gaps still exist in the effective implementation of climate-resilient food systems within Lesotho, as identified through comprehensive research and consultations with representatives from the Government, national UN representatives and LENAFU.

In the context of addressing these gaps and strengthening food systems resilience in Lesotho, this chapter delves into the specific needs and areas for improvement. It seeks to provide a comprehensive assessment of the challenges and opportunities that lie ahead, acknowledging Lesotho's strides towards a sustainable food system and the global impetus generated by the follow-up to the UN Food Systems Summit. This chapter serves as a critical foundation for the subsequent discussions and recommendations aimed at propelling Lesotho towards enhanced food security, climate and disaster resilience, and sustainable development.

7.2 Gaps identified by the study

7.2.1 Gaps in multi-risk approaches to comprehensive climate and disaster risk management

Lesotho faces multiple climate and disaster risks, including droughts, floods, and soil erosion. Addressing these risks requires a comprehensive, multi-risk approach to climate and disaster risk management. However, there are gaps in this approach. For instance, while Lesotho has made efforts to develop and implement climate adaptation and disaster risk reduction strategies, there's a need for better integration and coordination of these initiatives. Many of these efforts remain fragmented, limiting their overall effectiveness. Comprehensive risk assessments and risk reduction strategies that take into account the interactions between different risks are essential. Supporting Lesotho in implementing multi-risk approaches, with a focus on building synergies across various disaster and climate risk management strategies, is crucial for strengthening overall food systems resilience in the country.

7.2.2 Need to strengthen and support policy implementation

Lesotho has made progress in developing policies related to food security, agriculture, and climate resilience. However, the successful implementation of these policies is often hindered by various challenges. The lack of capacity for policy implementation and enforcement, limited resources, and weak monitoring and evaluation mechanisms can undermine policy effectiveness. Strengthening policy implementation is crucial for translating these policies into actionable measures on the ground. It's imperative to build the capacity of relevant government agencies and establish robust monitoring and evaluation systems to ensure that policies are effectively carried out. Additionally, engaging stakeholders, including local communities, in the implementation process is vital for making policies more relevant and impactful.

7.2.3 Need to scale up the implementation of Multi-Hazard Early Warning Systems

Lesotho is prone to various climate-related hazards, making early warning systems critical for preparedness and response. While Lesotho has made strides in developing early warning systems, there's a need to scale up their implementation and coverage. This includes expanding the network of monitoring stations, improving risk knowledge and data collection, dissemination and use, and enhancing public awareness and response mechanisms. Multi-Hazard Early Warning Systems should be tailored to the specific needs of local communities and linked to preparedness and response plans. The support of both national and international partners as well as leveraging on global initiatives such as Early Warnings for All (EW4All) is essential to bolster these systems and make them accessible to all communities, particularly those in remote or vulnerable areas.

7.2.4 Gaps in data and analytics on agriculture & food systems resilience

Comprehensive and up-to-date data is fundamental for informed decision-making, particularly in the context of food systems resilience. Lesotho faces gaps in the collection, analysis, and availability of data related to agriculture and food systems resilience. Insufficient data on crop performance, market dynamics, and the impact of climate change on food systems hinders effective planning and risk management. Addressing this gap involves investing in data collection infrastructure, remote sensing technologies, and local knowledge networks to gather and analyze relevant information. Public-private partnerships can help build the capacity for data analytics and contribute to better-informed agricultural and food policies.

7.2.5 Need to scale up the implementation of climate-smart agricultural practices

Climate-smart agricultural practices are essential for building resilience in Lesotho's agriculture sector. While some efforts have been made to promote these practices, their widespread adoption remains a challenge. There's a need to scale up the implementation of climate-smart agricultural practices, including the use of drought-resistant crop varieties, agroforestry, and sustainable soil management techniques. Providing farmers with the necessary training, resources, and incentives for adopting these practices is crucial. Partnerships with local agricultural extension services, NGOs, and research institutions can play a vital role in disseminating knowledge and building capacity among smallholder farmers.

7.2.6 Support the implementation of rural safety nets and social protection programs

Rural communities in Lesotho, especially vulnerable groups, require support in the form of safety nets and social protection programs. Many households in Lesotho rely on subsistence farming and are susceptible to food insecurity, particularly during periods of drought. Expanding the coverage and effectiveness of rural safety nets can help protect vulnerable populations from the impacts of climate-related shocks. Such programs may include cash transfers, food assistance, and access to healthcare. Ensuring that these programs are well-targeted and sustainable is essential for building resilience among rural communities.

7.2.7 Need to strengthen youth engagement in agriculture and rural livelihoods

The engagement of youth in agriculture and rural livelihoods is crucial for ensuring the sustainability of Lesotho's food systems. However, many young people perceive agriculture as unattractive and face limited opportunities for education and training in agriculture-related fields. Strengthening youth engagement involves providing education and training programs that equip them with the skills and knowledge needed for modern and climate-resilient farming practices. Initiatives such as agricultural vocational training, mentorship programs, and access to finance can encourage young people to participate in agriculture and contribute to the resilience of food systems.

7.2.8 Scale up access to finance for smallholder farmers

Access to finance is a significant challenge for smallholder farmers in Lesotho. Limited financial resources hinder their ability to invest in modern agricultural practices, irrigation equipment, and technologies. Scaling up access to finance through mechanisms such as microloans, agricultural credit, and subsidies can empower smallholder farmers to adopt climate-smart practices and enhance their resilience. Collaboration with financial institutions, government agencies, and development partners is crucial for expanding the availability of affordable and accessible financial services for farmers.

These gaps present critical challenges to building food systems resilience in Lesotho. Addressing them will require a concerted effort from various stakeholders, including government agencies, international organizations, local communities, and the private sector. By focusing on these key areas, Lesotho can enhance its capacity to adapt to climate change, ensure food security, and strengthen the overall resilience of its food systems.

8. Entry points for the Climate Resilient Food Systems Alliance

Launched at the UN Food Systems Summit in 2021, the Climate Resilience Food System Alliance (CRFS) is a consortium of both UN and non-UN agencies that aims to support countries in ensuring food system resilience through a multi-stakeholder collaborative approach. With UNFCCC leading its coordination,

members include CGIAR, Club of Rome, the Commonwealth Secretariat, FAO, ICCCAD, IFAD, SHE Foundation, UNCCD, UNEP, UNDRR, the World Bank and WFP. This alliance is committed bringing actionable solutions and making sustainable connections towards scaling up climate and disaster resilience in vulnerable regions, including arid and semi-arid lands, small island developing states, land-locked developing countries, and least developed countries.

To support the Government of Lesotho, the alliance brings together a wide range of international and local partners and utilizes a mix of methods and innovative solutions. In particular, based on the gap, needs and priorities identified jointly with the Government of Lesotho, the CRFS Alliance aims to provide the following targeted support to accelerate action on delivering climate resilient food systems:

- **Strengthening Multi-Risk Approaches**: CRFS can collaborate with Lesotho in implementing the UNDRR-FAO Comprehensive Climate and Disaster Risk Management for Agriculture Programme, which advocates comprehensive multi-risk approaches in the sector-specific context. This approach will enhance risk assessment and risk reduction capacities, enabling Lesotho to prepare for climate and disaster risks effectively.
- **Scaling Up Early Warning Systems**: CRFS can facilitate the scaling up of Lesotho's Multi-Hazard Early Warning Systems to address existing gaps. In particular, CRFS can facilitate links with the EW4All initiative, leveraging UNDRR's membership, to support Lesotho in strengthening its Early Warning Systems and preparedness mechanisms.
- CRFS can provide Lesotho with expertise and technical assistance to **strengthen policy implementation**. By working with relevant government agencies, the alliance can help Lesotho overcome capacity and resource constraints in implementing and enforcing key policies related to food systems and climate resilience.
- CRFS can also support Lesotho in **monitoring and evaluating policy outcomes** and creating mechanisms for better compliance, helping to close the gap between policy formulation and effective execution.
- CRFS can contribute to **addressing data and analytics gaps** in Lesotho. The alliance can invest in data collection infrastructure, remote sensing technologies, and local knowledge networks to improve the availability of data related to agriculture and food systems resilience. Collaboration with public and private sectors can help build the capacity for data analytics, providing decision-makers with valuable insights into food system challenges.
- In order to **scale up climate-smart agricultural practices**, CRFSA can support Lesotho in the dissemination of climate-resilient technologies, such as drought-resistant crop varieties and sustainable soil management techniques. Through partnerships with local agricultural extension services and research institutions, CRFSA can facilitate knowledge transfer and empower smallholder farmers with the skills required for modern, climate-resilient farming practices.
- Supporting the Government to **identify potential funding sources** and opportunities for generating pipeline proposals for strengthening food systems resilience. In particular, the CRFS Alliance can identify potential climate fiancé sources and support application and proposal writing process
- CRFS can also support the Government by identifying appropriate solutions and expertise and **promoting knowledge and innovation** towards climate resilient food systems in alignment with the country’s vision

- CRFS Alliance can also support through **generating evidence and learning** from what is working well and what is not in terms of scaling up food systems resilience at the policy, programme and project level
- CRFS can support the **integration between different organizations and stakeholders** at all levels to improve peer-to-peer exchanges on climate resilient food systems intervention leapfrogging progress
- CRFS can help strengthen the **coordination among national stakeholders, regional and international counterparts** to ensure enhanced implementation, monitoring and evaluation of actions.