SOMALIA

COUNTRY ECONOMIC MEMORANDUM

Volume I

Rebuilding Resilient and Sustainable Agriculture In Somalia

WORLD BANK GROUP

Food and Agriculture Organization of the United Nations

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SOMALIA: *Rebuilding Resilient and Sustainable Agriculture*

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CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF BOXES

ABBREVIATIONS

All currency is in U.S. dollars, except where indicated otherwise

ARC	American Refugee Committee
DFID	Department for International Development
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Corporate Statistical Database
FEWS	Food Early Warning System
FGS	Federal Government of Somalia
FSNAU	Food Security and Nutrition Analysis Unit
GDP	Gross Domestic Product
IDP	Internally Displaced Persons
IMF	International Monetary Fund
INDC	Intended Nationally Determined Contribution
IOTC	Indian Ocean Tuna Commission
NGO	Nongovernment Organization
PPP	Public-Private Partnership
SATG	Somali Agriculture Technical Group
SWALIM	Somalia Water and Land Information Management
UN	United Nations
UNFPA	United Nations Population Fund

FOREWORD

Following more than two decades of civil war, Somalia has made important progress in recent years with the establishment of permanent political, economic and security institutions. This points towards a future with stronger prospects for peace and for economic and social development. Agriculture remains key to the livelihood of half of Somalia's population that still lives in rural areas. It is also key to the country's food security and economic growth prospects. We are thus proud that the World Bank and the Food and Agriculture Organization (FAO) collaborated on this important report to assist Somalia in implementing the 2017–19 National Development Plan and to inform its forward policy panning and programming and that of its development partners.

The report canvasses all available information to document how Somalia's livestock and crops subsectors have been buffeted by deteriorating water and transport infrastructure, persistent insecurity, weak regulatory and enabling institutions, and severe environmental degradation of the country's rangelands and forested areas. Widepsread losses to assets, income and livelihoods stemming from the current drought attest to the sector's acute vulnerability to extreme weather events and Climate Change. Moreover, coastal fishing has remained artisanal and, in the absence of effective regulations and monitoring, foreign commercial vessels have engaged in both legal and illegal harvesting.

Despite these and other challenges, this report highlights why there is cause for optimism in the sector's growth prospects. Somalia's landmass encompasses vast tracts of arable land and a variety of agroecological zones conducive to agricultural expansion. There are large areas suitable for livestock grazing, browsing, and fodder production to support the country's growing markets and export trade; others with fertile alluvial soils for staple cereals, oil seeds, legumes, and horticulture crops. Its forests provide prized gums and resins for both export and local markets and charcoal for cooking. The country's waters are home to a diverse range of valuable reef and pelagic marine species. With better monitoring, management, supportive public investments, and an enabling environment, the livestock subsector can become more resilient, improve the quality of its animals, and enhance the safety and value added of its products; the crop subsector can recover and surpass its remarkable pre-war production and export levels; and both coastal and offshore fisheries can contribute more meaningfully to sector growth.

Supporting the sector's drought recovery, strengthening its climate resilience, and improving its overall performance will not only boost prospects for sustained economic development, but will also help cement peace and security, alleviate poverty and malnutrition, and enhance health outcomes in both rural and urban areas. It is thefore our hope that this report will help inform and guide Somalia's federal and state governments and their international development partners as focus shifts from short-term recovery and humanitarian response to long-term development and sustained sector growth.

Finally, let us take this opportunity to thank the many Somalis – academics and officials – who participated with our technical teams in the research and in consultation and who helped us to better understand the challenges facing Somali agriculture and the opportunities to catalyze its growth.

Bella Bird
Country Director, Somalia
The World Bank Group

Daniele Donati
Country Representative, Somalia
Food and Agriculture Organization
of the United Nations

PREFACE

During the past 27 years of civil conflict, violence, weak or absent governance, and protracted political crises, governments and local communities have nonetheless tried to rebuild state capacity and institutions, improve security, rehabilitate physical infrastructure, and provide an enabling environment for the private sector, with the dual aim of reviving the economy and ensuring political stability. The northern regions of Puntland and Somaliland have been mostly peaceful and have continued their decades-old processes of state building and economic development. The Federal Government of Somalia that emerged in 2012 has succeeded in extending its territorial control in southern Somalia, though many areas of it are still affected by terrorist insurgency, especially outside the main urban centers of Mogadishu and Kismayo. It has also fostered the creation of new Federal Member States, held indirect elections for a new president, government, and parliament, and is growing its revenues from domestic sources, albeit from a negligible base.

Even during the period of civil conflict and in the absence of a central government, the Somali economy continued to grow at a modest pace. State collapse in southern Somalia did not translate into economic collapse partly because the prewar regime was predatory in nature. The lifting of state constraints on private enterprise led not only to improved economic performance but also to private sector provision of many services previously provided inefficiently by the public sector, including telecommunications, air transport, money transfer, and (inadequately) urban water, electricity, and social services. Other factors that have helped support the economy include remittances sent by a highly skilled diaspora; traditional institutions based on clan networks, which provided some degree of secured property rights and contract enforcement, even in conflict-affected southern Somalia; and booming informal trade with neighboring countries, which provided a new source of income.

Despite rapid urbanization, about 49 percent of the population (6 million people) still lives in rural areas, of which slightly more than half derive their livelihood directly from nomadic pastoralism, slightly less than half from crops cultivation, and a much smaller share from fishing. The welfare of the remaining urban or internally displaced population also depends critically on the consumption and trade of Somalia's livestock and related products, of its crops, and of its fisheries. The premise of this report—like much of the work of international development agencies active in the country—is that a growing economy is a critical element of peace building and state building. Indeed, development and jobs can contribute to improving the security situation and create incentives for political settlement. With agriculture remaining central to the country's economic growth prospects, now is a propitious time for all levels of government and the international development community to assess the medium- and long-term development needs of its agricultural subsectors and start planning to address them.
In recent years, the Food and Agriculture Organization (FAO), various other development agencies, and the World Bank produced reports covering a range of issues including macroeconomic management, intergovernmental fiscal relations, economic growth opportunities, and agriculture. The most recent comprehensive analytical work on Somalia's economy, however, was carried out more than 10 years ago, when the World Bank prepared a Country Economic Report and a Joint Needs Assessment (with the United Nations Development Programme). Both reports covered the agricultural sector's performance and challenges (World Bank 2006; World Bank and UNDP 2007).

This report was prepared jointly by the World Bank and the FAO Investment Centre, with critical inputs by the FAO Somalia Office, and with the support in-country of the Federal Government Ministry of Planning, Investment and Economic Development as well as of sector ministries and sub-national governments. It represents the first module of a broader analytical work planned by the World Bank for a Country Economic Memorandum (CEM) expected to be completed in 2018. As envisioned, subsequent modules of the CEM will cover the information

and telecommunications, energy, financial, and transport sectors and several cross-cutting topics, including macroeconomic management, institutions, the diaspora, trade, and the private sector. This module assesses, across all major geopolitical regions of Somalia, the contributions to livelihoods, exports, and economic growth of the primary agricultural subsectors (livestock, crops, forestry, fishery and agro-processing) during the period from before the civil war through the mid-2010s. It also analyzes the major constraints, challenges, options, and prospects for agricultural growth. It does not, however, address the short-term impact of the severe drought that hit northwestern Somalia in 2015 and then moved southward in 2016–17, which is the focus of a separate report (Somalia 2018). Moreover, the limited availability and sometimes inconsistency of the data, especially for the fishery subsector, greatly constrained the quantitative analysis carried out for this report. A standalone overview has been produced which provides a summary of the key findings and recommendations of the report.

It is nonetheless the authors' hope that the information and analysis presented will inform the further elaboration (through sector strategies and programs) and implementation of the National Development Plan 2017–19 and will contribute to the preparation of the next National Development Plan. The report should also support further primary data collection, the formulation of investment projects for agricultural development, and the provision of other financial and technical assistance by the international development community and private sector investors, including the Somali diaspora.

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Core authors from the World Bank include Gianni Zanini, Stephen Paul D'Alessandro, Verena Phipps, and Catherine Ngumbau. Core authors from FAO include Pascal Sanginga, Julia Seevinck, Yamina Cherrou, Andrew Read, and Stephen Akester. Other key contributors from both the World Bank and FAO include Mohamood Abdi Noor, Hussein Mao Haji, Richard Trenchard, Sergio Innocente, Jan Helsen, Saeed Khalid, Malik Amin, Molla Daniel, Njeru Jeremiah, Julius Mwangi, and Laxman Reddy. The team appreciates contributions from the Somalia Water and Land Information Management (SWALIM) and the Food Security and Nutrition Analysis Unit (FSNAU).

World Bank peer reviewers including Teklu Tesfaye (Senior Agriculture Specialist) and Charlotte De Fontaubert (Senior Fisheries Specialist) as wells as many other staff from the World Bank and FAO reviewed the final draft report and early versions of the sectoral chapters, and provided valuable contributions that improved the final report quality.

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Barbara Karni edited the report volumes and Robert Waiharo provided design and layout. Hassan Hirsi and Chi Lael led communication and media related tasks in dissemination of the report. Janerose Lubisia, Eugenia Konya, Margaret Odhiambo, Celestine Kisaka, Mohamed Abdi, and Idris Mohamud provided overall dissemination planning and logistics.

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EXECUTIVE SUMMARY

This joint report by the World Bank and the Food and Agriculture Organization (FAO) is part of a wider set of economic and sector work being conducted by development agencies to assist Somalia in its further elaboration (through sector strategies and programs) and implementation of the current National Development Plan and its preparation of the next one. The report covers the historical performance of all major agricultural subsectors (livestock, crops, forestry, and fishing) and the status of agro-processing. It also analyzes the subsectors' key medium- and long-term development constraints, challenges, potential for growth, and policy and investment options.

Weak institutions, insecurity, a persistent insurgency, dilapidated infrastructure, environmental degradation, and climate change are major obstacles to Somalia's economic development, especially in the Southern regions. These challenges and the recent severe drought-related crises notwithstanding, agriculture is and will remain central to the country's economic development.

Agriculture Remains Key to Somalia's Economic Growth and Poverty Reduction

Over the past three decades, the livestock and crop subsectors have been buffeted by Somalia's increasingly fragile and degraded natural environment and more frequent and severe cycles of drought and floods. These factors, as well as continuing insecurity and lack of or weak government institutions and the consequent deterioration of the flood control, irrigation, and transport infrastructure in the Southern regions, have severely reduced crop production.

Livestock and crops nonetheless remain the main sources of economic activity, employment, and exports in Somalia. Despite the country's rich fishing grounds, coastal fishing has remained small-scale and artisanal while foreign commercial vessels have enjoyed both legal and illegal harvesting offshore. About 49 percent of the population still lives in rural areas, with 46 percent of employed people working in agriculture (25 percent in crop cultivation, 9 percent in herding, 4 percent in fishing, and 7 percent in related activities).

Largely because of the dramatic expansion of the relative economic importance of livestock production and exports, agriculture's share of GDP has risen significantly from its prewar level of about 62 percent to possibly 75 percent or higher. Before the civil war, the crop subsector was the second-largest contributor to GDP and exports, after livestock. It remains crucial for food security, but its contribution to the economy is much smaller than it was, as over the past three decades, the volume of cereal production has declined by almost 60 percent from its 1989 peak.

Thanks to livestock, total agricultural exports have climbed every year since the late 2000s, to a peak in 2015 of $634 million, more than five times the value before the civil war. Agriculture represents about 93 percent of total exports, down slightly from 95 percent before the war. Livestock exports remain by the far the largest category, having risen by a factor of almost 10 between the late 1980s and the mid-2010s. Because of the recent drought and a renewed import ban by Saudi Arabia, the volume of livestock exports fell in 2016 and in 2017.

Sesame exports are Somalia's second-largest export. Given the collapse of banana exports, dry lemon is the only sizable export among vegetables and fruits. Destructive charcoal exports to the Arabian Peninsula have fallen significantly since the federal and state governments started enforcing the export bans they adopted in 2012, but some are still taking place, through informal channels and misclassification of shipments.

The combination of increased domestic food demand (driven by rapid population growth and urbanization and largely supported by remittances) and the collapse of domestic crop production has led to a massive increase in food imports. Agricultural imports rose by a factor of 18, reaching almost $1.5 billion in 2015, up from an annual average of only about $82 million in the late 1980s. Even before the current drought, food aid and food imports were already larger than domestic production of grains. Imports of khat have also risen, with deleterious effects on health, family life, and productivity.

Somalia faces a chronic food crop deficit, as local production meets only 22 percent of per capita cereal needs. Even in the best agricultural seasons, domestic production provides only about 40–50 percent of per capita cereal needs. Pastoral, farming, and fishing communities all suffer from high rates of chronic malnutrition. The root causes of this extreme food insecurity are to be found in the collapse of most irrigation and flood-control infrastructure, itself a consequence of the lingering civil conflict in many rural areas in Southern Somalia. Other contributing factors are poverty; gender inequity; high population growth; limited access to water, sanitation, and health services; and more frequent, severe, and protracted droughts.

Poor Infrastructure and Low Skills Hold Back Agricultural Development

Somalia is a mostly semiarid country, where water is one of the main sources of conflict between nomadic pastoralists and agro-pastoralists. Water infrastructure to harness river water and extract groundwater has severely deteriorated since the outbreak of the civil war in the Southern regions, as a result of lack of regular maintenance and repairs, prolonged insecurity, weak government institutions, and the absence of effective community organizations. The already insufficient prewar road network is in extremely poor condition in the Southern regions. Both water and road infrastructures are still functional and gradually expanding in the northern regions, but they are far from adequate to meet needs.

As a result, livestock survival during severe droughts has become dependent on very costly and often unaffordable privately owned water tankers, and the cultivated area under irrigation has shrunk to only about half the estimated 222,950 hectares before the war, with the most recent drought reducing it even further. Deteriorated rainwater harvesting infrastructure and capacity have reduced the total rainfed area under cultivation. Access by producers to urban markets is also very costly, and sometime very difficult.

The only positive infrastructure development since the start of the civil war has been the rapid expansion of mobile phone service. It has allowed rural communities to communicate with nearby urban markets about input and output prices, facilitated receipt of remittances from the diaspora and payments for all kinds of purchases, and provided access to updated information on domestic and international developments and the availability of local services.

"Somalia is a mostly semiarid country, where water is one of the main sources of conflict between nomadic pastoralists and agro-pastoralists."

In the education field, many community and privately supported technical schools and universities have been established in the past two decades, some of them offering degree programs in livestock, crops, and fishery science. These efforts remain insufficient to ease the acute scarcity of skilled personnel for agricultural development.

Weak Security and Institutions Stymie Agriculture Recovery

The long civil war resulted in extreme lack of security in Southern Somalia. Armed militias belonging to clans from the central regions with little farming skills and experience continue to occupy prime farmland in the Lower Shabelle region. Political (and taxation)

control over much of the riverine and inter-riverine areas is still being contested between Al-Shabaab, a terrorist insurgency movement, and the national army (supported by an African Union peace-keeping contingent). The continuing insecurity makes access to farms and market outlets risky, costly, and unprofitable. Such conditions also make interventions by aid agencies extremely challenging. Ministries at the federal and state level provide agricultural services in Southern Somalia in only a very limited, fragmented, and inefficient way, because of lack of skilled staff and funding and poor access to most rural areas.

There is also a lingering vacuum in the policy functions, monitoring, and services normally provided by government. Grazing disputes between neighboring pastoral clans have become more common since the collapse of the pre–civil war government. Recent expansion of private enclosures on traditionally open rangelands, especially along livestock migration and transport corridors and urban centers, have exacerbated tensions. Even in the more secure northern regions, neither government nor community institutions appear capable of dealing with such disputes.

A complete registry of farms survived the civil war, but regardless of evidence and rulings, landholders who left their farms in southern Somalia during the civil war are still unable to reclaim their land, because of insecurity, the weakness of traditional arbitration, and the absence of modern judicial institutions. In contrast, there are very few farmland disputes in the northern regions, where prewar landholdings were never disrupted and ministries of agriculture have issued proper lease certificates for newly allocated farmland (mostly to new, small farmers).

Environmental Degradation and Climate Change Pose New Challenges

Severe deforestation and soil erosion from unregulated human activity, overgrazing of rangelands and climate change threaten not only the growth prospects but also the viability of Somalia's traditional nomadic pastoralism and rainfed crop cultivation. By 2014, forests covered only 10 percent of the country's land area, down from 62 percent before 1980. The move toward more private enclosures for livestock grazing and semi-permanent family shelters has exacerbated deforestation, and the phenomenon is still gathering speed. The more erratic and diminishing flows in major rivers—caused partly by increasing use of water in upstream basins in the Ethiopian highlands—also threaten irrigated crop cultivation.

The main cause of large-scale deforestation of rangelands has been the massive and unsustainable cutting of acacia trees to produce charcoal, exports of which reached $56 million at their peak in 2011, up from zero before the civil war and as late as the mid-1990s. This trade became increasingly controlled by and a major source of revenues for Al-Shabaab. Since 2012, increasingly effective enforcement of charcoal export bans by the federal and regional governments as well as by importing countries in the Gulf, the introduction of gas stoves, and growing popular environmental awareness have significantly reduced demand for and thus the production of charcoal.

"Agriculture is and will remain central to Somalia's economic development."

In the late 1980s, Somalia was the world's largest producer and exporter of frankincense and myrrh. Wide fluctuations in exports are related partly to overexploitation and poor harvesting practices by a new generation of tree owners and minders eager to maximize short-term earnings but unaware of the trees' long-term health needs.

Weather phenomena—including fluctuations in air and sea surface temperatures, rainfall, humidity, cloud cover, atmospheric pressure, and wind speed—have already become increasingly unpredictable and extreme across the Horn of Africa. Eight major droughts in the last four decades

have severely affected crop and livestock production in Somalia. By early 2017, the cumulative impact of various failed successive rainy seasons had created a serious humanitarian crisis that threatened to become a famine in a few areas.

The climate in the Horn of Africa is projected to become even drier, warmer, more erratic, and more extreme than in recent decades and thus less favorable to crop, livestock, fisheries, and forestry-based livelihood systems. While most climate models predict higher rainfall, the expectation of a drier climate is supported by the stronger historical evidence, both recent as well as from prehistoric times. In any case, all scientists agree on a warmer future, with increased variability and frequency of extreme rainfall events.

The consequences of such changes are dire for Somalia's agriculture. Higher air temperatures will increase transpiration from soil, tree canopies, and water bodies. More variable and extreme rainfall on already barren soils will result in more run-off and erosion, less groundwater recharge, and less water availability in the surface layers for plant growth. Other likely impacts include reduction of vegetation for grazing and more variable water availability, with grave impacts on livestock herding and related livelihoods. Rising sea temperatures and acidification will also reduce fish stocks and change their distribution.

Strong Performance in Live Animals Contrasts with Weak Performance in Livestock Products

Livestock remains the traditional repository of household wealth in Somalia, the largest export, and an important source of livelihood for a large part of the population. The main production systems are nomadic pastoralism and agro-pastoralism, but large livestock-rearing operations with dairy animals (mostly camels) have been on the rise in settled mixed farming. They supply nearby urban and peri-urban markets with fresh milk only, as there are no or minimal processing facilities.

Demand is high and growing for good-quality fodder along trading routes, in market centers, and at terminal ports. However, the predominant feed production systems rely mostly on fresh grasses and shrubs on the country's vast rangelands, and on their straw of low nutritional value. Hay production from native grasses is very limited, and storage practices are so poor that its nutritive value very quickly drops to that of straw. At peak demand periods, grains, other fresh crops, and even emergency relief food for people are also sold as livestock feed.

Although well adapted to the harsh geographical and climatic environment, Somali livestock is characterized by low weights and milk yields, mainly because larger and heavier animals are selected for slaughter or live export rather than breeding. In the absence of government animal health programs and institutions, the private sector and local veterinary associations funded by development partners have provided many critical services. Such efforts remain insufficient to address the serious risk of animal diseases and consequent import bans. The latest ban, imposed by Saudi Arabia at the end of 2016, was only temporarily suspended during July–September 2017. As of early 2018, it remains in effect.

"Livestock and crops remain the main sources of economic activity, employment, and exports in Somalia."

The sector has shown remarkable resilience, although the stock of animals, the health and welfare of surviving animals, and livestock products have suffered severely from the most recent drought. The stock of animals (estimated at 53 million in 2014) is well past the peak level registered in the late 1980s (about 40 million), and Somalia has more camels (7.1 million as of 2016) than any other country in the world. Substantial investment in quality improvements has supported an impressive growth in livestock exports, including for breeding, with both volumes and values (peaking at $533 million in 2015) higher than before the civil war. Processing of livestock products, however, is minimal and well below prewar levels.

Milk production, especially from camels, has risen steadily since the late 1980s, reaching a market value of about $3.3 billion in 2014. Somalia nonetheless still imported dairy products while exporting none. In early 2017, at the peak of the recent drought, milk yields were cut by more than half for camels and up to two-thirds for cows and goats. Structural constraints that have kept the dairy sector from reaching its potential include the same ones that affect the welfare and health of live animals, as well as poor or no enforcement of low and outdated prewar hygiene standards, lack of processes to preserve milk quality, inefficient marketing channels fraught with excessive intermediaries, the poor state of roads, rapid spoilage from high temperatures and humidity, and the absence of economies of scale.

Production of fresh meat has expanded to meet rising domestic demand, but it remains well below potential. Commercial meat processing is limited to very small quantities of chilled goat and beef meat for export. Growth has been hampered by most of the constraints listed above as well as mismanagement. The quantity of hides and skins is comparable to the late 1980s level, at about 7 million pieces a year. Raw hides and skins are of poor quality, however, as improper preservation and storage often leaves them damaged by vermin. Unlike before the civil war, processing is currently minimal (sun-drying only), with virtually no domestic leather production.

Poultry keeping is widespread among poor households. Imports of day-old chicks and of eggs for local hatcheries as well as production by commercial poultry farms are still limited but growing steadily. The subsector's further expansion, however, is constrained by shortages and the high costs of inputs, including poultry feed and feed concentrates.

Performance of the Crop Subsector Is Weak, but Growth Potential Is High

Some 3 million hectares (about 5 percent of Somalia's total land) are cultivable, with 2.3 million under rainfed conditions and 700,000 hectares suitable for either pump or recession-controlled irrigation. In recent years, only a fraction of irrigable land was irrigated and cultivated (less than 20 percent of potential and about half of irrigated land before the war). Almost two-thirds of cultivable land, both rainfed and irrigated, is in the fertile areas along and between the two major rivers in the southern regions. A smaller cultivated rainfed area in the northwestern regions and some oasis and coastal cultivated areas in the northeastern regions constitute the remaining third. Rainfed areas rely mostly on groundwater extraction, rainfall harvesting, and moisture retaining techniques.

Irrigated farming systems—which grow maize, sesame, other food crops, bananas, other fruits, and vegetables—face many constraints. They include (a) much diminished and inconsistent surface water availability, as a result of the dilapidated state of prewar irrigation and flood control infrastructure in southern Somalia; (b) inefficient water use, increased salinization, and water logging, caused by lack of water use planning and regulation; (c) poor soil fertility management, as inputs such as manure, fertilizer, and pesticides are either used in a suboptimal way or not used at all; (d) low-quality seeds and the retail availability of only a few seed varieties; (e) limited and unreliable mechanized equipment (most farmers use handheld tools to till the land); (f) badly deteriorated roads, which increase the time and costs of transporting crops to markets, undermining incentives to expand horticulture crops; and (g) inappropriate farming techniques, as a result of the absence of extension and research services.

Another, potentially overwhelming, threat to Somalia's irrigated crop production is agricultural development upstream in the Ethiopian basins of the Shabelle and Juba rivers. The Shabelle River dried out completely twice in recent years (in March 2016 and December 2016–early April 2017), a new and unprecedent development. Full implementation of the Ethiopian water master plan could eventually cause a drastic reduction in river flows downstream, possibly by more than 80 percent for the Shabelle River, and alter prevailing stream flow patterns, including flood intensities.

Under rainfed farming, a production system geared mainly to meet subsistence needs of rural households, the major crops grown are sorghum, cowpea, and, to a lesser extent, maize and sesame, as well as khat and millet in the northwest. The main constraints faced by rainfed farming systems include (a) lower and more erratic rainfall than in the past, resulting in more frequent and intense cycles of droughts and floods; (b) deteriorated water harvesting and storage infrastructure; (c) poor soil management, resulting in very low moisture retention and inadequate internal drainage; and (d) very low-input farming techniques.

Even in normal years, average yields for both irrigated and rainfed crops are very low. However, if constraints were fully addressed, the expert consensus is that average yields could increase by a factor of four to six for maize and three for sorghum.

The Fishery Subsector Has Strong Growth Potential

Somalia has the longest coastline in Africa (3,330 kilometers) and a large Economic Exclusive Zone (EEZ). While its coastal shelf is narrow and thus with limited habitat for demersal (bottom feeder) fish stocks, except off the Puntland coast, the Somali Large Marine Ecosystem supports a wide variety of ecosystems and fish, from large pelagic (highly migratory) species such as tuna to smaller pelagic species such as sardines, as well as crustaceans and other reef species.

Fish consumption in Somalia remains one of the lowest in Africa, but increased urbanization and the return of diaspora members with newly acquired preferences have fueled rapid growth in domestic demand for fresh fish. Coastal communities have traditionally relied on fishing for both their food security and their livelihood, exporting fish to Kenya, Tanzania, and the Arabian Peninsula.

Weak or absent governments and lack of active fishery management during the past three decades have allowed both artisanal fishing and (legal and illegal) fishing activity by foreign vessels to expand without controls. The result has been severe degradation of both marine and coastal environments. Moreover, projected increases in sea temperature and sea level will negatively affect coastal fish nesting and fishing grounds and increase the frequency and severity of flooding of low-lying coastal lands, estuaries, deltas, and salt marshes.

Knowledge of Somalia's fishery subsector is very limited, because its waters remain uncharted, unsupervised, and unmonitored. No reliable data on fishing activity, landings, stocks, or habitat status have been collected since before the civil war. The onshore marine fishery subsector is modest in size, with artisanal fishing carried out near land mostly by men (about 9,500 full-time or part-time, with about 1,300 small vessels), and trading and support activities and (minimal) fish processing carried out by women. Since 1980, guesstimates by a team of Somali and international researchers of onshore and offshore marine catches by domestic and foreign vessels have fluctuated, but they show an increasing trend, with current levels between one-sixth and one-fourth the guesstimated annual production potential of about 835,000 tons. Reliable assessments of 17 species, however, find that 8—swordfish, striped marlin, emperors, goatfish, snapper, sharks and rays (which represent as much as 40 percent of the catch of artisanal fisheries), grouper, and grunts—were fished unsustainably.

"Despite Somalia's rich fishing grounds, coastal fishing has remained small-scale and artisanal while foreign commercial vessels have enjoyed both legal and illegal harvesting offshore."

Maritime and fisheries' governances are still in their infancy, with provisions for licensing defined partly under the 2014 federal fisheries law, which still lacks important provisions, and partly under some states' legislation or regulations. Revenue sharing between federal and state governments for the licenses recently granted remains to be

implemented. Despite stated ambitions, neither the federal nor state ministries have been transparent about the licenses they have issued, and they do not have the capacity to monitor or control fisheries, especially offshore.

The main challenges for the subsector are (a) the lack or poor functioning of cold-chain facilities, (b) inadequate fish landing facilities at all major ports, (c) minimal processing ventures, and (d) the lack of or very poor transport links between major urban centers and isolated fishing communities along the coast, many of which remain reliant on trading with Yemeni vessels for their income.

There is a strong consensus among scientists and fishers alike that considerable potential exists for sustainable expansion of many fisheries within Somali waters, especially of tuna and oceanic tuna-like species. Fish waste could be also used in a variety of ways, including for human consumption, livestock feed, and energy generation. Effective management, supervision and monitoring, and public investment and technical assistance plans, including for support to expansion plans by fishers' cooperatives and the private sector, are needed to ensure the sustainability of all fisheries. Two prerequisites for improvement are stock and catch assessments and ecosystem analysis as well as effective enforcement of existing regulations.

Stronger Institutions, Management, Extension Services, and Infrastructure Are Needed to Support Private Investment in Production and Markets

In the short to medium term, recovery of agricultural production, especially for crops, to prewar levels depends on better security; stronger public and community institutions; and at least a start toward rehabilitating the dilapidated flood control, irrigation, and transport infrastructure. In the longer term, the sector's growth potential can be realized only by developing and implementing a comprehensive sector development strategy, supported by effective institutions and interventions that harness the dynamism of its private sector in both primary production and domestic and foreign trade of inputs and processed products. While ensuring country ownership and enhanced coordination, providing economic opportunities and jobs for youth, and leveraging remittances from the diaspora for investment rather than consumption, this strategy should aim at achieving the following objectives:

- Increase crop production beyond prewar levels, through full rehabilitation of prewar public infrastructure and adoption of improved technologies and climate-smart agriculture practices.
- Protect and improve the natural environment, in light of the vulnerability of all agricultural subsectors to the negative impact of climate change.
- Transform private sector–led production systems in all subsectors into modern, commercial, and competitive ones that add value through agro-processing.
- Strengthen household resilience and reduce hunger and malnutrition, including by introducing more modern postharvest long-term storage technologies and drought risk mitigation.

Recommendations for addressing specific challenges include the following:

- **Climate change.** Full implementation of Somalia's well thought-out indicative action plan is needed to foster the adaptation of its agricultural systems for improved climate resilience. This should focus on, inter alia, supporting adoption and scale up of climate-smart agriculture practices and innovations.
- **Management of natural resources and rangeland.** There is a pressing need to clarify land tenure arrangements; reach consensus over policies and their implementation with local communities; improve communities' capacity to manage their natural resources in a sustainable manner; and support rangeland rehabilitation with technical assistance and public investments for (a) intensified soil and

water conservation, (b) reforestation and afforestation, (c) the reseeding of pastures, (d) the planting of drought-resistant and fast-growing grasses and legumes, (e) the use of micro-catchments to enhance water filtration and various flood control technologies.

- **Charcoal, gums, and resins.** An expanded program of action to reduce charcoal production, especially from acacia trees, should be the top priority for all regional governments. A second priority for the Puntland and Somaliland governments and donors supporting them should be to protect all other trees, including trees that produce frankincense, myrrh, and gum Arabic, by fostering and enforcing sustainable tapping methods and frequency. Policy makers should also promote value addition by supporting new private investments in better-quality processing of all gums and resins, as well as other forestry products, such as aloe vera.
- **Livestock.** A top priority of public policy and assistance should be building capacity along the entire value chain to cope with animal disease threats, coupled with open and regular dialogue with importing countries to review and update sanitary standards and other import requirements. Other priorities include promoting innovative breeding and good husbandry practices and strengthening rangeland use policies, planning, and enforcement, with community participation. Support is recommended for integrated production systems, to leverage the interlinkages between crop agriculture and peri-urban livestock rearing systems for an expanded and more efficient feed supply chain and the promotion of more value addition and diversification opportunities. Rangeland use policies, planning, and enforcement, especially regarding private enclosures, also need strengthening. With strong promotion of private sector–led value addition and the processing of animal products, output of livestock products could easily exceed the modest official targets.
- **Crops.** A holistic medium-term program is required to deliver quick, large, and sustainable production and productivity gains for staple commodities and more diversification into horticulture and other high-value crops for both improved incomes and nutritional outcomes. The main components should include (a) institutional and human capacity building; (b) rehabilitation of prewar flood control and irrigation infrastructure along the two major rivers in southern Somalia; (c) expansion of rain water catchment and moisture conservation and introduction of control measures for soil erosion and gully formation in the central and northern regions; (d) rehabilitation of prewar trunk and rural roads to improve transportation of inputs to farms and of produce to markets; and (e) improved access to and adoption of productivity-enhancing and resilient technologies (climate-smart agriculture practices). The first four components should be pursued in parallel, rather than sequentially, as institution building without investment in infrastructure will not yield gains, and initial gains in production and productivity from investment in infrastructure will likely prove unsustainable without complementary institution and capacity building.

"Weak institutions, insecurity, a persistent insurgency, dilapidated infrastructure, environmental degradation, and climate change are major obstacles to Somalia's economic development."

- **Fishery.** The strongest growth prospects for fishery are for small pelagic and tuna and tuna-like species that migrate through Somalia's highly productive oceanic waters during the southwest monsoon. Their realization will depend largely on private investment in underexploited offshore fisheries; the development of coastal and inland fisheries, including cold chains for domestic

markets and improved nutrition; and processing. All levels of governments, in partnership with international fishery and development organizations, academic institutions, and donors, have crucial roles to play. They can help provide (a) basic field data collection and indicators estimation, as well as capacity building in teaching, research, and professional skills; (b) a clear and effective system of fishery management, at both the federal and regional levels, based on a sound legal framework and the rule of law for private investors, including for licensing; and (c) design and cost estimates, adoption, and implementation of master plans for developing fish landing sites at all five major ports and redevelopment of related transport infrastructure, including rural roads connecting small fishing communities to main roads and urban markets.

SOO KOOBID XOG CILMIYEED

Xogtani waa warbixin ay si wada jir ah ay u soo saareen Baanka aduunka iyo hay'adda cuntada iyo beeraha Qaramada Midoobay ee FAO, waana qayb ka mid ah balaarinta dhaqaalaha iyo qaybta shaqada ee ay tahay inay fuliyaan hay'addaha horumarinta, si ay uga caawiyaan qorshaha horumarineed ee Soomaaliya (iyadoo loo marayo qorshaynta qaybta iyo barnaamijyada) iyo fulinta qorshaha qaran ee horumarinta ee wakhtigaan jira iyo sidii loogu diyaarin lahaa kan xiga. Warbixintu waxay daaha ka qaadaysaa soo jireenka wax qabadka dhamaan dhinaycada kala duwan ee beeraha, kalana ah xoolaha, dalagyada, kaymaha iyo kalluumaysiga iyo duruufaha hab raaca beerasho. Waxay sidoo kale qeexaysaa qayb hoosaadyada muhiimka ah ee tilmaamaya joogtaynta horumarinta qaybahaan ee wakhtiga dhexe iyo kan dheer, sidoo kale xalinta caqabadaha, muhiimadda in ay leedahay in kor loo qaado wax soo saarka, siyaasadda iyo qaybaha maal gashiga

Hay'addaha maamul oo tamar daran, amaan darada, kooxaha wax iska caabinta, kaabayaasha dhaqaalaha oo liita, nabad guurka deegaanka iyo isbedelka cimilada ayaana ah qaybaha ugu waaweyn ee garba duubka u xiray horumarka dhaqaalaha Soomaaliya, khaas ahaan gobollada bartamaha iyo koonfurta. Iyadoo ay jiraan caqabadaan oo ay weheliyaan dhibaatooyinka la xiriira abaaraha daran ee wakhtiyadii la soo dhaafay ku dhuftay, ayaa beeraha ay yihiin, ahaanna doonaan kuwo udub dhexaad u ah horumarinta dhaqaalaha wadanka.

Beeruhu weli waa qayb muhiim u ah kororka dhaqaalaha Soomaaliya iyo yaraynta Saboolnimada

30kii sano ee la soo dhaafay qaybaha xoolaha iyo dalagyada waxay ahaayeen kuwo dhibaatooyinka iyo dayaca haystaa sii kordhayaan, sidoo kale saamaynta dhibaatada dhinaca deegaanka ayaa in badan ku soo noq noqotay, abaaraha iyo daadadka oo iyana joogto noqday. Qodbadaan oo ay weheliyaan amaan darada iyo jiritaan la'aanta ama tamar darida hay'adihii dawliga ahaa waxay keeneen inay sii xumaadaan hanaankii lagu ilaalinayey fatahaada, waraabka, kaabayaasha wadooyinka iyo gaadiidka ee gobolkada bartahama iyo koonfurta, waxayna arrimahaan dhamaantood si daran hoos ugu dhigeen wax soo saarkii dallagga.

Inkastoo xoolaha iyo dalagyadu weli ay yihiin ilaha muhiimka ah ee dhaq dhaqaaqa dhaqaale, shaqaalaynta iyo wax dhoofinta Soomaaliya. (Inkastoo wadanku uu leeyahay khayraad qani ah oo dhinaca kalluumaysiga, kaluumaysiga xeebuhu waa mid heerkiisu hooseeyo iyo iyadoo taa bedelkeed maraakiib jariif ah oo shisheeye ay ku daabulanayaan kalluumaysi isugu jira mid sharci ah iyo mid sharci darro ah oo ay ka jilaabanayaan gudaha badda). Qiyaasta 49% dadku waxay ku nool yihiin dhulka miyiga ah, iyadoo ay soo raacdo 46% dadka shaqeeyaa ay ka hawl galaan beeraha (25% qodaalka dalagyada, 9% xoolo raacista, 4% kalluumaysiga iyo 7% oo ah qaybo shaqooyin la xiriira hawlahaan aan soo sheegnay).

Si balaaran waxaa u kordhay arrimaha balaarinta la xiriirta dhaqaalaha ee muhiimka u ah wax soo saarka xoolaha iyo dhoofka, beeruhu waxay wadaagaan in dakhliga guud ee dalka GDP ay si cad u kordhiyeen iyagoo ka soo qaaday heerkii hore ee ahaa62% gaarsiyeyna 75% ama ka badan. Ka hor dagaalkii sokeeye, dhinaca wax soo saarka dalaggu wuxuu ahaa kan labaad ee ugu balaaran ee laga helo dakhliga guud ee dalka GDP iyo wax dhoofinta, marka laga soo tago xoolaha oo iyagu ahaa kan koowaad. Welina wuxuu muhiim u yahay wax soo saarku haqab beelka cuntada, laakiin wax ku kordhinta dhaqaalaha waa mid aad uga yar siduu ahaan jiray, marka la eego sodonkii sano ee la soo dhaafay, wax soo saarka firalayda wuxuu hoos u dhacay qiyaastii 60% marka laga soo bilaabo sanadkii 1989.

Waxaase amaan mudan xoolaha, isu geyn ahaan wax dhoofinta beeraha kor u qaaday tan iyo dhamaadkii sanadkii 2000, iyagoo gaaray sanadkii 2015 $634

milyan, waayna shan goor ka badan yahay qiimahaani ka hor dagaalkii sokeeye. Beeruhu waxay u taagan yihiin 93% wax dhoofinta guud, waxayna si tar tiir bah hoos uga soo dhacayeen 95% ka hor dagaalkii sokeeye. Dhoofka xoolaha weli waa mid aad u balaaran, kor u kiciisuna waa mid cad oo ahaa 10 intii u dhaxaysa dhamaadkii sanadihii 1980maadkii iyo bartamihii 2010. Laakiin abaaraha hadda jira iyo dib u soo cusboonaysiinta xanibaadda Sucuudi Carayba ku xanibtay inay xoolo ka soo dhoofsato Soomaaliya waxay keentay in qiimahii xoolaha la dhoofinayey uu hoos u dhaco sanadihii 2016 iyo 2017.

Dhoofka sisintu waa shayga labaad ee ugu balaaran ee Soomaaliya dhoofiso. Markii uu istaagay dhoofkii musku, liin dhanaan la qalajiyey ayaa noqotay waxa kaliya ee la dhoofin karo iyadoo ay ka mid ahaayeen sidoo kale khudaar iyo geed miroodyo. Dhibaatada dhoofka dhuxusha ee loo dhoofinayey wadamada khaliijka ayaa si balaaran hoos ugu dhacay tan iyo intii dawladda federaalka iyo kuwa maamul goboleedyadu ay dhaqan geliyaan qaraarkii lagu mamnuucayey dhoofinta dhuxusah ee soo baxay 2012, laakiin weli waa mid ka socota meelaha qaar, iyadoo loo marayo dariiqyo aan rasmi ahayn iyo habab aan kala cadayn oo lagu raro.

Marka lagu daro baahida cunada gudaha oo sii kordhaysa (taasoo ay keentay tirade dadka oo sii kordhaysa, magaalaynta iyo taageerada balaaran ee dhinaca dhaqaalaha ah kana imanaysa xawaaladaha) iyo baaba'a ku yimid wax soo saarkii dalaygada gudaha waxay tani si balaaran u keentay inay kordhaan cuntada la soo dhoofinayo. Wax soo dejinta beeraha waxay kor u qacday qiyaasta 18, iyadoo gaartay sanadkii 2015 1.5 bilyan oo dollar, iyadoo ahayd celi celiska guud qiyaasta sanadihii 1980maadkii 82 milyan oo dollar. Xitaa ka hor abaarahan hadda jira, cunada gargaarka iyo cunooyinka soo dibadda laga keeno waxay ahaayeen kuwo aad u balaaran marka loo eego firalayda ka soo baxda gudaha wadanka. Sidoo kale soo dejinta qaadka ayaa iyana kor u kacday, iyadoo uu leeyahay saamayn xun oo dhinaca caafimaadka, nolosha qoyska iyo wax soo saarka qofka Soomaaliya waxay wajahaysaa wax soo saarka cunada oo aad hoos ugu dhacay wakhti dheer, iyadoo wax soo saarka guduhu keliya ka yahay 22% baahida cunada firayda ee qofka. Xitaa marka la eego xiliyada beeruhu si wanaagsan u baxee, wax soo saarka guduhu wuxuu keliya oo uu quudiyaa 40 – 50% baahida dadka ee dhinaca firalayda. Bulshooyinka reer guuraaga, beeralayda iyo kaluumaysatadu waxay dhamaan dhibane u noqdeen nafaqa daro soo jiitantay. Aasaaska keenay cuna yaraanta daranna waa bur burka ku dhacay habkii waraabka iyo kaabayaashii ilaalinta daadadka, iyadoo ay la daala dhacayaan duruufaha ka dhashay dagaaladii sokeeye ee ka dhacayey dhulal badan oo miyiga bartamaha iyo koonfurta Soomaaliya ah. Qodobada kale ee dhibaatada qaybta ka ah waa saboolnimada, sinaan la'aanta dhinaca ragga iyo dumarka, kororta xad dhaafka ah ee tirade dadka, helitaanka biyaha oo adag, saxada iyo adeegyada caafimaadka iyo abaaro daran oo soo noq noqday.

Kaabayaasha dhaqaalaha oo liita iyo xirfadda hoosaysa oo dib u dhigay horumarinta beeraha

Soomaaliya waa wadan qalayl xigeen ah, waa meel biyuhu yihiin ilaha nololeed ee ugu muhiimsan oo isku dhacyada dhex mara reer guuraada iyo beeralay xoolo dhaqatada ay ka dhashaan. Kaabayaasha dhinaca biyaha waxay ka yimaaddaan webiga iyo biyo laga soo saaro dhulka hoostiisa, kuwasoo si daran iyana ay u sii xumaanayeen tan iyo markii dagaalada sokeeye ka bilowdeen gobollada bartamaha iyo koonfurta, waxaana arrimahaan ka dhashay in la waayo dayactirkii iyo hagaajintii joogtada ahayd ee ay u baahnaayeen, iyadoo ay u sii raacday amaan daro raagtay, tamar daradda haysata hay'adahii dawladda iyo maqnaanshaha hay'adihii bulsho. Iyadoo ay mar horeba jireen dhibaatoyin dhinaca wadooyinka oo ahaa kuwo ay xaaladoodu aad u liidata gobollada bartamaha iyo koonfurta. Labada dhinaca ee biyaha iyo kaabayaasha wadooyinka weli waa kuwo shaqaynaya iyo iyagoo si tartiib ah ugu sii balaaranayey gobollada waqooyiga, laakiin weli waa kuwo ka fog inay daboolaan baahida.

Waxaa ka dhashay, badbaadintii xoolaha xilligii abaarta darani jirtay waxay keentay in dhaqaale badani ku baxo iyo in aan si gaar ah loo heli karin haamaha biyaha, dhinaca dhulalka qodaalka waraabkii ayaa isana dhibaato ku dhacday wuxuuna hoos uga dhacay qiyaastana kala bar intii uu ahaa dagaalka ka hor oo lagu qiyaasay 22,950 higtar, iyadoo abaaraha wakhtiyadaan danbe jiraana ay si daran hoos ugu sii dhigeen. Waxaa xumaaday kaabayaasha lagu qabto biyaha roobka iyo awoodoodii tanoo yaraysay dhulkii qodaalka eek u tiirsanaa roobka. Sidoo kale beeralayda wax soo saarka waxaa dhibaato iyo qiimo aad u sareeya ku ah sidii ay wax soo saarkooda ugu iib geyn lahaayeen suuqyada magaalooyinka, iyadoo mararka qaarkood ay aad u adagtahay inay gaaraan.

Keliya waxa wanaagsan ee dhinaca kaabaha dhaqaalaha ee hormaray tan iyo markii ay dagaalada sokeeye bilowdeen waa adeegyada isgaarsiinta taleefonada gacanta oo iyagu balaartay. Waxay siiyeen fursad u ogolaanaysa dadka miyiga ku nool inanay si fudud ula xiriiraan suuqyada magaalooyinka ku dhow oo ay kaga helaan xog, iyaguna ay ku waydiiyaan qiimaha, wuxuu u fududeeyey inay lacago kaga helaan qurba joogta iyo inay ku iibsadaan dhamaan noocyada adeegyada ay u bahan yihiin iyo sidoo kale waxay ka helaan warbixinaha ay u bahan yihiin ee gudaha iyo kuwa horumarinta caalamiga ah iyo adeegyada gudaha ah ee la heli karo.

Dhinaca waxbarashada, bulsho badan iyo qaybaha gaarka loo leeyahay ayaa taageeray dugsiyo farsamo iyo jaamacado ay aas aaseen 20kii sano ee la soo dhaafay, goobahaan waxbarasho qaarkood ayaa bixiya barnaamijyo heerka koowaad ee waxbarashada sare ee digriiga oo ah cilmiga xoolaha, dalagyada, iyo sayniska kalluumaysiga. Dadaladaan waa kuwo aan ku filayn inay yareeyaan baahida ka taagan yaraanta dadkii xirfad layaasha ahaa ee dhinaca horumarinta beeraha.

Amaanka iyo hay'addaha maamul oo liita oo dhibaato ku ah soo kabashada beeraha

Dagaalka sokeeye ee mudada dheer socday ayaa keenay amaan daro ba'an oo ka jirta koonfurta iyo bartamaha Soomaaliya. Kooxo hubaysan oo qabaa'ilku leeyahay oo ka yimid gobollada dhexe oo aan wax aqoon iyo xirfad beerasho oo ay ku sii wadi karaan wax soo saarka lahayn ayaa qabsaday dhul beereedkii muhiimka ah ahaa ee ku yaalay gobolka Shabeellaha Hoose. Maamulka Siyaasadda (iyo canshuurta) ee meelo badan oo webiyada iyo marinada webiyada ah weli waxaa si balaaran ugu hardamaya ururka Alshabaab, oo ah urur wax iska caabin argagixiso ah, iyo ciidamada dawladda oo ay taageerayaan cutubyo ka tirsan ciidamada nabad ilaalinta ee Midowga Afrika ka socda. Sii socoshada amaan darada jirta waxay keentay khatar dhianca gaaritaankii beeraha iyo suuqyada, waxay kordhisay qiimahii wax lagu soo qaadayey iyo iyadoo ka dhigtay wax soo saarkii mid aan wax faaiido ah laga helayn. Xaaladaha noocaan ahi sidoo kale waxay keeneen in soo fara gelintii hay'addaha gargaarka ay caqabado balaaran la kulmaan. Wasaradihii heer Federaal iyo heer dawlad goboleed iyana adeegyaday u fidin lahaayeen beeraha waxay noqdeen kuwo xadidan, tamar daran, oo aan ku filnayn, maxaa yeelay shaqaale xirfadda leh iyo dhaqaalaha ayaa ku yar, waxaana ku adag gaaritaanka inta badan dhulka miyiga.

Sidoo kale waxay keentay tani banaanaasho siyaasaddii shaqooyinka, kormeerka iyo adeegyadii caadi lahaa ay bixin lahayd dawladdu. Muranka daaqsinka ee u dhexeeya qabaailka deriska ah wuxuu noqday mid caan noqday tan markii ay bur burtay dawladdi. Waxaana wakhtiyadaan danbe sii balaarana dhulalka sida gaarka ah looga xiranayo dhulkii furnaa ee soo jireenka u ahaa dhul daaqsimeedka, khaas ahaan meelaha xooluhu u kala guurayeen iyo gaadiidka degsiiooyinka iyo magaalooyinka, ayaa sii kordhiyey xasaradda. Xitaa meelaha xooga amaanka wanaagsan leh ee gobollada waqooyi, mana jirto hay'ad dawladeed ama mid bulsho oo awood u leh inay xaliso muranada ku aadan dhinacaan dhul daaqsimeedka.

Dhamays tirka diwaan gelinta beeraha ka samata baxay dagaalka sokeeye, laakiin iyadoon lahayn cadayn iyo sharci, cidda dhulka leh ee iyagu ka tegey beerahooda ku yaalay koonfurta Somaaliya wakhtigii dagaalada sokeeye weli ma ahan kuwo awooda inay dib u sheegtaan dhulkoodii, sababo la xiriira amaan

darada, waxaa kale oo liita habka dhex dhexaadinta dhaqanka iyo iyadoo ay meesha ka maqan tahay hay'adihii garsoor ee dawliga ahaa. Taas bedelkeed waxay kaga duwan yihiin gobolkada Waqooyi inay ka jiraan muranno aad u yar oo dhinaca dhulka, goboladaas lahaanshaha dhulka laguma murmo iyo wasaaradda beeraha oo bixisa ruqsado cadaynta dhul beereedka cusub ee loo bixinayo in beero laga dhigo (Inta badan kuwa cusub, beeralayda yar yar).

Nabaad guurka deeganka iyo isbedelka cimilada oo iyana keenay caqabado cusub

Xaalufka daran ee kaymaha iyo nabaad guurka ciidda ee ka imanaya hawlaha aan sharciga ah ayn ee dadku ku samaynayaan deegaanka, bur burinta dhul daaqsimeedka iyo isbedelka cimilada ayaa keliya aan khatar ku ahayn kororka dhaqaalaha ee sidoo kale waxay dhibaato weyn ku tahay hab dhaqankii soo jireen ee xool raacatada Soomaaliyeed iyo beeralayda wax ku beerta roobka. Sanadkii 2014 kaymuhu waxay dhulka wadanka ka ahaayeen 10%, iyagoona ahaa ka hor 1982 ahaa 62%. Iyadoo ay dhinaca socdaan dhul daaqsimeedkii oo si gaar ah gaar loo xirtay iyo qoysas deegaamayn joogto ah ka sameeyey dhulkaas ayaa uga sii daray xaalufinta kaymaha, dhibatooyinkaanna weli waa kuwo si xawli leh ku socoda. Waxaa iyana yaraaday qul qulkii webiyadda tanoo ay keentay kororka isticmaalka biyaha ee biyo qabatinada dhulka sare ee Ethiopia, arrintaani sidoo kale waxay khatar ku noqotay in waraab loo helo dalagyada.

Dhibatada ugu balaaran ee ku dhacday xaalufinta loo geystay dhul daaqsimeedka waxay ahayd mid aad u balaaran iyadoona si daran loo jaray geed qodoxlaha quraca oo laga jaro dhuxuso, taasoo dhoofkeeda lagu qiyaasay in sanadkii ay gaarto 56 milyan oo dollar, waa qiyaasta la sameeyey 2011, tanoo ahayd mid aan jirin ka hor dagaalkii sokeeye ee 1990meeyadii. Ganacsigaani wuxuu noqday mid ay si weyn gancata ugu hayaan iyo inuu yahay il dhaqaale oo ay canshuur ka heleen ururka Alshabaab. Tan iyo sanadkii 2012, waxaa sii kordhayey in la dhaqan geliyo meel marinta xakamaynta dhoofinta dhuxusha ee ay soo jeedisay dawladda federaalka iyo maamul goboleedyada, sidoo kale wadamada soo dhoofsada ee ku yaal gacanka khaliidja, baahinta iyo soo saarista shooladaha gaasta ku shaqeeya ee wax lagu karsado iyo kororka dhinaca wacyi gelinta ee dhianca deegaanka oo isna si wanaagsan ku socday ayaana yareeyey doonistii iyo soo saaristii dhuxusa.

Dhamaadkii sanadihii 1980maadkii, Soomaaliya waxay ahayd wadanka aduunka ugu weyn ee soo saara, dhoofiyaha xabagta maydiga iyo mal malka. Wax soo saarkeedii iyo dhoofka qayb ahaan waxay la xiriirtaa iyadoo xad dhaaf noqota iyo jiilasha cusub ee geedaha ka dhaxlay waalidkood oo si aan hagaagsanayn xabagta u gura, iyagoo aan fiirinaya keliya sida ay geedka xabagta ugu badan uga heli karaan, halka aysan wax ogaal ah u lahayn bed qabka caafimaad ee geedka wakhtiga dheer.

Dhacdooyinka cimilada la xiriira; oo ay ka mid yihiin isbedelka hawada iyo heerkulka oogada badda, roobabka, huurka, hogashada daruuraha, culaysyada deegaan iyo xawaaraha dabaysah ayaa mar horeba noqday kuwo sis ii kordhaysa aan loo saadaalin karin oo xad dhaaf ah kana jira geeska Afrika. Sideed abaarood oo dhacay 40kii sano ee la soo dhaafay ayaana si daran waxyeelo ugu geystay dalaggga iyo wax soo saarkii xoolaha ee Soomaaliya. Bilowgii 2017, saamayn ka dhalatay dhowr xilli roobaad oo baaqday ayaa abuuray dhibaato bani'aadanimo oo aad u daran, taasoo keentay khatar ah in macaluuli ka dhacdo meelo yar.

Cimilada geeska afrika waxay sii noqonaysaa mid aad u sii qalalan, kulul, qalafsan, aadna u sii xad dhaaf ah tobanaankii sano ee la soo dhaafay , tanoo yaraysa dlagyadii, xoolihii, kalluumaysigii iyo kaymihii ay ku tiirsanaayeen hab nololeedka dadku. Inta badan cimilada la saadaaliyo waxay tustaa roobab badan, taasoo cadaynaysa soo jireenka wixii dhowanahay iyo wakhti horeba, soojeedimaha cimiladuna waxay noqon donaan kuwo qalayl sii noqdo. Dhamaan saynis yahanadu waxay isku raaceen in mustaqbalka ay sii kululaanayso tanoo si la taaban karo iyo si joogto ahba si daran u saamaynaysa helitaankii roobabka.

Duruufaha ka dhashay sibedeladaan waxay six un u saameeyeen beeraha Soomaaliya, heerkulka hawada ee sareeya wuxu kor u qaadi doonaa qaab samaysankii ciidda, soo bixiddii dhirta iyo oogada biyaha. Is bedbedlada badan iyo roobabka xad dhaafka ah waxay xumaynayaan ciida tanoo keenaysa nabaad guur iyo inay roganto, in biyo yari dhulka galaan iyo in helitaanka biyaha oogada dhulku ay yaraadaan tanoo saamaynaysa bixitaanka geedaha. Saamaynaha kale ee suurta galka ah ee ay keenayso waxaa ka mid ah iyadoo yaraynaysa wax soo saarka cawska iyo helitaanka biyaha, waxayna tani si xun saamayn ugu yeelanaysaa xoolo raacatada iyo arrimaha la xiriira hab nololeedkooda. Kororka heerkulka badda iyo kor u kaceedu waxay sidoo kale yaraynaysaa wax soo saarka kaluunka, waxayna isbedel ku samaynaysaa wixii laga helayey.

Wax qabad xoog leh oo lagu sameeyo nolosha xoolaha waxay ka hor tagtaa wax soo saarka liita xoolaha

Xoolaha nool weli waa kuwo ay ku tiirsan tahay qaninimada wax haysiga qoyska Soomaaliyeed, waa kuwa ugu balaaran ee ah waxa wadanku dhoofiyo, waana khayraad dhaqaale oo muhiim u ah nolosha qaybo badan oo ka mid ah dadka. Habka ugu weyn ee wax soo saarkooduna waa habka xoolo raacato iyo beeralay xoolo dhaqato, waxa ugu badan ee laga helaana waa nacfiga xoolaha (waxaana ugu badan nacfigaas xoolaha laga helo geela) oo ay soo kordhaysay hab dhaqashada xoolaha ee aan ahayn kuwa guur guura. Waxayna nacfiga xoolahaa aan guur guurini quudiyaan magaalooyinka iyo suuqyada ku xiran magaalooyinka oo ay siiyaan caano dhay ah, iyadoo aysan jirin haba habayn ah oo kale oo la mariyo.

Waxaa koreeye dalabadka iyo kororka nacfiga xoolaha oo wanaagsan tayana leh oo hab ganacsi ah ku yimaadda, lagana helo suuqyada iyo goobaha dekedaha ah. Sidaa darted habka ugu weyn ee wax soo saarka quudinta xoolaha waa cawska iyo cagaarka kale ee ka baxa dhul daaqsimeedka, kuwaasoo leh heer nafaqo oo liita. Wax soo saarka ka yimaadda cawskaanna waa mid yar, sidoo kale habka kaydinta ayaa isna liita, kaasoo si dhakhso ah u luminaya nacfigii ku jiray. Waxaa taasi keentay inay kororta baahida loo qabo firalayda iyo dalagyada kale ee cusub iyo xitaa raashinka gargarka ee dadka loogu deeqay in la iibiyo laguna quudiyo xoolaha.

Inkastoo ay si wanaagsan ula qabsadeen cimilada dhibta badan iyo cimilada deegaan, xoolaha Soomaaliya waxay caan ku yihin miisaan h ooseeya iyo caano yai, iyadoo keliya xoolaha culus loo xusho in la qasho ama la dhoofiyo halkii iyaga laga sii tabci lahaa. Maqnaanshaha barnaamijyadii caafimaadka xoolaha iyo hay'addihii ku shaqada lahaa, qaybaha gaarka loo leeyahay iyo ururo takhaatiir xoolaad oo ay maal geliyeen la hawl galayaan horuamrinta ah ayaa bixinayey adeegyo aad u mihii ah oo daaweynta xoolaha ah. Dadalada noocaan ahi ma ahan kuwo ku filan inay xaliyaan khatarta daran ee ka imaanaysa cudurada xoolaha, kuwaasoo ku dhacaya xoolaha ayna ka dhalatay xayiraadda dhoofkooda la saarayo. Joojintii ugu danbaysay ee dhoofka xoolaha ee Sucuudiga sameeyey waxay ahayd dhamaadkii sanadkii 2016, waxay keliya ahayd mid ku meel gaar ah wakhtigii July ilaa Sebteembar 2017, sidoo kale bilowgii sanadkaan 2018 waa mid weli sii socota.

Qaybtaan xooluhu waxay si la yaableh u muujisay adkaysi, inkastoo suuq geynta xoolaha, caaifmaadka iyo wanaajinta bed qabka xoolaha iyo wax soo saarkooda ay six un u saamaysay abaaraha wakhtiyadaan danbe jiraa. Suuq geynta xoolaha waxaa lagu qiyaasay 53 milyan oo dollar sanadki 2014 tanoo si weyn uga koraysa intii la diwaan geliyey dhamaadkii sanadihii 1980maadkii oo ahayd qiyaasta 40 milyan oo dollar. Soomaaliya waxay leedahay geela ugu badan oo tiro ahaan lagu sheegay 7.1 milyan sanadkii 2016, tanoo ka badan wadan kastoo kale oo dunida ah geela jooga. Maalin gelin joogto ah horumarinta tayda xoolaha ah waxay gacan ka geysatay inay si wanaagsan u hormariso dhoofka xoolaha, waxaana ka mid ah horumarinadaas taranta oo ah qiimaha tanoo keentay in si wanagsan ay kor ugu kacdo dakhliga xoolaha ka soo xerooda oo gaaray sanadkii 2015 aduun gaaraya 533 milyan oo dollar tanoo aad uga koraysa dhaqaalihii ka soo bixi jiray ka hor dagaaladii sokeeye. Habaynta nacfiga xoolaha waa mid aad u yar, kana hooseeya heerka caadiga ah ee la rabay.

Wax soo saarka caanaha, khaas ahaan geela, wuxuu ahaa mid si tartiib ah u kobcayey tan iyo dhamaadkii sanadihii 1980maadkii, wuxuna gaaray qiimaha wax soo saar ee suuqa uu geelu ku leeyahay 3.3 bilyan oo dollar sanadkii 2014. Soomaaliya waxay weli soo dhoofsataa nacfiga xoolaha iyadoo aan iyadu wax nacfigeeda xoolaha ah aan dhoofin. Bilowgii sanadkii 2017 waxaa saamayn k yeeshay wax soo saarkii caanaha abaartii iyadoo dhintay kala bar caanihii geella iyo saddexdii meeloodba laba meelood ka dhintay caanihii lod'da iyo riyaha. Qaab dhismeedka garba duubka u xiray in nacfiga xooluhu gaari heer laga faa'iidayso waxaa ka mid ah saamaynta ay keentay wanaajinta iyo caafimadka nolosha xoolaha, sidoo kale dhaqan gelinta iyo heerka saxo oo liita, maqnaanshaha habaynta lagu sameeyo tayada caanaha, dariiqyo suuq geyn oo aan jirin, jidadka oo liita, cimilada aadka u kulul iyo huurka oo khasaariya wax soo saarka nacfiga xoolaha iyo maqnaasnshaha aasaaska dhaqaale.

Wax soo saarka hilib cusub wuxuu kordhiyey in ay kororto baahida gudaha, laakiin wuxuu weli ka hooseeya heerkii loo baahnaa in looga faa'iidaysto. Habaynta hilibka ganacsiga loogu tala galay waa mid aad u yar, keliyana loo adeesado adhiga jiqiiqa ah iyo hilibka lo'da ee dhoofka loogu tala galay. Inuu kobcana waxaa jilbaha u dhigay arrimahaan aan kor ku soo sheegnay iyo sidoo kale maamul xumo. Tirade hargaha iyo saamaha marka la bar bar dhigo dhamaadkii sanadihii 1980maadkii waxay ahaayeen qiyaastii 7 milyan oo harag. Hargaha iyo saamaha diyaarsani waa kuwo tayadoodu liidato, waana kuwo si aan hagaagsanayn loo megdiyey iyo nidaamkooda kaydinta oo liidata ayaana keentay inay noqdaan kuwo dhaawacyo qaba. Caadiyan ka hor dagaalkii sokeeye habaynta harguhu waxay ahaayeen kuwo keliya qoraxda lagu qalajiyo iyadoo aysan jirin wax laga sameeyo maqaarka oo gudaha laga soo saaro.

Xanaanada digaaggu waxay si balaran ugu siid hex fidaysaa qoysaska saboolka ah. Soo dejinta digaag iyo ukun maalmo lagu kobiciyey waxay madax wareer ku riday wax soo saarkii gudaha ee dhinaca dhaqashada digaagga, beero digaag oo gudaha ahina weli waa kuwo aad u yar laakiin si tartiib ah ku koraya. In qaybtaan la balaariyo waxaa caqabad ku ah yaraanta iyo qiimaha koreeya ee ku baxaya, kharashkaas badanna waxaa ka mid ah quudinta digaagga iyo waxa lagu quudinayo helitaankeeda.

Wax tarka qaybhoosaadka dalaggu waa mid liita, laakiin muhiimadda uu u leeyahay in ka kobciyo waa mid aad u saraysa

Qiyaasta 3 milyan oo higtar oo ka ah qiyaasta dhulka beereedka Soomaaliya 5% ayaa la beeraa, tiradaan 2.3 milyan oo ka mid ah waa kuwo lagu beero roobka iyo 700 oo kun oo higtar oo lagu beero bam biyaha soo tuuro ama hab waraab la maamulo. Sanadihii danbe, keliya qaybo ka mid ah dhulka la waraabin karo ayaa la waraabiyey, lana beeray, taasoo ah wax ka yar 20% inta ku haboon iyo kala bar dhulka la waraabin jiray ka hor dagaalkii. Qiyaasta saddex meelood oo laba meelood oo dhulka beerashada ku haboon ah, oo ah beeraha roobka iyo kuwa waraabka, waa dhul wax dhalis leh una dhexeeya inta badan labada webi ee gobollada koonfurta. Qaybo yar yar oo beeraha roobka ah oo ku yaal gobollada waqooyi galbeed iyo meelo ku yaal dhulka xeebaha ee la beero eek u yaal gobollad waqoyi bari ayaa iyana kaalinta saddexaad soo gelaya. Meelaha roobka wax lagu beerto waxaa biyo lagala soo baxaa dhulka hoostiisa, biyaha roobka oo la qabto iyo farsamooyin qoyaanka ciidda lagu joogteeyo.

Habka waraabinta beeraha, kaasoo inta badan lagu beero geleyda, sisinta iyo dagalayada kale, muuska, geed midhoodka kale iyo khudaarta waxay wajahayaan iyana dhibaatoyin. Waxaa ka mid ah (a) caqabadahaas hoos u dhaca iyo helitaanka biyaha oogada kore ah oo dhibaato ka jirto, tanoo keentay dhibaato ku timid helitaanka waraabka iyo kaabayaashii lagu ilaalinayey daadka ee koonfurta Soomaaliya; (b) isticmaalka biyo aan ku filayn, waxay kordhisay dil dilaaca ciidda iyo haysiga biyaha, tanoo ay ka dhalatay in la waayo habka qorshaynta isticmaalka biyaha iyo nidaaminta, (c) maamulka wax dhalista ciidda oo liita, sida in lagu daro digayn, barwaaqeeye iyo cayayaan dile , hababkaani waa kuo aan si hagaagsan loo isticmaalin haddii la adegsado ama gebi ahaanba lama isticmaalo; (d)

tayada abuurka oo liidata iyo suuqyada oo keliya noocyo kooban oo abuur ahi yaalaan; (e) waxaa yar oo aan la heli karin qalabkii (inta badan beeralaydu waxay isticmaalaan qalab lagu sameeyey gacanta si ay dhulka ugu diyaariyaan); (f) waxaa sii xumanaya wadooyinka, tanoo badisay wakhtiga iyo qiimaha gaadiidka ee la doonayo in dalagyada lagu geeyo suuqa, waxayna caqabad tani ku noqotay in la balaariyo wax soo saarka dalagyada; iyo (g) habab aan haboonayn oo dhinaca beerashada ah, tanoo dhaxalkeedu noqday maqnaanshaha habkii fidinta iyo adeegyadii cilmi barista.

Waxaa intaas dheer, muhiimadda wax soo saarka beeraha eek u dhisan waraabka waxaa khatar ku noqday horumarinta ay Ethiopia ku samaynayso marinada biyo qabatinnada webiyada Jubba iyo Shabeelle. Webiga Shabeella wuxuu si xiriir ah u qalalay laba sano oo isku xigta oo kala ahayd bishii Maarso 2016 iyo Diiseembar 2016 iyo bilowgii bishii Abriil 2017, waana wax cusub oo aan horay loo arag. Hir gelinta buuda ee qorshayaasha maashaariic ee waaweyn ee Ethiia ay fulinayso waxay si cad u yaraynayaan qul qulka webiyada ee ka imanaya dhulkeeda, waxaana suurto gal ah 80% biyaha webi shabeelle in la waayo iyo inay ka dhashaan waxyaalo aan lagu tala gelin sida daad si kedis ah ku yimaadda.

Beeraha roobka, habka wax soo saar ee nidaamkaan waxaa keliya oo isticmaala qoysaska miyiga ku nool si ay u daboolaan baahidooda, dalagyada ugu badan ee ay beertaanna waa mesego, digir iyo wax aan badnayn oo geley iyo sisin ah, sidoo kale waxay beertaan qaadka iyo heedda oo iyana ka baxa waqoyi galbeed. Caqabadaha ugu waaweyn ee ay wajahayaan beeralayda nidaamka roobka wax ku beerta waxaa ka mid ah (a) roob yaraan iyo badnaan aan la saadaalin karin oo ka duwan wixii hore, tanoo ay ka dhalatay waxyaabo badan oo soo noq noqday oo dhinaca abaaraha iyo daadadka ah; (b) waxaa sii xumaaday qabsashada biyaha roobka iyo kaabayaasha kaydinta biyaha; (c) maamulka ciidda oo liita, tanoo ay ka dhalatay inuuyaraado horumarinta qoyaanka carada iyo hab biyo shub oo ku filan; iyo (d) hab liita oo farsamada beerashada ah oo ay leeyihiin.

Xitaa sanadaha caadiga ah, cel celis ahaan wax soo saarka ka soo baxa beeraha waraabka iyo kuwa roobkaba waa mid aad u hooseeya. Sidaa darted, haddii caqabadah si dhab ah loo xaliyo, waxay tirakoobeen khubarada in cel celis ahaan wax soo saarku kordhi karo wax la taaban karo sida geleyda oo afarta loor soo saaraysay la gaarsiiyo lix iyo mesegada oo saddex laga qaado.

Qayb hoosaadka kalluumaysigu waxay leedahay awood muhiim u ah kororka

Soomaaliya waxay leedahay xeebta ugu dheer afrika oo dhererkeedu yahay 3,330km iyo qayb balaaran xuduud badeedka dhaqaale ee afka qalaad loogu soo gaabiyo (EEZ). Inkastoo qalfoof badeedku gaaban yahay, sidaa darted xayiraad suuqa kaluunka ayaa jira, intaa ka ahayn dhul xeebeedka Puntland, Soomaaliya si balaaran dhaqaalaha badda wuxuu taageerayaa si balaaran oo noycada dhaqaalaha iyo kalluunka ah, waxaana jira noocyo badan oo laga helo sida kalluunka tuna iyo qaybo kala gedisan sida cansaanyada, caydiga iyo noocyada qubada.

Isticmaalka kaluunka ee gudaha Soomaaliya weli waa mid ka mid ah meelaha ugu hoseeya Afrika, laakiin wuxuu ku sii kordhayaa magaalooyinka iyo qurbo xubnaha qurbo joogta ee soo noqonaya, tanoo keentay in ay kor u yara kacda dalabka kaluunka cusub ee ka imanaya gudaha. Bulshooyinka xeebaha ku nooli dhaqan ahaan kalluumaysigu wuxuu u yahay hanaan uu ku tiirsan yahay haqab beelkooda cunnada iyo nolosha qoyskooda, waxaana kalluunka loo dhoofiyaa Kenya, Tansaaniya, iyo wadamada gacanka carabta.

Daciifnimada iyo maqnaanshaha dawladeed iyo la'aanta hawlaha maamulka kalluumaysi 30kii sano ee la soo dhaafay ayaa waxay keentay farsamada kaluumaysi oo ah mid sharci ah iyo mid sharci daraba ah oo ay samaynayaan maraakiibta jariifka ah ee shisheeya inay balaarato iyadoo aysan jirin wax ilaalin ah oo lagu hayo. Arrintaanna waxaa ka dhashay dhibaato ku dhacday badda iyo deegaanka xeebeed. Waxaa intaas dheer iyadoo ay sii kordhayaan heer kulka badda iyo heerka badda oo kor u sii kacaya oo iyana saamayn xun ku yeelanaya shabakadaha

kalluumaysiga ee xeebaha iyo dhulka kaluumaysiga iyo koror ku yimaadda daadad ku soo dhaca dhulka hoose iyo marintada iyo sidoo kale inay aasmaan goobihii cusbada.

Aqoonta kallumaysatada soomaaliya ay u leeyihiin kalluumaysiga waa mid aad u kooban, waayo biyaha Soomaaliya waxay yihiin mid aan laga faa'iidaysan, iyo iyadoo ah meel aan la ilaalin. Ma jirto xog rasmiya oo la isku halayn karo oo ku aadan hawlaha kaluumaysiga, dhulka, suuq geynta iyo xaaladdaha deegaanka oo laga uririyey kadib iyo ka horba dagaalkii sokeeye. Kaluumaysiga badweynta waa mid qaab ahaan balaaran, iyadoo ay dhinac socoto in meelaha berriga u dhow waxa ka kaluumaystaa ay yihiin ragga, iyagoona tiro ahaan ah 9,500 oo kalluumaysato wakhti buuxa ama qayb ahaan wakhti kalluumaysta, oo ayna haystaa qiyaasta 1,300 oo doonyo yar yar oo kalluumaysi, ganacsiga iyo taageerada hawlaha habaynta kaluunka waxaa fuliya haweenka. Tan iyo 1980, , qiyaasta ay sameeyaan koox Soomaali ah iyo cilmi baarayaal caalamiya oo ay ku sameeyeen gudaha badweynta iyo xeebaha ee ku aadan kalluumaysatada gudaha iyo kuwa shisheeye waa mid isbedbedelaysay, laakiin waxay muujiyeen inuu jiro koror, kaasoo ay la socoto heerarka wakhtigaan oo u dhexeeya in lixdiiba mid iyo afartiiba mid ka mid ah qiyaasta laga sameeyey wax soo saarka sanadle ee la heli karaa uu yahay 835,000 oo tan. Qiimayn la isku halayn karo waxay tusinaysaa in 17 nooc ay jiraan, iyadoo 8 ka mid ahi yihiin, afdhuub, Tabadiin, Boqor, Geesale, libaax iyo fiidmeer (kuwaan oo 40% ay soo jilaabtaan kaluumaystadu, waxaana jira noocyo kale oo kalluumaysigoodu uusan joogto ahayn.

Maamulka badaha iyo kalluumaysigu weli waa mid aan socod baran, sharciga qeexaya bixinta ogolaanshaha ee la qeexay kaasoo hoos imanaya sharicigga kalluumaysiga ee dawladda federaalka ay meel marisay 2014, kaasoo weli aan weli muhiimadiisa la dhaqan gelin iyo qayb ahaan sharci dejiyaasha Gobolada ama sharciyada. Wadaagista dakhliga ee u dhexeeaya dawladda federaalka iyo kuwa maamul goboleedayada eek u aadan sharciyada kallumaysi ee la bixiye dhowaanahan in la meel mariyo. Inkastoo ay jiraan rajooyinka, ha ahaado dawladda federaalka ama wasaradaha gobollada oo si hufan loola socdo arrimaha ku aadan sharciyada la bixiyey iyo iyagoo aan lahayn awoodda ay ku ilaalin karaan ama kula socon karaan kaluumaysiga khaas ahaan kan ka socda badweynta.

Caqabadaha ugu waaweyn ee qaybtaan waxaa ka mid ah (a) maqnaanshaha iyo hab isku xiran oo adeegyada qaboojiyaha ah oo liita, (b) iyadoo aysan jirin marsooyinka dhulka ah oo laga heli karo dekedaha waaweyn oo ah adeegyada kalluumaysiga, (c) habka habaynta oo yar, iyo (d) maqnaanshaha ama ay aad u hoosayso isku xirka gaadiidka ee u dhexeeya suuqyada ku yaal magaalooyinka waaweyn iyo bulshooyinka godoonsan ee kalluumaysatada ah eek u nool xeebaha, qaybo badan oo ka mid ahi waxay ku xiran yihiin kalluumaysato Yaman ka yimid oo ay ganacsi kalluumaysi la sameeyaan, uuna ka soo galo dakhli.

Waxaa jira arrimaha xoog leh oo ah walaacyo ay qabaan sanisyahanadu iyo kalluumaysatada oo loo tix gelin karo muhiimado jiro kuwaasoo ah in qaybo badan oo ka kalluumaysiga biyaha Soomaaliya lagu balaarin karo, gaar ahaan kaluunka noocyada tuunada ah. Sidoo kale kaluunta xumaaday ayaa loo isticmaali karaa qaabab kala duwan, oo ay ka mid yihiin quudinta dadka, xoolaha iyo in laga dhaliyo tamar. Maamul wax tar leh, hab isku agaasiman, kormeer, maalgelin guud iyo qorshooyin farsamo oo lagu caawinayo, oo ay ka mid yihiin taageero loo fidiyo in lagu balaariyo agaasinka qorshayaasha kalluumaysgi ee iskaashatooyinka iyo qaybaha gaarka loo leeyahay ayaa looga bahan yahay si loo xaqiijiyo in la joogteeyo dhamaan kalluumaysiga. Laba ha boo lagu hormarin karo suuq geynta iyo qiimaynta soo jilaabashada iyo hakbak dhaqaale sidoo kale in la meel mariyo habkii uu ku shaqayn lahaa sharciyadii kalluumaysi ee jiray.

Maamul xoog leh, maarayn, balaarinta adeegyada iyo kaabayaasha dhaqaalaha ayaa looga baahan yahay si loo taageero maal gelinta gaarka ah ee wax soo saarka iyo suuqyada

Marka laga soot ago wakhtiga dhow ee loo gudbayo wakhtiga dhexe, soo kabashada wax soo saarka beeraha, khaas ahaan dalagyada si kor loogu qaado heerkooda waxay ku xiran tahay amaanka, hay'ado maamul oo xoogan oo dadka iyo dawladda

ah iyo ugu yaraan in la bilaabo talaaboyin horay loogu qaadayo oo dib loogu habeeyo habkii dumay ee ilaalinta daadka, waraabka iyo kaabayaasha gaadiidka. Wakhtiga dheerna, muhiimadda ay leedahay kor u qaadista qaybtaani waxay xaqiijin kartaa horumarinta iyo fulinta qoshe leh faham oo lagu hormariyo, oo ay taageeraan hay'ado maamul oo wax tar leh iyo fara gelin keenta in la dhiiri geliyo qaybaha gaarka loo leeyahay ee wax soo saarka koowaad iyo kan gudaha iyo ganacsiga dibadda waxa ka imanaya iyo habaynta wax soo saarka. Markii la xaqiijiyo lahaanshaha wadanka iyo isku duwidda agaasinka, wuxuu bixinayaa fursado dhaqaalah iyo shaqooyin oo ay helaan dhalinyaradu iyo in lacagaha ka imanaya xawaladuhu noqdaan maal gelin halka ay hadda ka yihiin wax la quuto oo dabka lagu shubo, qorshahaan waxaa ujeedkiisu noqon karaa in lagu gaaro ujeedooyinkaan soo socda:

- Kor u qaadista wax soo saarka dalaga oo ka badan heerka uu hadda joogo, iyadoo la gaarsiinayo hab buuxa oo soo kabasho ah oo dhinaca kaabayaasha dhaqaalaha dadweynaha iyo meel marinta farsamada casriga ah ee la hormariyey iyo hab wanaagsan oo cimilo ah oo lagu saleeyo beeraha.
- Ilaalinta iyo horumarinta xaaladaha deegaan, iyadoo la iftiiminayo dhamaan dayaca ka jira qaybaha beeraha ee saamaynta xun ku yeelanaya ee ka imanaya isbedelka cimilada
- Dubu habaynta qaybaha gaarka loo leeyahay ee hagaya nidaamka wax soo saarka ee dhamaan qaybaha oo loo habeeyo, ganacsi ahaan iyo mid loo tartamo kaasoo kor u qaadaya habka diyaarinta wax ka soo baxa beeraha.
- Xoojinta adkaysiga wax haysiga qoysaska iyo haraynta gaajada iyo nafaqa darada, oo ay ka mid tahay iyadoo la soo saarayo hab cusub oo lagu kaydiyo wakhti dheer wax soo saarka soo baxay, habkaasoo leh farsamo casriya iyo nidaamka ka hor tegis oo ku aadan khataraha abaaraha.

Talo bixinno ku aadan xalka cadayna caqabadaha waxaa ka mid ah waxyaalahaan soo socda

- Isbedelka cimilada. In si buuxda looga fuliyo Soomaaliya hab wanaagsan oo tilamaamaya qorshe wax qabad oo looga bahan yahay in lagu kobciyo nidaamka beeraha kaasoo loo hormariyey hab u adkaysi oo cimilada ah. Tan waxaa xoogga lagu saaraya, hab dhexdhexaad, fulinta taageero iyo kor u qaadista nidaamka hagaajinta cimilada ee beeraha oo leh wax qabad iyo casriyeyn.
- Maamulka khayraadka dabiiciga ah iyo dhul daaqismeedka. Waxaa jirta baahi sii kordhaysa oo loo qabo kala maamulista dhulka, gaarista siyaasado la isku raacsan yahay iyo ku fulintooda bulshooyinka gudaha; horumarinta tayada bulshada si ay u maamushaan khayraadkooda dabiiciga ah hab ku haboon; iyo taageerada dib u habaynta dhul daaqsimeedka iyadoo la sinayo taageero farsamo iyo maal gelin guud, waana (a) xoojinta ciida iyo maaraynta biyaha, (b) Dibu dhiraynta iyo dhirta, (c) dib u beerista daaqa, (d) abuurista dhirta u adkaysta abaaraha iyo cawsaska dhakhsaha u baxa iyo bahaha digirta, (e) isticmaalka biyo xireeno waaweyn oo biyaha lagu qabto iyo habab kala duwan oo farsamo casri ah leh taasoo lagu ilaaliyo daadadka.
- Dhuxusha: xabagta iyo fooxa. Barnaamj lagu balaariyo wax qabadka si loo yareeyo dhuxusha, khaas ahaan jarista geedka quraca ah, waa inay noqoto mid leh muhiimadda ugu saraysa ee dhamaan maamul goboleedyada. Tan labaad maamulada Puntland iyo Somaliland iyo deeqbixiyaasha oo taageeraya waa inay muhiimadda koowaad siiyaan ilaalinta dhirta kale, oo ay ku jirto maydiga, beeyada iyo xabag carbeedda, iyadoo la bilaabayo hab xoojin ah oo lagu joogtaynayo jiritaanka. Dejiyayaasha siyaasaddu waa inay dhiiri geliyaan waxyaabo dheeraad ah oo lagu taageeryo habab cusub oo maal gashiga gaarka loo leeyahay oo leh tayo wanaagsan oo ah habaynta dhamaan xabkaha iyo malmalka, sidoo kale wax soo saarka ka soo baxa kaymaha sida dacarta oo kale.
- Xoolaha: Taakulaynta iyo muhiimadda siyaasadda guud waa inay noqotaa dhismaha awoodda hab isku xiran oo lagu maamulo daaweynta cudurada xoolaha, waa in loo furaa wada hadalo laba dhinaca ah oo lala yeelanayo wadamada soo dhoofsada si la isula fiiriyo iyo in lala

socdo heerka faya qab iyo waxyaabaha kale ee muhiimka ah ee looga baahan yahay xoolaha. Waxyaabaha kale ee muhiimka ah waxaa ku jira kor u qaadista habka dhalista iyo habka farsamo ee wanaagsan ee dhaqashada xoolaha iyo xoojinta siyaasado ku aadan isticmaalka dhul daaqsimeedka, qorshaynta iyo dhaqan gelinta ay kaga qayb gelayaan bulshadu. Taageerada lagu talo bixiyey waa hab isku dhaf ah oo nidaamka wax soo saarka ah, si looga faa'iidsya xiriirka u dhexeeya wax soo saarka dalagyada beeraha iyo xoolo dhaqatada miyiga kaasoo ah nidaam lagu balaarinayo hab balaaran oo isku xiran oo quudinta iyo kor u qaadista qiimaha iyo fursadaha kala duwanaanshaha. Siyaasada isticmaalka dhul daaqsimeedka, qorshaynta iyo meel marinta, khaas ahaan waxa khuseeya dhul xirashada sida gaarka loo xirto, sidoo kale waxaa loo bahan yahay in la xoojiyo. In la xoojiyo kor u qaadista qaybaha gaarka loo leeyahay waxay keenaysaa qiimo dheeraad ah iyo habayn ku timaadda wax soo saarka xoolaha. Dhiiri gelinta wax soo saarka xoolaha waxay si fudud u balaarin kartaa hab wanaagsan oo rasmiya oo la gaaro.

- Dalagyada: Gaarista barnaamijyo wakhti dhexe ah waxaa looga bahan yahay in si degdeg ah loo fuliyo , hab balaaran iyo mid joogto ah oo wax soo saarka ah iyo in wax soo saarku helo hab alaabooyinku ay ku caga dhigtaan iyo hab balaaran oo sku kala duwanaanshaha wax beerista iyo dalagyada kale ee qiimaha sare leh ee hormarinaya dkahliga iyo nafaqada. Qaybaha ugu waaweyn waa inay ku jiraan (a) dhismaha maamul iyo tayada wax qabad ee dadka; (b) dib u dhis lagu sameeyo habka ilaalinta daadadka iyo kaabayaasha waraabka ee dul saaran labada webi ee koonfurta Soomaaliya; (c)balaarinta biyo qabatinada roobka iyo habka celinta qoyaanta iyo soo saarista hab lagula socdo nabaad guurka qoyaanka ciidda iyo dariiqyada warbixinaha looga helayo gobollada bartamaha iyo waqooyiga Soomaaliya; (d) dibu dhiska jidadka caro tuurka iyo wadooyinka miyiga si loo hormariyo gaadiidka si beeruhu u helaan wax tar iyo suuq geyn wixii ka soo baxa; iyo (e) horumarinta garitaanka iyo korinta wax dhalista oo ka imaanaysa maal gelin lagu sameeyo kaabayasha dhaqaalaha tanoo noqonaysa mid aan joogto ahayn haddii aan la helin hay'ad maamul iyo dhismaha tayada oo la sameeyo.
- Kalluumaysiga: Kororka ugu xoogga badan ee khayraadka kallumaysiga waa kalluunka tuunada iyo noocyada kale kaasoo isaga kala goosha soomaaliya soo saaristiisuna ay ku badan tahay biyaha badweynta wakhtiga mansoonka koonfurgalbeed uu dhacayo. Xaqiijintooduna waxay si balaaran ugu xiran tahay maal gelin lagu sameeyo qaybaha gaarka loo leeyahay si ay awood ugu yeeshaan inay ka kalluumaystaan biyaha gunta badda ah; horumarinta kallumaystada xeebaha iyo kuwa gudaha dhulka oo ay k amid tahay samaynta hab isku xiran oo qaboojiye oo suuqyada gudaha iyo horumarinta nafaqada iyo habaynta. Dhamaan heerarka dawladda, iyagoo la hawl gelaya hay'addaha caalamiga ah ee horumarinta kalluumaysiga, macaahidda waxbarashada iyo deeq bixiyaasha waxay ciyaari karaan door muhiim ah. Waxay gacan ka geysan karaan inay bixiyaan (a) ururinta xogta rasmiga ah ee dhulka taal iyo tilmaamaha qiimaynta, sidoo kale dhismaha taydaa baraysa, cilmi barista iyo xirfadaha ; (b) hab cad oo wax tar leh oo ku aadan maamulka kalluumaysiga, oo ah labada dhinacba dawladda federeaalka iyo heer maamul goboleed, tanoo ku salaysan qaab dhismeedka sharci iyo nidaamka sharci ee maal gashiyada gaarka loo leeyahay, oo ay k a mid yihiin bixinta sharciyada; iyo (c) dejinta iyo qiimaynta qiimaha, kobcinta, iyo fulinta qorshayaal balaaran oo horumarinta kalluunka goobo lagu dejiyo oo laga fuliyo dhamaan shanta dekedood iyo horumarinta la xiriirta kaabyaasha gaadiidka, oo ay ka mid yihiin jidadka miyiga oo bulshooyinka kalluumaysatada yar yar ku xiraya jidadka waaweyn iyo suuqyada magaalooyinka.

Chapter 1

THE DOMINANCE OF AGRICULTURE IN SOMALIA

KEY FINDINGS ▶

- Somalia's fragile and seriously degraded natural environment and the increased frequency and severity of drought and floods in recent years have buffeted the livestock and crop subsectors. Recurring droughts, the lack of research and extension services, and especially insecurity, lack of government, and consequent deterioration of the flood control, irrigation, and transport infrastructure in the Southern regions have severely reduced crop production.
- Livestock and crops nonetheless remain the main sources of economic activity, employment, and exports in Somalia. Supporting their recovery from the recent drought, strengthening their resilience to increasingly frequent extreme climate events, and improving their overall performance will not only strengthen the basis for the country's sustained economic development but also help cement peace and security, reduce poverty and malnutrition, and improve health outcomes.
- Fishery—which is still artisanal, virtually unmanaged, and exploited by illegal, unreported, and unregulated vessels—has good potential to grow.
- Agriculture's share of GDP has risen significantly from its prewar level of about 62 percent to possibly 75 percent or even higher. In the early 2010s, agricultural exports represented 93 percent of the country's total exports, down from about 95 percent prewar. Recent estimates suggest a dramatic expansion of the relative economic importance for Somalia of livestock. About 49 percent of the population still lives in rural areas, and about 46 percent of employed people work in agriculture (25 percent in crops cultivation, 9 percent in herding, 4 percent in fishing, and 7 percent in other related activities).
- Agricultural exports have climbed every year since the late 2000s, to a peak in 2015 of $634 million, more than five times the value before the civil war, thanks to livestock exports, which rose by a factor of almost 10 since the late 1980s. As a result of the impact of the recent drought, the volume of livestock exports fell 11 percent in 2016, and an even worse decline is feared for 2017.
- Sesame exports are Somalia's second-largest export. They reached an historical peak of $40 million in 2014 before falling 15 percent in 2015. Given the collapse of banana exports, dry lemon is the only sizable export among vegetables and fruits, the combined export value of which is only about 20 percent of prewar levels.
- Destructive charcoal exports to the Arabian Peninsula have fallen significantly since the federal and state governments started enforcing the export bans they adopted in 2012, but some are still taking place through informal channels and misclassification of shipments.
- Agricultural imports have risen since the late 1980s, reaching almost $1.5 billion in 2015, up from an annual average of only about $82 million in the late 1980s. The combination of increased domestic food demand (driven by rapid population growth and urbanization and largely supported by remittances) and the collapse of domestic crop production has led to a massive increase in food imports. Imports of *khat* have risen, with deleterious effects on labor productivity and socioeconomic activities.
- Somalia has a chronic food crop deficit. Local production meets only 22 percent of per capita cereal needs. Even in the best agricultural seasons, domestic production provides only about 40–50 percent of per capita cereal needs. Pastoral, farming, and fishing communities all suffer from high rates of chronic malnutrition. The root causes of poor nutrition include poverty, food insecurity, gender inequity, high population growth, and limited access to water, sanitation, and health services, as well as lingering civil conflict in many rural areas in Southern Somalia and more frequent, severe, and protracted droughts.

1.1 Livelihood Systems in Somalia

The economy of Somalia has always been based on its natural resources. Its rangelands, grass, trees, and shrubs feed the livestock that dominate exports, provide sustenance and cash income to its pastoralists and agro-pastoralists, and underpin the food security of most of its population, estimated at 12.3 million in 2014 (UNFPA 2014) and expected to be have reached 13 million in 2016. The fertile alluvial soils and water resources in the two main river valleys in the Southern part of the country underpin both crop and livestock production systems. Forests provide frankincense, myrrh, and gum arabic for both export and local markets, charcoal for cooking, and pasture and browsing resources for livestock. Though still minimally tapped for their economic potential, the country's long coast and ocean are home to numerous and valuable species of fish and other marine life.

The Somali civil war, which started in 1988 in the northwestern region (today's Somaliland) and reached Mogadishu in late December 1990, engulfed the Southern part of the country, causing severe deterioration of the country's natural environment, physical infrastructure, and human capital. It also resulted in major weakness—or, in the case of Southern Somalia, the total absence—of government institutions until the early 2010s. In the past three decades, these factors negatively affected all of the country's geopolitical entities and their economic performance, resilience, and revival, especially in the crop subsector. Nonetheless, the livestock and crop subsectors remain the backbone of the Somali economy, playing a crucial role in the country's food security, resilience, job creation, income generation, and foreign exchange earnings.

Some observers claim that, unlike many countries in Africa, Somalia has not experienced significant income growth, the emergence of a middle class, or the growth of the nonfarm economy. A comparison of recent gross domestic product (GDP) estimates with prewar estimates, however, strongly suggests that despite the turmoil, the nominal size of the economy increased more than fivefold and per capita GDP almost tripled between 1989 and 2015, from $187 to $549 (Table 1.1).[1]

In 1990, about 70 percent of the population was rural. In the last two and a half decades, the rural share shrunk by 21 percentage points. The most recent and best available estimates (UNFPA 2014) show that about 48.7 percent of the population (6 million people) lives in rural and nomadic areas. Among these people, 53.2 percent are classified as nomads, and 46.8 percent derive their livelihood from crops cultivation and fishing (believed to be no more than 1 percent of the total population).

Table 1.1: GDP and GDP per Capita in Somalia, 2010s and 1980s

Year	GDP at market prices (millions of dollars)	GDP per capita (dollars)
1980	604	129.1
1985	878	163.1
1986	934	168.3
1987	1,023	179.2
1988	1,046	177.9
1989	1,132	186.9
2013	5,352	434.5
2014	5,706	450.2
2015	6,111	468.6
2016	6,336	472.1
2017	6,522	472.3

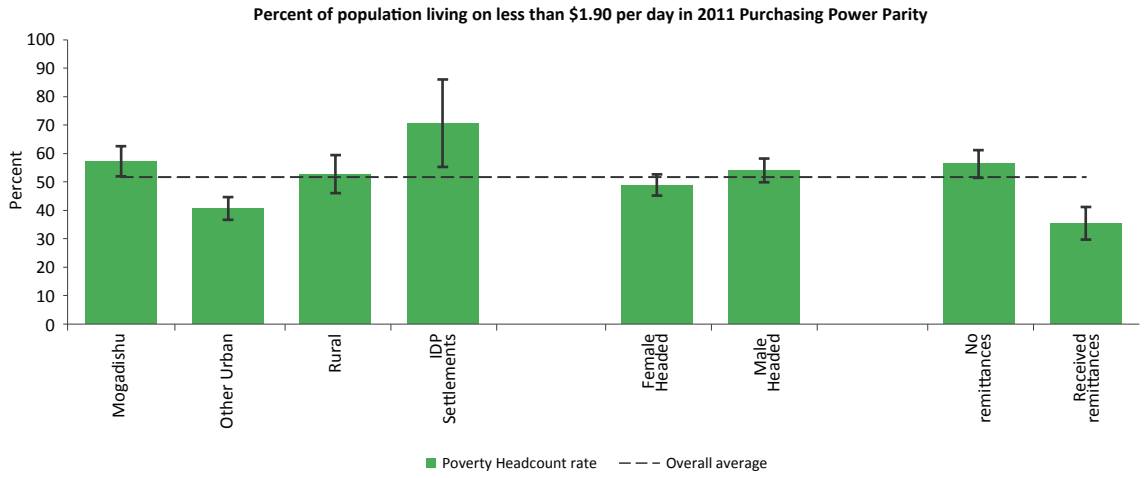
Source: FGS (1989), World Bank (1991), World Bank-IMF Staff Estimates (2017).

Poverty is widespread in Somalia, which has one of the lowest human development indicators in the world. According to the *Somalia Human Development Report*, 82 percent of the population is poor across multiple dimensions (UNDP 2012). The incidence of poverty is especially high in the Southern regions (89 percent), partly because of a still active insurgency, food shortages, and badly deteriorated infrastructure. But poverty is also very widespread in the more stable northwestern and northeastern regions of the country (72 percent in Somaliland and 75 percent in Puntland). The latest household survey, conducted in 2016 by the World Bank, shows that Somalia ranks among the poorest countries in the world, with the poverty incidence (the percentage of the population living on less than $1.90 a day in 2011 purchasing power parity terms) estimated at 52 percent (53 percent among the rural population) (figure 1.1).

Somalia's diverse livelihood systems can be grouped into four broad categories: pastoralists, agro-pastoralists, fishing and coastal communities, and the urban population. A fifth category is internally displaced people. The serious political and economic problem of very high youth unemployment is briefly discussed in box 1.1.

- Pastoralists are mostly nomads tending livestock herds. They are found in all rural areas of Somalia but predominantly in the arid rangelands of northern and central Somalia, as well as along the Ethiopian and Kenyan borders in southern Somalia. They are estimated to have numbered 3.2 million in 2014, about 26 percent of the population (UNFPA 2014). Ninety-nine percent are considered poor across multiple dimensions of poverty and human development (UNDP 2012). See chapter 5 for more information.
- Agro-pastoralists depend on settled crop production and livestock rearing. They are located mainly in the inter-riverine regions of Bay, Bakool, western Hiran, and eastern Gedo in Southern Somalia but also in certain rural areas in southwestern and northwestern Somalia with underground water and high levels of precipitation. A small proportion are riverine crop growers, a small number of whom also have animals on their farms; most keep no livestock. The United Nations Population Fund (UNFPA) estimate their number at 2.8 million in 2014, about 23 percent of the total population. Most small-scale farmers are trapped in a poverty cycle, without the capacity or resources to increase production and modernize their farming practices. Multidimensional poverty incidence within this group is at 95 percent (UNDP 2012). The World Bank estimates the income poverty level of all rural dwellers in 2015 at slightly over half. See chapter 6 for more information.

Figure 1.1: Incidence of Poverty in Somalia, 2016



Source: World Bank (2016).

- Somalia has the longest coastline in Africa, but coastal communities are believed to represent less than 1 percent of the population. They rely on artisanal fishing. As artisanal fishing is limited in the monsoon season (July–October), when seas are rough, this sector represents a very limited source of livelihood. See chapter 7 for more information.
- Somalia's urban population is estimated at 5.2 million in 2014 (42 percent of the population). They are net food buyers and depend on income from the informal sector, trade, casual labor, remittances, and other forms of social support. The multidimensional poverty level of urban dwellers was estimated at 67 percent in 2012 (UNDP 2012). The World Bank estimates the incidence of income poverty at almost 60 percent in Mogadishu and about 40 percent in other urban areas in 2015.
- The number of internally displaced people is estimated at 1.1 million (9 percent of the population). Protracted crises and recurrent droughts have led to massive population displacements toward urban centers and nearby refugee camps. About 88 percent of internally displaced people live in acute poverty. They receive international relief assistance and food aid. Sixty-eight percent are in crisis and emergency situations (UNDP 2012). The World Bank estimates the incidence of income poverty among internally displaced people at about 70 percent in 2015.

1.2 The Dominance of Agriculture in GDP

According to the latest employment survey, the agricultural sector employs 45.8 percent of the employed people 15 and older, with 25.2 percent in crops cultivation, 9.4 percent in herding, 4.0 percent in fishing, and 7.2 percent in other agriculture-related activities (ILO 2014; see also appendix B). Moreover, agriculture generates about 93 percent of the country's exports (based on partner countries' reporting), as discussed in more detail in section 1.3.

Box 1.1: Agriculture Offers Opportunities to Reduce Somalia's High Youth Unemployment

Seventy percent of Somalia's population is under the age of 30. This youth bulge will continue to increase, as a result of decades of high fertility rates (still about 6.2 births per woman). At the same time, Somalia has one of the highest rates of youth unemployment in the world, estimated at 68 percent, and very low education indicators. Secondary school enrollment rate, for instance, is just 6 percent, with poverty and early marriage keeping many young people out of school (UNDP 2012).

Most youth in Somalia face a blocked transition to adulthood as a result of multiple social, economic, and political exclusions. About two-thirds want to migrate (90 percent in the Southern regions) (UNDP 2012). Lack of economic opportunity for youth also fuels conflict and instability: 40 percent of youth who join rebel movements worldwide are motivated to do so by a lack of jobs (World Bank 2011b). High rates of unemployment; lack of livelihood opportunities; insufficient, unequal, and inappropriate education; a legacy of violence; weak governance; and institutional vacuum are all factors that sustain Al-Shabaab's appeal to Somali youth.

A revival and modernization of agriculture present opportunities for youth employment and income generation along the agricultural value chains, from input supply and primary production to distribution and marketing, as well as increased agro-processing, as discussed in chapter 8.

Table 1.2: Agriculture's Share of GDP in Somalia, 1980, 1986–88, and 2013–16 (percent)

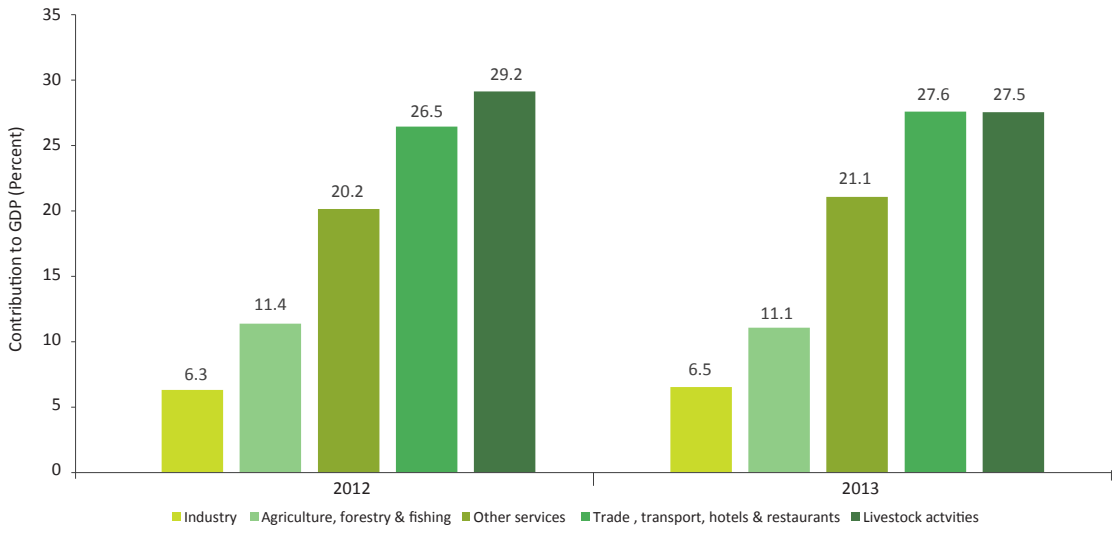
	1980	1986-88	2013-16
Agriculture	**64.4**	**64.4**	-
Livestock & Crops	**61.9**	**61.9**	**70.9**
Livestock and livestock products	43.7	43.7	60.7
Crop Production	18.3	18.3	10.2
Other	**2.4**	**2.4**	-
Forestry[a]	2.1	2.1	1.5
Fishing	0.3	0.3	-

Source: Data for first two columns are from Somalia 1989 (National Accounts Report). Data for 2013–16 are based on the estimated gross production values in the Drought Impact Needs Assessment (Somalia 2018)] divided by the IMF-World Bank's estimated GDP.
Note: Estimates cover all of Somalia, including Somaliland.
a. Among forestry products, only the value of frankincense production was estimated for the Drought Impact Needs Assessment study for the (predrought) 2013–15 years.

Livestock and livestock products represent almost 61 percent of GDP, according to the most recent estimates by the World Bank and International Monetary Fund (IMF) of expenditure-based GDP and estimates by World Bank and FAO staff of gross production values and the value added of the main agricultural subsectors (Table 1.2). This figure is much larger than the 37–44 percent of the 1980s. The crop subsector has fallen to about 10 percent, from about 18 percent.[2] Adding to these two subsectors any reasonable guesstimate (such as 3–4 percent) of the forestry and fishery subsectors' value added yields an overall share of the value added of agriculture of about 75 percent of GDP.[3]

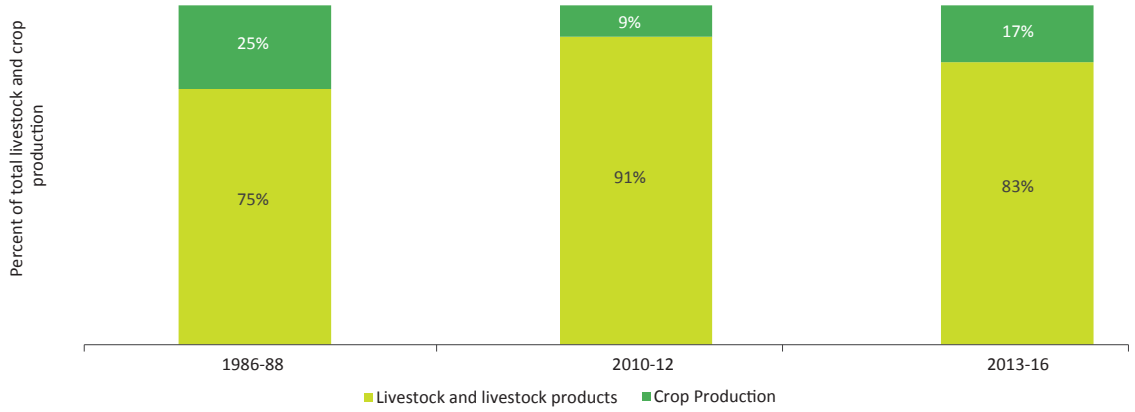
This share is so much higher than the 62–64 percent share estimated from official data in the 1980s that it raises some doubts about its reliability. It is true that many prewar subsectors—such as agro-processing, other manufacturing, utilities, and government services—have shrunk. But others—such as telecommunications, construction, and retail trade activity—have thrived, especially in the northern regions and Mogadishu. Sectoral production–based official GDP estimates for Somaliland for 2015 show only a 40 percent share of agriculture value added in GDP (see table 3 in FGS 2017b). The government and World Bank estimate the share at 40 percent for 2012–13 (figure 1.2).[4]

Figure 1.2: Sectoral Contributions to GDP in Somaliland, 2012–13



Source: Estimates by the Ministry of Planning of Somaliland and World Bank staff.

Figure 1.3: Shares of Livestock and Crop Production in Somalia, 1986–88 to 2013–16



Source: FGS (1989) for 1986–88, FAOSTAT for 2010–12, and FGS (2017a) for 2013–17

More reliable than the guesstimate of the share of GDP of the livestock subsector and the agricultural sector are estimates of the changes in the shares of livestock and crops. Figure 1.3 shows the dramatic expansion in the livestock subsector, whose share of total livestock and crop production rose from 75 percent in the late 1980s to 83 percent in the mid-2010s. Over the same period, the contribution of the crop subsector fell from 25 percent to 17 percent.

Estimates of gross production values (in current dollars) suggest a very large expansion of the livestock subsector during the past three decades (table 1.3). These figures are consistent with the volume trends discussed in chapter 5.

The picture for the crop subsector shows a misleading expansion over the prewar years, when production volumes for most crops were at their peak. With underlying production volume estimates by the FAO, elaborated in chapter 6, showing a decrease by more than half for both staple grains and bananas from their prewar levels, all of the gross production value expansion of the crop subsector shown in table 1.3 reflects the low prices used in the national accounts before the civil war and the much higher prices in the years after the start of the war.

Before the outbreak of the civil war, almost all agro-processing industries were owned or heavily controlled by the government, and few were fully developed or well managed. All of them were destroyed soon after the start of the civil war. As the northern regions reestablished security and self-governance institutions in subsequent years and the regions in the Southern part of the country became more secure in recent years, new privately owned agro-processing industries emerged, with high potential opportunity for expansion, job creation, and greater and sustained economic growth. Despite their enormous potential, even before the civil war, livestock and seafood processing were minimal, however, and crop processing underdeveloped. Agro-processing remains very limited (see appendix H and chapters 5, 6, and 7).

Table 1.3: Gross Production Values of Livestock and Crops in Somalia, 1986–2017

Annual Averages, US$ million	1986-88[a]	2010-12[b]	2013-16[c]	Deyr 2016 - Gu 2017[c]
Livestock and livestock products	**606**	**3,489**	**3,756**	
Meat (including exports)\[b]	366	761	1,051	-
Livestock products\[b]	240	2,729	2,704	-
of which: fresh raw milk\[c]			2,848	2,353
Crop Production	**198**	**355**	**751**	**329**
Staple food crops	**127**	**189**	**136**	**62**
Sorghum	36	88	48	25
Maize	55	59	35	23
Sesame Seed	24	15	33	6
Cowpeas		22	15	6
Rice	4	3	3	1
Legumes			1	0
Pulses\[d]	7		..	-
Groundnuts\[d]	1	2	..	-
Fruits	**23**	**46**	**175**	**56**
Banana	11	26	82	27
Grapefruit and Lime	2	4	26	12
Watermelon		7	32	8
Papaya			23	9
Dates			12	1
Other Fruits\[d]	9	9		-
Vegetables	**16**	**13**	**46**	**5**
Tomatoes		2	41	4
Onions		10	5	0
Other vegetables\[d]	16		-	-
Forestry	**-**	**-**	**88**	**-**
Frankincense (Boswellia)	-	-	88	73
Other	**32**	**24**	**-**	**-**
Roots and Tubers\[d]	25	24	-	-
Seed Cotton\[e]	1	-	-	-
Sugar Cane\[e]	6	-	-	-
Relative sector ratios, %				
Livestock and livestock products	**75%**	**91%**	**83%**	
Crop Production	**25%**	**9%**	**17%**	

Source: FGS (1989) for 1986–88, FAOSTAT for 2010–12, and FGS (2017a) for 2013–17.
Notes:
a\ 1986–88 annual average estimates are nominal values in Somalia shilling from official national accounts divided by the official average exchange rate.
b\ 2010–12 annual average estimates were derived by multiplying FAOSTAT production volumes by retail prices from FSNAU or other sources when FSNAU prices were not available.
c\ 2013–16 estimates are the baseline estimates (annual averages or latest available year) from the 2017 Drought Impact Needs Assessment (FGS 2017a).
d\ Estimates are available from FAOSTAT, but they are believed to be less reliable than the Drought Impact Needs Assessment estimates. They were left out to avoid double-counting.
e\ Estimates showing positive numbers are available from FAOSTAT through 2014, but they are believed to be incorrect, as there has been no production since the civil war.

1.3 The Dominance of Agriculture in Foreign Trade

Somalia's foreign trade was and still is mostly in agricultural products. Agricultural exports represented about 93 percent of total exports in early 2010s (down very slightly, from about 95 percent before the war). Much changed during the last three decades, however. Recorded export performance (estimated from partner country customs data) has been extraordinary (table 1.4). Average annual agricultural exports of $518 million in the early 2010s were more than five times the level recorded before the civil war, climbing every year since the late 2000s to a peak of $644 million in 2014 and $634 million in 2015.

Somalia remains highly dependent on a small number of export products (table 1.4) and overseas markets (table 1.5). In the early 2010s, the largest export, livestock (mostly for slaughter but also for breeding), earned about $420 million a year (more than $424 million if animal byproducts are included), almost seven times the value of the late 1980s. In 2015, recorded live animal exports (which include reexports from animals that originate in Ethiopia) reached $533 million and total sector exports reached $542 million, almost 10 times more than in the late 1980s. As a result, the livestock subsector accounted for 76 percent of total export earnings in the early 2010s and 79 percent in 2015, up from 53 percent in the late 1980s.

Table 1.4: Somalia's Top 15 Agricultural Exports, 1981–2015 (millions of dollars, annual averages)[6]

Product Description	1981-85	1986-90	1991-95	1996-2000	2001-05	2006-10	2011-14	2015
Live animals chiefly for food	88.4	55.7	66.6	72.9	76.7	126.3	377.1	493.9
Animals, live, zoo animals, dogs, cats	0.0	0.0	4.2	6.5	0.6	5.2	42.8	38.7
Oil seeds and oleaginous fruit	0.0	0.7	0.1	1.0	2.1	6.2	40.0	34.3
Cork and wood	0.1	0.0	1.1	6.9	16.1	31.0	25.0	0.0
Hides, skins and furskins, raw	3.9	5.3	2.4	2.3	6.6	8.7	8.6	3.8
Crude animal and vegetable material	4.8	7.1	3.8	3.0	3.3	5.2	6.0	20.7
Vegetables and fruit	14.7	29.5	5.0	7.2	0.6	4.5	5.9	4.9
Of which: Bananas, fresh or dried	*13.8*	*28.1*	*4.3*	*6.6*	*0.0*	*0.0*	*0.0*	*0.6*
Other citrus fruit, fresh or dried	*0.1*	*0.1*	*0.1*	*0.0*	*0.1*	*0.6*	*4.5*	*4.0*
Other vegetables & fruits	*0.5*	*0.8*	*0.6*	*0.5*	*0.5*	*4.0*	*1.3*	*0.3*
Cereals and cereal preparations	0.0	0.0	0.0	1.0	4.7	0.2	4.8	0.1
Meat and meat preparations	0.1	0.0	0.1	1.7	7.5	13.2	4.0	9.6
Fish, crustaceans, mollucs, preparation	2.1	9.0	10.1	8.1	18.3	7.6	3.6	27.8
Dairy products (all)	0.0	0.0	0.1	0.3	1.2	0.4	0.2	0.0
Fixed vegetable oils and fats	0.2	0.1	0.0	1.3	1.6	0.1	0.0	0.1
Sugar,sugar preparations and honey	0.7	1.5	0.2	0.1	1.9	0.3	0.0	0.0
Animal-vegetable oils-fats, processed	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
Animal oils and fats	0.0	-	0.0	0.0	0.1	0.0	-	0.0
Total (Top 15 agric exports)				115.0	109.0	93.7	112.3	141.1
Total Agric Exports)	115.0	109.0	93.7	112.3	141.1	208.9	518.1	634.0
Total Exports	119.6	114.3	102.5	119.9	169.5	282.5	559.1	688.5

Source: Partner country data from UN COMTRADE.

Table 1.5: Top 15 Destinations for Somalia's Agricultural Exports, 1981–2015 *(millions of dollars, annual averages)*

Destination	1981-85	1986-90	1991-95	1996-2000	2001-05	2006-10	2011-14	2015
Saudi Arabia	86.9	46.9	58.1	44.6	6.8	42.4	257.8	318.0
Oman	0.4	0.1	0.6	5.5	10.2	32.7	102.4	140.8
United Arab Emirates	3.8	11.2	6.7	13.0	65.4	42.3	55.3	84.3
Yemen	2.5	-	7.2	26.0	23.1	54.0	34.7	8.6
India	0.0	0.1	0.3	1.1	2.8	5.2	23.8	15.6
China	-	1.0	0.9	0.2	3.9	1.1	12.3	22.6
Bahrain	-	-	0.1	0.5	5.3	2.0	8.6	5.0
Pakistan	-	0.1	0.8	0.3	1.9	5.7	6.1	2.6
Kuwait	-	-	0.8	3.8	4.8	8.0	4.5	0.4
Lebanon	-	-	-	0.2	0.7	1.7	3.3	-
Turkey	0.0	0.1	0.4	0.9	0.8	1.4	1.5	0.8
France	0.9	2.1	0.8	0.7	0.5	0.5	1.2	8.1
Thailand	-	0.0	-	0.1	3.8	1.6	0.2	0.5
Italy	15.5	32.7	12.7	10.9	0.3	0.1	0.0	0.0
Greece	0.5	5.9	0.6	0.4	0.0	-	0.0	0.1
Total Top 15 destinations for Agric Exports	110.4	100.2	90.0	108.2	130.3	198.5	511.7	607.4
Memo Item: Total Agric Exports	115.0	109.0	93.7	112.3	141.1	208.9	518.1	634.0
Memo Item: Total Exports	119.6	114.3	102.5	119.9	169.5	282.5	559.1	688.5

Source: Partner country data from UN COMTRADE.

In the prewar period, the second-largest export item by value was fruit, mostly bananas, shipped mostly to Italy (Somalia also exported grapefruit and papaya). In recent years, fruit exports were limited to some small test shipments of bananas to Gulf countries. Total vegetable and fruit exports, which include dry lemon exports (which began in about 2009), are only about 20 percent what they were just before the civil war began.

In 2011–14, sesame seeds were the second-largest export. Most of the $40 million in exports goes to India. Destructive charcoal exports and gum and resin exports each account for $10–$20 million of exports (see chapter 4).[5] In 2015, Somalia exported $34 million of sesame seeds and $21 million of charcoal.

Only a few primary agricultural commodities were processed before the civil war. The only item now processed is meat and meat preparations, mostly chilled goat meat, which is exported to Gulf and South Asian countries. The annual value of these exports was about $4 million in the early 2010s and almost $10 million in 2015. In 2011–15, 87 percent of total agricultural exports (mostly sheep and goats during the *haj* for slaughter) went to four countries in the Arabian Peninsula, up from 53 percent in the late 1980s (Table 1.5).

Despite dependence on the Saudi market, Somali livestock exporters were able to quickly circumvent the livestock import ban Saudi Arabia imposed in 2001–09 out of fear of a Rift Valley Fever epidemic. The combination of the Saudi ban on Somali livestock imposed at the end of 2016 (and lifted temporarily only from the two major northern ports for the *haj* season of July–September 2017) and the impact of the drought on animals' health and welfare could cause exports to fall by as much as $400 million in 2017.

In the immediate post–civil war period, trade was hampered by a lack of trade finance and insurance services, the breakdown of transport and communication networks, poor marketing facilities, limited access to international markets, and the lack of security. Although these constraints still act as brakes on trade expansion, trade flows, including cross-border trade, not only survived state failure but increased dramatically after 1991, as Little (2003) notes for informal cross-border trade. Table 1.4 documents the increase for recorded exports. Table 1.6 shows the increase in recorded imports.

Two main factors facilitated trade expansion: the growth of the telecommunications sector, which has made it possible for accurate and timely information to reach even remote settlements, and the growth of remittance companies, which has done away with the need to transport large quantities of cash across borders. The combination of these factors resulted in deep domestic and international market integration, despite highly insecure conditions in the Southern regions of Somalia.

Somalia has become a *de facto* duty-free zone and a critical part of a trade network spanning from Dubai (a critical supply and finance center for Somali businesspeople) to Ethiopia, Kenya, and their neighbors. Although no quantitative evidence is available on informal cross-border trade, qualitative studies and anecdotal evidence strongly suggest that Somalia has become a major informal supplier of cattle and charcoal to large parts of the Horn of Africa and a major reexporter of other items, such as sugar, pasta, and electronics, that are subject to high tariffs in neighboring countries.

Table 1.6: Somalia's Top Agriculture Imports, 1981–2015 (millions of dollars, annual averages)[7]
(millions of dollars, annual averages)

Product Description	1981-85	1986-90	1991-95	1996-2000	2001-05	2006-10	2011-14	2015
Vegetables and fruit	2.6	2.9	6.7	2.0	3.4	94.2	386.6	552.1
Cereals and cereal preparations	63.0	40.3	32.8	38.1	51.7	132.7	293.7	313.9
Sugar, sugar preparations and honey	4.5	3.2	17.9	37.6	55.9	93.8	160.6	187.7
Live animals chiefly for food	0.0	0.0	0.0	-	1.2	9.4	93.1	147.7
of which: Poultry	0.0	0.0	0.1	0.0	1.8	0.6	0.5	3.4
Miscel.edible products and preparat	1.3	6.3	1.9	0.7	6.2	15.3	65.3	51.6
Dairy products (all)	15.9	5.9	2.4	1.7	4.7	16.2	62.0	82.0
Tobacco and tobacco manufactures	4.5	4.0	7.7	15.8	33.9	38.9	57.0	18.1
Fixed vegetable oils and fats	15.9	9.3	6.1	8.6	13.9	31.0	52.9	76.8
Cork and wood	1.6	2.8	0.2	0.1	0.3	1.0	8.3	5.9
Fish, crustaceans, mollucs, preparation	0.2	0.0	0.2	0.1	0.6	2.9	8.2	13.9
Crude animal and vegetable material	0.2	0.2	1.7	11.8	25.4	75.6	8.1	2.4
of which: Raw vegetable matter	0.2	0.2	1.7	11.8	25.4	75.6	8.1	2.4
Cork and wood manufactures (excl. fu)	1.4	1.8	2.6	0.3	0.2	4.2	7.6	16.6
Paper, paperboard, artic.of paper, pap	3.8	3.6	0.7	1.0	1.0	2.1	6.8	16.9
Beverages	1.0	0.7	2.0	0.6	1.0	4.4	4.7	7.2
Coffee, tea, cocoa, spices, manufacture	2.2	1.0	1.7	3.5	2.6	4.1	2.3	3.4
Poultry products (eggs)	0.0	0.0	0.0	0.0	0.0	0.1	0.6	0.5
Total (Top 15 agric imports)	118.1	82.0	84.7	122.0	201.9	525.9	1,217.9	1,496.8
Total Imports	297.9	279.1	144.2	167.1	288.1	719.7	1,674.9	2,358.0

Source: Partner country data from UN COMTRADE.

Agricultural imports have also increased since the late 1980s (see table 1.6). They are estimated to have averaged $1,218 million a year in recent years, reaching $1,497 million in 2015. Increased domestic demand for food, mostly for cereals, sugar, and other preparations, driven by rapid population growth and urbanization, has led to rapidly rising food imports, especially in light of the collapse of their domestic production. The most striking trend implicit in table 1.6, however, is the jump from zero before the war to an annual average of almost $76 million in the late 2000s of *khat*, a mild stimulant fresh shrub mostly imported by air from Ethiopia and Kenya, with deleterious side effects on labor productivity and socioeconomic activities (box 1.2).[8] Remittances are the largest source of finance for these imports (box 1.3).

Box 1.2: High Socio-economic Cost of *Khat* Use by Somali Men

The widespread practice of *khat (Catha edulis)* chewing on the weekends, especially by the majority of Somali men, is a major concern throughout Somalia, and particularly so in rural areas. In contrast to before the civil war, when *khat consumption* was reserved mostly for major holidays and limited only to men. in recent years many young and middle-age men (and also an increasing although still small number of women) have taken to chew it on an almost weekly basis, as a distraction from the stresses of life.

Chewing *khat* per sitting per person costs range from $2 to $6, depending on the air or road distance of retail markets from the producing areas and on the freshness of its leaves, as the stimulant effect of its active ingredient, chathinone, is highest when leaves are fresh and proportional to the length of time from harvest to consumption.

According to a presentation made in 2013 to Concern Worldwide (Ireland's largest aid and humanitarian non-profit organization) by the Somali Technical Agriclutral Group (SATG), a vehicle arrives in Boqor, Gabilley District, Somaliland, every morning at 7:00am from across the border in Ethiopia carrying the daily supply of *khat*. One bundle in Boqor sells for $1.50 to $2.00 and since men typically chew two to three bundles per sitting, the cost for an average individual sitting is $3 to $6. For those consuming khat only on weekends (eight sittings per month), the average monthly cost can be as high as $48. For those addicted to it and consuming it daily, the average monthly cost can be as high as $180-$200. In either case, such expenses represent a huge burden for those families whose only sources of income are from crop and livestock sales. This very often results in conflict within the family, as in the reported case of a father stealing a goat from the herd his son was watching over and using the proceeds of its sale to feed its *khat* addiction.

***Khat*, moreover, causes severe and protracted lack of sleep, thus leaving users in a severely debilitated state and unable to work early the next day, or at the very least very unproductive.** In urban areas, most formal employment is therefore open only to those who do not chew *khat*. In rural areas, *khat* chewers lose their will to work in the field, and favor instead sitting under the shade of a tree with their friends. Other health hazards of *khat* chewing include rapid aging and sometimes loss of the teeth and reduced mental performance.

In addition to recorded imports under the categories of 'crude vegetable material' and 'vegetables and fruits', actual consumption is also met by large unrecorded imports and sizable domestic production (mostly in the area between Hargeisa and Boroma in Somaliland). In September 2016, the Federal Government of Somalia (FGS) banned all Kenyan flights carrying *khat*, but several federal states, including both Somaliland and Puntland, rejected the order. The impact of the ban is not yet clear.

Box 1.3: Remittances Are Critical to Somalia's Food Security

The Somali diaspora sends more remittances home ($2,040 per emigrant a year) than any other African diaspora group (the African average is $1,263). An estimated 1–1.5 million Somalis living abroad contribute remittances, estimated at $1.2–$1.3 billion a year (FSNAU 2015; U.K. Government 2015) or $2 billion (Hammond, Dagan Ali, and Hendrick 2011; Orozco and Yansura 2015) a year. They exceed the $1 billion received in development aid in 2012 and account for about 80 percent of investment in Somalia and half of the country's gross national income.

Remittances account for 60 percent of average annual household incomes, with more than 3.4 million people (43 percent of the population) relying on remittances to meet their basic needs. Surveys in Somaliland and Puntland reveal that mean annual remittances per recipient were $946, reaching up to $6,000 in some cases in Somaliland. Remittances are used mostly for food purchases: 73 percent of recipients use them to buy food, and food expenditures account for 45–65 percent of household expenditures for recipients of remittances. They are thus a major contributor to food security in general and to household resilience during crises.

Remittances can sometimes create a culture of dependency by reducing the incentives for taking up low-paid work, but they also provide a very important source of funds for investment in agriculture-related activities (farm and off-farm) that can help create more sustainable livelihoods and economic growth (World Bank 2015).

1.4 Poor Food Security and Nutrition

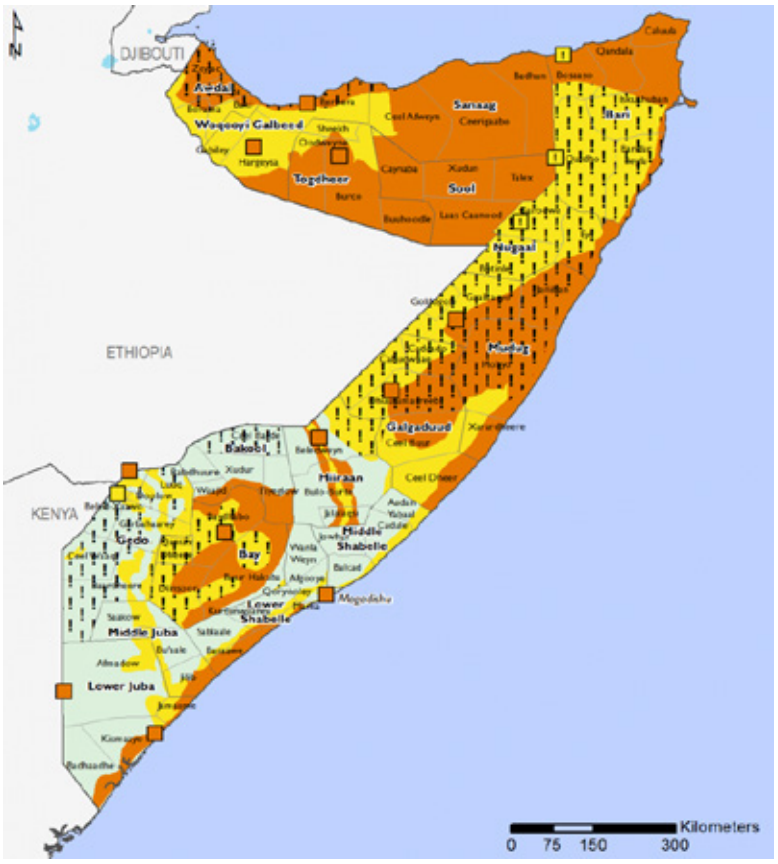
Somalia is a chronic food crop deficit country. Local production provides an average of only 22 percent of per capita cereal needs. Even in the best agricultural seasons, domestic production provides only about 40–50 percent of per capita cereal needs (FSNAU 2014). Somalia produces less than half of as much food as it did before the war. Average production decreased from about 500,000 tons in 1980–90 to about 280,000 tons in 1995–2006; it remained largely unchanged in 2009–15. In this period, food imports (mainly cereals and sugar) averaged 61 percent of total imports, including direct food aid (11 percent of total imports).

During the 1980s, pastoral, farming, and fishing communities in Somalia all suffered from a high rate of chronic malnutrition. The situation today is worse than before the civil war. Between 2007 and 2014, about 40 percent of the population experienced food stress, crisis, or emergency situations.[9] These numbers have been steadily increasing, as a consequence of two consecutive years with below-average rainfall, which led to well below-average livestock and crop production and large-scale livestock mortality and reduced household access to food and income. In mid-2016, nearly 4.7 million people (38 percent of the population) were in need of humanitarian assistance in Somalia; in drought-affected Puntland and Somaliland, the figure was about a third of the population. With a worsening of the year-long drought, as a result of the onset of a La Niña weather event, and signs of prefamine conditions, in February 2017 the United Nations issued an urgent appeal for action and donor support to stem the extremely deteriorated food security conditions that were already affecting 6 million people (almost half the population), especially in the Bakool region and Puntland.

Sustained humanitarian assistance and an easing of the drought in the 2017 *Gu* season (April–June) prevented more extreme outcomes, but the risk of famine is not over (figure 1.4).[10] According to the Food Early Warning System (FEWS), as of October 2017, food security needs were nearly twice the five-year average in Somalia, with more than 2.4 million people in crisis (IPC Phase 3) and 866,000 in emergency (IPC Phase 4). As another such season of below-average rainfall is forecast (the October–December 2017 *Deyr* season), further deterioration in their food security is likely through May 2018, in at least some areas.

The root causes of poor nutrition include poverty, food insecurity, gender inequity, high population growth, and limited access to water, sanitation, and health services, in addition to lingering civil conflict in many rural areas in Southern Somalia and more frequent, severe, and protracted droughts. Micronutrient deficiencies related to poor diets are widespread and have far-reaching, long-term health consequences, including high rates of infant and maternal mortality. Poor nutrition also has substantial negative impacts on agricultural productivity, with cascading impacts on income and poverty. It often leads to illness, a serious problem for poor people, because health costs can force households to tap savings, sell assets, or go into debt, inevitably pushing them farther into poverty. In addition, sick people do not make good herders, farmers, or fishers.

Figure 1.4: Food Security in Somalia, by Livelihood Zone, January 2018



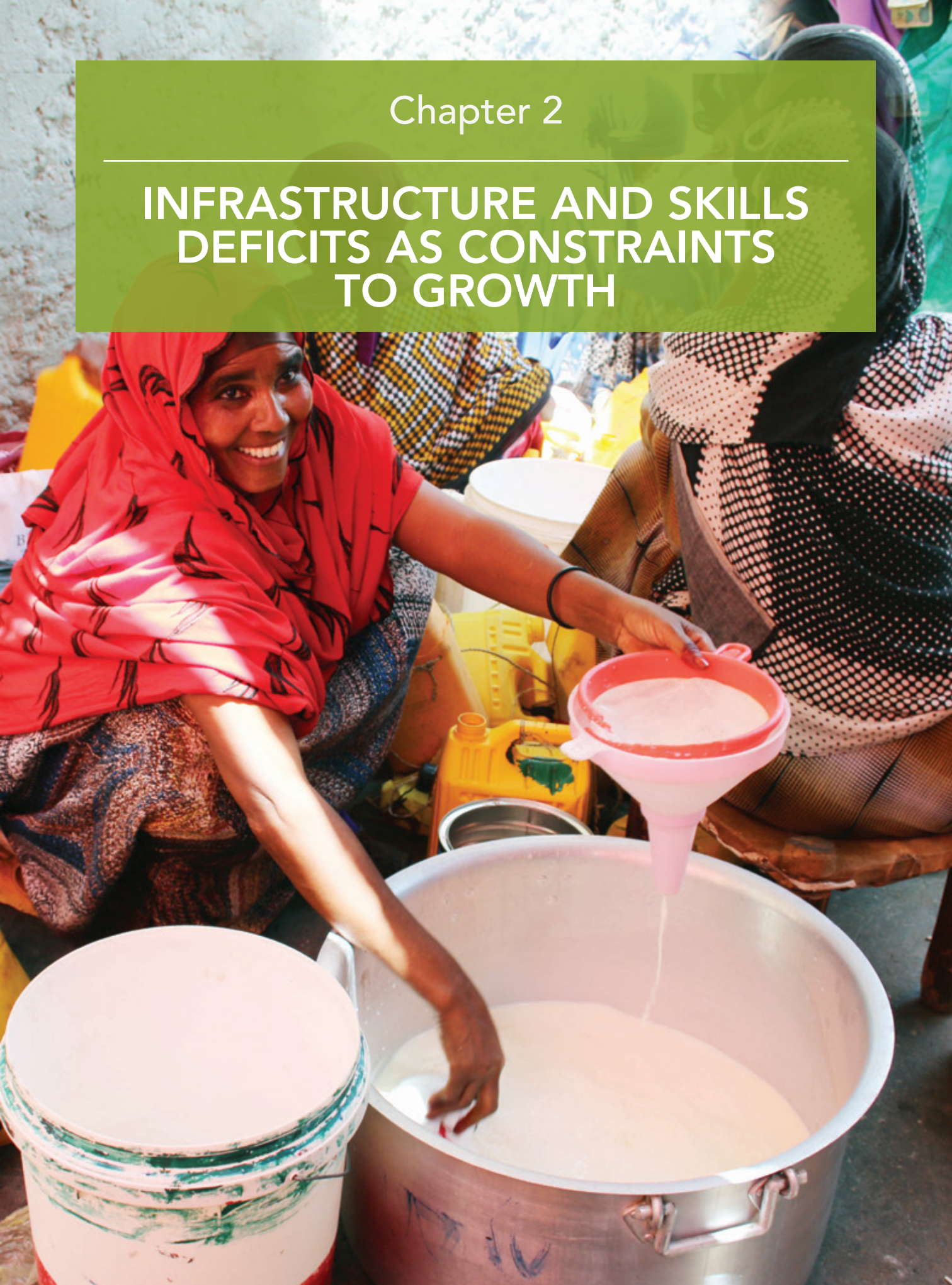
Sources: Food Early Warning System (FEWS) (http://www.fews.net/east-africa/somalia/key-message-update/january-2018);
Note: The Integrated Phase Classification (IPC) is a tool for classifying the food security and nutrition situation. It is based on indicators such as the food consumption, food access, livelihood change, nutritional status, food utilization, and hazards and vulnerabilities of the population.

The increased availability, affordability, and consumption of diverse, safe, and healthy foods from stronger agricultural sector performance would improve nutrition directly and increase the resilience of poor households indirectly. People who are well nourished in childhood have greater physical and intellectual capacities, leading to higher earnings over their lifetimes and a larger cushion to absorb shocks. Improving the production, trading, and processing of primary agricultural products would not only contribute to the country's overall economic recovery and growth, it would also have important direct effects on cementing peace and security, strengthening livelihoods, reducing poverty, and enhancing health outcomes in both rural and urban areas.

Production of staple grains has decreased by more than half from prewar levels. Meanwhile, the population has more than doubled, from 6.3 million in 1990 to about 13 million in 2016, and to reach 30 million by 2050. In addition, because of the high level of migration to urban areas, which creates more net food buyers, agricultural production needs to grow faster than the population just to maintain recent food security levels. An even higher rate of growth is needed to substantially improve living standards for both producers and consumers. More land needs to be cultivated and livestock, crop, and fishery production needs to be intensified to raise yields and produce more and higher-value processed products.

Chapter 2

INFRASTRUCTURE AND SKILLS DEFICITS AS CONSTRAINTS TO GROWTH



KEY FINDINGS ▶

- The poor condition of watering facilities in all regions compounds the natural water scarcity in a mostly semiarid country like Somalia. Water supply for household use, livestock, and small-scale irrigation depends mainly on groundwater and related infrastructure. Such infrastructure has deteriorated badly in the Southern regions, where it is inadequate to meet needs. In the northern regions it is still functional and gradually expanding.
- Even in the fertile areas of southern Somalia, water scarcity remains one of the main sources of conflict between nomadic pastoralists and agro-pastoralists.
- Livestock herders rely mostly on rainfall harvested by an extensive network of reservoirs (*berkads*), which often become silted during the dry seasons and thus need regular desilting. During a longer, more severe dry season, livestock herders move closer to the Juba and Shabelle rivers. Both rivers experience wide seasonal variation, at times breaking through their weak embankments, causing major flooding to the adjacent villages and beyond, at other times drying up completely. As a result of prolonged insecurity in this part of the country, which has prevented regular maintenance and repairs, and the absence of effective community organizations, most of this watering infrastructure have fallen into disrepair. In recent years, therefore, livestock survival during severe annual or seasonal droughts have become dependent on very costly and often unaffordable privately owned water tankers.
- Before the war, the total irrigated area in southern Somalia (estimated at 222,950 hectares) was almost equally split between land under controlled pump irrigation and land under flood-recession irrigation. Both the extensive prewar network of crop-related flood control and irrigation infrastructure and the road network are in extremely poor condition. The few modest cash-for-work donor-funded rehabilitation efforts of irrigation canals and feeder roads have had very little impact; most of this infrastructure is not functioning. As a result, the area under irrigation was only about half what it was before the war—and the recent drought reduced it even further.
- The large geographical coverage of mobile phone services has allowed remote communities to communicate directly with nearby urban markets about input and output prices and to stay in touch with family members scattered around the world. It also facilitates receipt of remittances from the diaspora and payments for all kinds of purchases and provides Somalis with updated information on domestic and international developments and the availability of local services.
- In the last two decades, a number of community and privately supported technical schools and universities were established. Some of them offer degree programs in livestock, crops, and fishery science. These efforts have been inadequate to ease the acute scarcity of skilled personnel, including for agricultural development, however.

2.1 Dilapidated and Poor Infrastructure

Livestock, crop, and fishery infrastructure is extremely poor or absent in southern Somalia. Since the collapse of the Somali government, in December 1990, there have been almost no major repairs of the flood control, irrigation, and road infrastructure. The few modest rehabilitation efforts of some irrigation canals and feeder roads—through cash-for-work approaches by the FAO and various nongovernmental organizations (NGOs), with support from donor agencies—have had very little impact.

In the more stable and self-governed northern regions, infrastructure has been largely rehabilitated and in some cases expanded. Although in better shape than in Southern Somalia, it is still inadequate. Tight budget constraints, the result partly of low tax collections and limited donor support in the past two decades, have meant that Somaliland and Puntland have prioritized spending on security rather than infrastructure.

2.1.1 Watering Sources and Facilities for Livestock

In southern Somalia, unlike in the central and northern regions, annual rainfall is relatively high (about 500–600 millimeters, with a bimodal distribution). It can sustain sufficient pasture for livestock grazing during the two growing seasons of *Gu* (April–June) and *Deyr* (October–December). During the longer, more severe dry season of *Jilaal* (which runs from January to-mid-April), livestock herders move closer to permanent water sources, mainly the Juba and Shabelle rivers, which originate in the Ethiopian highlands and cut across the southern regions of Somalia. The Juba River is 1,004 kilometers long; the Shabelle River is 1,130 kilometers long. Both rivers experience wide seasonal variation, with the highest water flows experienced during the wet growing seasons, when the rivers frequently break through their weak embankments, causing major flooding to the adjacent villages and beyond. In the *Jilaal* season, river flow volumes are reduced significantly.[11]

The Shabelle River dried out completely during the 2016 and 2017 *Jilaal* seasons, causing severe damage to bananas and other fruit and vegetable crops that are highly dependent on river water for irrigation. The event is believed to be related to the hydroelectric and agriculture development activities carried out upstream in Ethiopia.

In the inter-riverine areas of the Bay and Bakool regions, rainfall is harvested for livestock watering by an extensive network of large and shared reservoirs using earth dams and cemented cisterns (*berkads*), originally constructed and maintained by the Ministry of Livestock, Forestry, and Rangeland. These water reservoirs often become silted during the dry seasons and need regular desilting.

As a result of the prolonged civil war and the absence of nomadic communities' organization, most of the prewar infrastructure for flood control and irrigation (embankments, gates, canals, and water reservoirs) has not been maintained and is not currently functioning adequately. The FAO and some NGOs have performed some maintenance, but only on an occasional and limited basis, depending on available funds from donors. In recent years, livestock survival during annual or seasonal severe droughts has become dependent on very costly and often unaffordable water transported by privately owned water tankers.

Puntland, Somaliland, and the central rangelands of southern Somalia receive only about 100–200 millimeters of rain a year, except in the Awdal region of Somaliland, where annual rainfall can reach up to 500 millimeters. Except in some parts of the Golis Mountain range along the Gulf of Aden, these areas have no permanent springs. They depend mainly on groundwater for domestic water supply, livestock rearing, and small-scale irrigation. The water sources in the plateaus south of the mountains consist mostly of shallow wells, water reservoirs using earth dams in depressions, cemented *berkads*, and few deep wells (boreholes). Most of the wells are along the banks of dry rivers (*wadis*). In some parts of Somaliland, a few check dams have been constructed across the *wadis*, to raise the water level in the shallow wells along the *wadis*. Three- to four-meter deep subsurface dams, built of concrete and/or bricks with cement, are used to store surface water and help recharge the groundwater in the area. Many of these sources retain water for a short duration only, however, and cannot be relied upon for year-round water supply. Boreholes are the most valuable, because they supply water throughout the year, including when other sources dry out (SWALIM 2012b).

The development of new groundwater resources in Somalia is fraught with challenges, key among them poor water quality. Most groundwater sources in the country have salinity levels above 2,000 microsiemens per centimeter, which exceeds the standard for drinking water. Many shallow wells are unprotected from the elements, leaving them vulnerable to microbiological and other contamination (SWALIM 2012b).[12]

2.1.2 Irrigation, Flood Control, and Water Harvesting Infrastructure for Crops

Before 1990, Somalia had large-scale flood control and irrigation schemes, consisting of barrages, canals, and other infrastructure in the middle and lower reaches of the Juba and Shabelle rivers, particularly in banana production areas. The canal system consisted of primary, secondary, and tertiary canals, with water flow controlled by barrages or weirs. Pumped irrigation systems also existed, especially along the rivers, where large pumps moved water from the rivers to the extensive network of canals. Just before the collapse of the government, the Somali Ministry of Agriculture estimated that 112,950 hectares were under controlled irrigation and 110,000 hectares were under flood-recession irrigation (cultivation along the edge of rivers or other water bodies using water from receding floods), for a total irrigated area of 222,950 hectares.

The vast majority of this infrastructure is no longer functioning, and the area under controlled irrigation has been reduced by 42.5 percent from the prewar period, to about 65,000 hectares (50,000 hectares along the Shabelle River and 15,000 along the Juba River). Flood recession cultivation is estimated to have shrunk by 58.4 percent, to 45,800 hectares (24,200 hectares along the Juba River and 21,600 along the Shabelle River) (EU 2010; SWALIM 2013a). The total irrigated area is thus less than half what it was before the civil war (see chapter 6).

The Middle Shabelle region had some of the best irrigation and flood control infrastructure in the country (box 2.1). Gravity irrigation was frequently used; where it was not possible, pump irrigation was used. These works were associated with large state-owned primary farms with associated agro-processing factories, such as the sugar and rice projects in Jowhar and the cotton project in Balad.

Box 2.1: Poor State of Key Irrigation and Flood Control Infrastructure in Middle Shabelle Region

All these facilities are currently in very poor condition, hardly operating, and their irrigation or storage capacities are only potential today, if fully rehabilitated, not actual as it was just before the civil war and reported below.

- Jowhar Off-Stream Storage Project. In the high-flood season—when the Shabelle River can reach a height of 5.5 meters at Belet Weyne, in the Hiran region—water was diverted through the Saboon barrage and an FAO-funded primary canal to a depression south of Jowhar, with storage capacity of 200 million cubic meters (World Bank and UNDP 2007). During the low season, water was supplied back to the river through a downstream gate. The reservoir also supported a commercial-scale tilapia fishery for both local consumption and export by air, run by a businessman using local labor, motorized fishing boats, and cold-storage facilities and trucks. This $34 million project was funded by Saudi Arabia and built in the mid-1980s by SIETCO, a Chinese construction company. Under the supervision of the Ministry of Agriculture, it was operating effectively on the eve of the civil war and was very beneficial to farming communities downstream in both the Middle and Lower Shabelle regions.
- Duduble Flood Relief Scheme. Upstream of the Saboon barrage, the Chinese government funded the Duduble barrage and its relief canal (known as the Chinese Canal), constructed by SIETCO, mainly to safeguard against flooding when the Jowhar reservoir became full and the level of the river at Belet Weyne was still high. The canal also supplied water to agro-pastoral and farming communities between Jowhar and Wanla Weyne.
- Balad barrage. Built in 1987 in the Balad district of the Middle Shabelle region, with funding and technical assistance from the Democratic People's Republic of Korea, the Balad barrage provided irrigation for up to 10,000 hectares, mainly to small-scale farmers growing cotton for the (state-owned) clothing factory in Balad.
- To protect all low-lying areas along the river from floods, flood control embankments were constructed and maintained annually during the dry season. In addition, various river gauges (in Mustahill, Ethiopia, and in Belet Weyne, Bulaburde, Mahadday Weyne, and Jowhar) provided regular monitoring of water flow and early flood warnings downstream.

The Lower Shabelle region was one of the main producing areas for major export crops, such as bananas, grapefruits, and watermelons. It had the highest productivity and generated the highest agricultural value added in Somalia, because of its leveled land and location closest to the major urban and port facilities of Mogadishu, Marka, and Barawe. Major infrastructure included seven barrages (box 2.2) and various primary and secondary canals to facilitate gravity irrigation to large areas along the Shabelle River, mostly associated with the largest state-owned enterprise, Somalfruit, which obtained its products from the region's privately owned plantations. Some of this infrastructure was constructed during the colonial era; other projects were constructed by the Somali government before the civil war.

Lack of annual maintenance and repairs has undermined the functioning of all of this infrastructure. Attempts have been made to rehabilitate broken barrages and clogged irrigation canals, but the results have been mixed.[13] Lack of rehabilitation of main and rural roads has meant increased and severe isolation of farms during rainy periods and increased and substantial crop wastage and quality deterioration during transport to markets.

Box 2.2: Poor State of Barrages in the Lower Shabelle Region

All of the barrages in the Lower Shabelle are in very poor condition and hardly operating. To reach their irrigation capacity , they would need to be fully rehabilitated.

- The Hawaay barrage was built by the Italian government in 1926, in the Barawe district of the Lower Shabelle region, to divert water into the Hawaay irrigation scheme and serve small canals irrigating farms neighboring the Shabelle River. It has one sliding main gate and a number of sluice gates. It has the capacity to irrigate 3,000 hectares.
- The Janaale barrage was built in 1927, in Janaale village, to divert water into canals and regulate the river level to reduce flooding downstream. It is the largest barrage in the Lower Shabelle; operation of the other downstream barrages depend on it. The barrage is fitted with 11 gates that use manual lifting gears. It was designed to irrigate 67,440 hectares under the Janaale Buulo Mareerta irrigation scheme. Primary canals include Primo, Secondario, Asayle, and Dhame Yasin. A number of upstream direct intake canals also depend on the barrage.
- The Qoryooley barrage was built in 1955, in the Qoryooley district of the Lower Shabelle region, to regulate river levels and divert water to the Farhani and Libaan canals. It was fitted with a manual lifting gear with turning wheels. The barrage has the capacity to irrigate 4,120 hectares. New lifting gears were installed in 2009.
- The Falkeerow barrage was built in 1955 by the Italian government, in Falkeerow village in the Lower Shabelle region, to regulate river levels and divert water into the Furuqulay and Bakooro canals for irrigation. It has nine gates, which are lifted manually using a lifting gear, and the capacity to irrigate 26,800 hectares.
- The Kurtunwaarey barrage was built in 1986 by the Somali government, in Kurtunwaarey village in the Lower Shabelle region, to abstract water through canals to support irrigation of farms for drought-displaced population. It has eight gates and lifting mechanism of mounted slides on steel structures. The primary canals include Towfiiq, Hagaag, Shanad, and Sedihad; they have the capacity to irrigate 5,000 hectares of land. The barrage was rehabilitated in 2009.
- The Mashallaay barrage was built in 1986, in Mashallaay village, to regulate river levels and provide additional water for irrigation through the Primo Secondario canal. It is fitted with eight gates, but it never functioned, because of a faulty link canal design (water flowed in the wrong direction, from Primo Secondario to the Shabelle River). It was designed to irrigate 27,000 hectares.
- The Sablaale barrage was built in 1987 by the Somali government, in the Sablaale district of the Lower Shabelle region, to divert water into the Sablaale irrigation settlement scheme. It has a single main gate, with a manual lifting gear and four weirs. The barrage has the capacity to irrigate 940 hectares.

In 2009, the FAO implemented an irrigation rehabilitation project in the Middle Shabelle region funded by the European Union and the World Bank (World Bank 2011a). The project appears to have only stemmed the postwar trend of declining rice production, although it did strengthen the Jowhar Rice Growers' Association, which was established before the war and survived the conflict. The high-yielding varieties of rice that were introduced in the prewar period (and contributed to an increase in the area under rice cultivation from zero to a peak of 6,500 hectares in 1989 at the eve of the civil war) are still in use. These varieties from the International Rice Research Institute make rice growing still profitable in the region. By the early/mid-2010s (predrought) rice was being grown on only about 750–1,500 hectares, however, a small fraction of the area under rice cultivation in the prewar years.[15]

In the Lower Shabelle region, a more limited irrigation rehabilitation (funded and implemented by the same institutions) also had a short-term positive impact on agricultural production. The absence of annual maintenance resulted in the lack of sustainability of the progress achieved, however. The problem reflected both the inadequate capacity of the Ministry of Agriculture and the lack of security.[16]

The middle and lower reaches of the Juba River cut through rich alluvial soils, which made this region one of the most productive agricultural areas of the country. Pump irrigation was a common. The Fanoole dam and its associated infrastructure were the main gravity irrigation facilities in the Juba Valley (box 2.3). The planned Bardheere hydroelectric dam in the Upper Juba (Gedo region) was to have extensive storage capacity to supply irrigation water to the Middle and Lower Juba basins as well as the lower reaches of the Shabelle River. It was never built.

Box 2.3: Severe Deterioration of the Fanoole Hydroelectric Dam and Its Canal System in the Lower Juba

The Fanoole dam and hydroelectric power generation plant was the most important infrastructure facility in the Juba Valley. Various projects were located downstream from Fanoole, such as the Mareerey Sugar Project and the Mogambo Rice Project (box 2.3.1); the port of Kismayo, also located downstream from Fanoole, was the main economic outlet for the Juba Valley and its banana exports. The dam and its canal system were constructed with the assistance of China from 1977 to 1982, at a cost of about $50 million, to provide irrigation for government-owned rice and sesame farms. The prewar irrigated area had reached 1,800 hectares for rice and 700 hectares for sesame. The dam also provided electricity to the towns of Jilib and Mareerey. In addition, the project had 20 storage facilities for inputs and rice. Some 1,500 Somali staff and 42 Chinese experts and technicians worked at the facility (dam and associated farms).

The plan was to extend electricity transmission to Jamame and other towns downstream, including Kismayo. The onset of the civil war interrupted such initiatives. The potential and planned second-phase development area for the project was 13,000 hectares. Just before the civil war, 5,000 hectares of rice and sesame were developed. Work on the remaining 8,000 hectares never started because of the onset of the civil war.

The dam's gates and hydroelectric equipment are badly deteriorated and nonfunctional, as a result of both decades of neglect and the change in the path of the river flow after the 1998 El Niño torrential rains. The government considers rehabilitation of the dam a top priority for the recovery of the Juba basin's agricultural capacity and its economic development.

Box 2.4: State-Owned Productive Facilities in the Lower Juba before the Civil War

The Mareerey Juba Sugar Project

The Mareerey Juba Sugar Project (JSP) project was started in 1976. Production began in 1980, and the plan was completed in 1982, with funding from the Somali government, the Abu Dhabi Fund for Development, the Saudi Fund for Development, and the Organization of the Petroleum Exporting Countries (OPEC). The plant was managed by Booker Agriculture International Ltd., which manages many other large sugar projects throughout the world.

By 1984, JSP had 1,700 employees; 3,000 casual laborers who assisted in planting and harvesting; 100 kilometers of access roads connecting it to the major paved road leading to Kismayo port; 200 staff homes; stores; and a small hospital. Its extensive sprinkler irrigation system used 26 kilometers of a primary canal and 17 kilometers of secondary canals and was served by 72 pump stations, 11 relifting stations, and 61 field sprinkler pumps. By the mid-1980s, the small village of Mareerey, where the plant was located, had grown into a town.

The management company provided training for Somali engineers, agriculturists, and technicians working at the factory, its farms, and associated infrastructure. By the late 1980s, the plant was gradually reducing the large number of expatriate staff.

In the plant's first phase, production fluctuated, because of lack of fuel and lubricants, especially for the irrigation pumps. The problems were related to the difficult macroeconomic conditions Somalia was facing. Nonetheless, in the late 1980s, the first phase of the project covered 7,200 hectares of prime agricultural land, and the plant produced 39,000–65,000 tons of sugar a year (the near-term production target was 70,000 tons) and other byproducts, such as molasses and bagasse.

The onset of the civil war did not allow the target to be achieved or the second phase (which planned to put another 13,000 hectares of land under cultivation and to increase production by 100,000 tons a year) to materialize. During the early years of the civil war, all of the plant's physical assets—including the roof, fixtures, machinery, pumps, and sprinklers—were looted and resold as scrap metal. The project's farmland was highly dependent on sprinkle irrigation and thus quickly became unproductive; its housing and office buildings were looted. As a result of the looting of this important sugar-producing facility and a similar one in the Middle Shabelle region (the Jowhar Sugar Factory), Somalia now no longer produces sugar.

The Mogambo Rice Project

The Mogambo Rice Project was developed in 1982–86 to cover 2,052 hectares of paddy rice fields and 163 hectares of sprinkler-irrigated land planted with cotton (Sir McDonald & Partners Ltd. 1982). Associated farms benefited from the project's irrigation and drainage canals, offices, houses, and office building.

The civil war began right after the first phase of the project was completed. As a result, the plant was swiftly looted and never produced the 10,000 tons of rice a year it had planned to produce. Because the project's irrigation infrastructure and upstream flood control embankments were not maintained, the farmland is also no longer cultivated.

Bananas, maize, grapefruit, sugarcane, cotton, and rice were the major crops grown in the region, some of them cultivated under large public projects (box 2.4). Some, including maize and sesame, still partially benefit from flood irrigation and recession farming following periods of high water levels.

In contrast to infrastructure in southern Somalia, irrigation infrastructure in Somaliland and Puntland was and remains very limited. The North-West Development Project is among the few agriculture interventions in Somaliland. It seeks to improve the soil banding that was used mostly by sorghum farmers under rainfed conditions to conserve moisture and stop soil erosion. In Puntland the development of date palm plantations was a major intervention. It included improvements in associated irrigation infrastructure through small canals that provide water from shallow wells or water springs to small-scale farmers. One of the state's priority is to develop rainwater harvesting technology, as groundwater in Puntland is too deep or its quality too poor for consumption and irrigation.

2.1.3 Water as a Source of Conflict

Recurrent scarcity of water is a major political issue in Somalia, with the power to move millions of people from their homelands. Particularly in the central and northern regions of the country, it is one of the main sources of social conflict, as the pressing demand for water during the dry season by pastoralists creates conflict between them and sedentary agriculture communities. Even in southern Somalia, where competition for water is far less fierce than in the northern regions, the struggle over land and water resources is a major driving force underlying the civil war.

Conflicts over water often erupt when wells dry up and the local water supply diminishes, particularly during dry seasons and dry years, and when new groups of pastoralists settle in a new area in search of water. Neither clan affiliation (tribalism) nor hostility within Somali society is the root cause of such conflicts. Clan affiliation is only a tool to achieve the ultimate and legitimate objective of obtaining the resources necessary for sustaining life and human security.

2.1.4 Postharvest Storage Facilities for Crops

Postharvest losses are substantial across Somalia. Average grain losses in southern Somalia are estimated at 20–30 percent of the harvest and may exceed this range in some cases. The loss is on the order of 50,000–80,000 tons of cereals a year, valued at $15–$20 million. A baseline survey conducted by the Somali Agriculture Technical Group (SATG) revealed that grain losses associated with traditional storage systems (underground pits) are significantly higher (40 percent) than losses associated with postharvest techniques (harvesting, transportation, and drying) (20 percent) (SATG 2009).[17]

The most commonly used grain storage practices in the main rainfed grain cultivation areas in the Bay and Bakool regions are traditional underground storage pits lined with clay. This system is highly prone to moisture contamination, particularly during the rainy season, and bacteria and fungi contamination. The health hazards—including stunted growth, delayed development, liver damage, and liver cancer—have even more serious effects than the economic loss. They include a significant hazard from aflatoxin, a highly toxic dark mold produced by fungi when grain is not very dry at storage time or is affected later by the seepage of water.

As a result of the baseline survey, the SATG, in partnership with the FAO and the European Union, introduced household metal silos, produced by local artisans, that can hold 120–250 kilograms of grain (SATG 2009). Their use could expand through effective extension service, which needs to be put in place and strengthened by government, with assistance from the donor community and civil society. Figure 2.1 shows traditional grain storage pits before and after improvements and the metal grain silos.

Figure 2.1: Traditional Postharvest Grain Storage Pits and Metal Grain Silos before and after Rehabilitation

2.1.5 Food Safety

Food safety systems reduce the risks of food poisoning and the effects of pests and diseases. They protect consumers, the natural environment, and vital ecosystems. By enabling countries to meet the stringent sanitary and phytosanitary measures required by both foreign governments and major private supermarket chains, they also support agricultural exports.[18] Lack of or inadequate food safety systems (legal framework, good records, testing and inspection facilities, and so on) severely reduces both export capacity and the ability to ensure the safety of imports.

Somalia has great potential to expand its domestic agricultural market and opportunities to improve its exports of agricultural products. It can do so, however, only by complying with local, regional, and export market requirements and standards.

Somalia does not have in place a plant health inspectorate services center. It is not a party to the World Trade Organization's Sanitary and Phytosanitary Agreement or a contracting party to the International Plant Protection Convention, the key charter for International Standards for Phytosanitary Measures. Establishment of a phytosanitary center is imperative.

To start addressing the lack of government oversight over food safety, in 2014, the SATG, in partnership with the federal Ministry of Agriculture, surveyed all pre–civil war laws and regulations, including phytosanitary standards. National and international experts were engaged to review the old policies and develop new regulations while harmonizing with policies in use elsewhere in East Africa. Consultations were conducted with various stakeholders in the agriculture sector.

The policies developed included the Plant Protection Act, the Seed and Plant Variety Act, and subsidiary legislation, as well as manuals for phytosanitary inspection procedures.[19] However, the ministry has yet to review these documents or submit them to the Cabinet of Ministers. Once endorsed by the Cabinet, they would have to be submitted to Parliament for further discussion and legislative approval. The Ministry of Agriculture plan includes training its staff on agriculture policies and regulations, deploying

inspection staff, and establishing laboratories to evaluate the safety of selected foods. Once Parliament passes the laws, the challenge for the government will be to ensure adequate enforcement at major ports, among local private storage facilities, and in local markets.

2.1.6 Transport Infrastructure

Airport, seaport, and road infrastructure are crucial for accessing inputs and exporting agricultural products. Efficient air transport can boost the export of fresh fish, fruits, and vegetables without the need to rely on costly refrigerated cargo ships.

All prewar airports are functioning, though their contribution to Somalia's agricultural development and exports is very small. Recently, Somalia began exporting shark fins and chilled meat to the United Arab Emirates from the Mogadishu airport, which Turkey has rehabilitated and improved, extending the runway and building a new modern terminal. Other airports include Kismayo, Baidoa, Marka, and Belet Weyne in southern Somalia; Galkayo, Garowe, and Bosaso in Puntland, the latter two recently enlarged; and Hargeisa and Berbera in Somaliland.

Only two international airlines serve Somalia: Turkish Airways (between Istanbul and Mogadishu) and Ethiopian Airlines (between Addis Ababa and Hargeisa). Daallo Airlines, Jubba Airways, and African Express Airways serve all domestic airports in Somalia. The International Civil Aviation Organization recently transferred management and control of the country's air space from the Civil Caretaker Authority for Somalia (CACAS) to the Somali Air Space Management Center (ASMC).

Despite the civil unrest and destruction of the civil war, the country's four major seaports (Mogadishu, Berbera, Kismayo, and Bosaso) are still fully operational, though lack of maintenance has caused some minor deterioration in the operations of Mogadishu and Kismayo ports. The ports' capacity is limited, and their facilities are very basic at best. Most livestock are exported through the northern ports of Bosaso and Berbera. Agriculture produce is exported mainly through the Port of Mogadishu, which is managed by a Turkish company.

Somalia had about 22,000 kilometers of roads in the late 1980s, of which 2,757 kilometers were paved (World Bank and UNDP 2007). On the eve of the civil war, some of the paved trunk roads were already in poor conditions and being reconstructed (for example, the one linking Mogadishu to Kismayo) or in need of reconstruction. The Mogadishu–Kismayo road, which passed through several agriculture villages in the Lower Shabelle and Lower Juba regions, served as the main transport route for milk and agriculture products to Mogadishu. It is no longer in use for vehicles. Most other paved roads in southern Somalia, including those linking Mogadishu to Middle Shabelle (Jowhar), Hiran (Beletweyn), and Mudug (Galkayo), are extremely deteriorated, as a result of lack of maintenance. In addition, the vertisol soil in these regions causes cracks in paved roads.

In the southern regions, major and minor gravel roads, including virtually all farm access roads, have also deteriorated to the point that they are not passable during the rainy season; when passable in drier times, travel times are much longer than they used to be, causing spoilage to produce, particularly milk, fruits, and vegetables, on the way to major markets. Moreover, illegal road taxation by both Al-Shabaab and clan militia wearing government uniforms at various checkpoints and high government taxation at the ports are major constraints facing producers and exporters.

In the northern regions, Italy completed the Galkayo–Garowe–Bosaso road a few months before the civil war begin. The project and the Bosaso port provided the economic backbone for the establishment and development of Puntland. Both still remain in relatively good condition. Most of the

major roads in Somaliland as well as its seaport at Berbera are also in relatively good condition. What is lacking in the northern regions are secondary roads that can facilitate access from rural and coastal towns to larger urban markets along the main highways.

2.1.7 Telecommunications

Despite the civil war, Somalia's telecommunication services have flourished. In the late 2000s, the largest telecommunication companies (Hormud Telecom, National Link, and Telecom Somalia) had combined coverage of 1.8 million mobile phone users (Shiekh and Mohamed 2009; Canada 2015). Today, seven telecom companies provide mobile and fixed-line telephone and internet services.

Until recently, Internet access depended mainly on satellites. In 2013, the first fiber-optic broadband network was built. Managed by Hormud Telecom, it covers both the north and the south of the country. The estimated penetration rate for Internet services remains very low, at 2.1 percent of the population in 2015. Coverage of voice and text services is much higher, at 58 percent for mobile phones and 0.6 percent for fixed lines.

The large geographical coverage of mobile phone services in Somalia allows pastoral, agro-pastoral, and farming communities far from major urban centers to stay in touch with family members scattered within Somalia and around the world. It also facilitates the receipt of remittances from the diaspora, the making of payments, and access to updated information on domestic and international political and economic developments and the availability of local services. Modern telecommunications have enabled the pastoral, agro-pastoral, agriculture, and fishing communities to communicate directly with major markets to enquire about market prices, helping help them make informed decisions about selling their products or buying inputs and supplies.

2.2 Lack of Education and Training

All prewar technical schools and universities were destroyed in the war, and 80 percent of highly skilled professionals emigrated (Lindley 2005). On the eve of the civil war, the only prewar university, the Somali National University, had 15 departments, about 5,000 students, and about 700 teaching staff. It received financial support from the European Union and the U.S., Canadian, Saudi, and Italian governments, including teaching support from various Italian universities. Some departments, including agriculture, ran collaborative programs with U.S. and Canadian universities.[20]

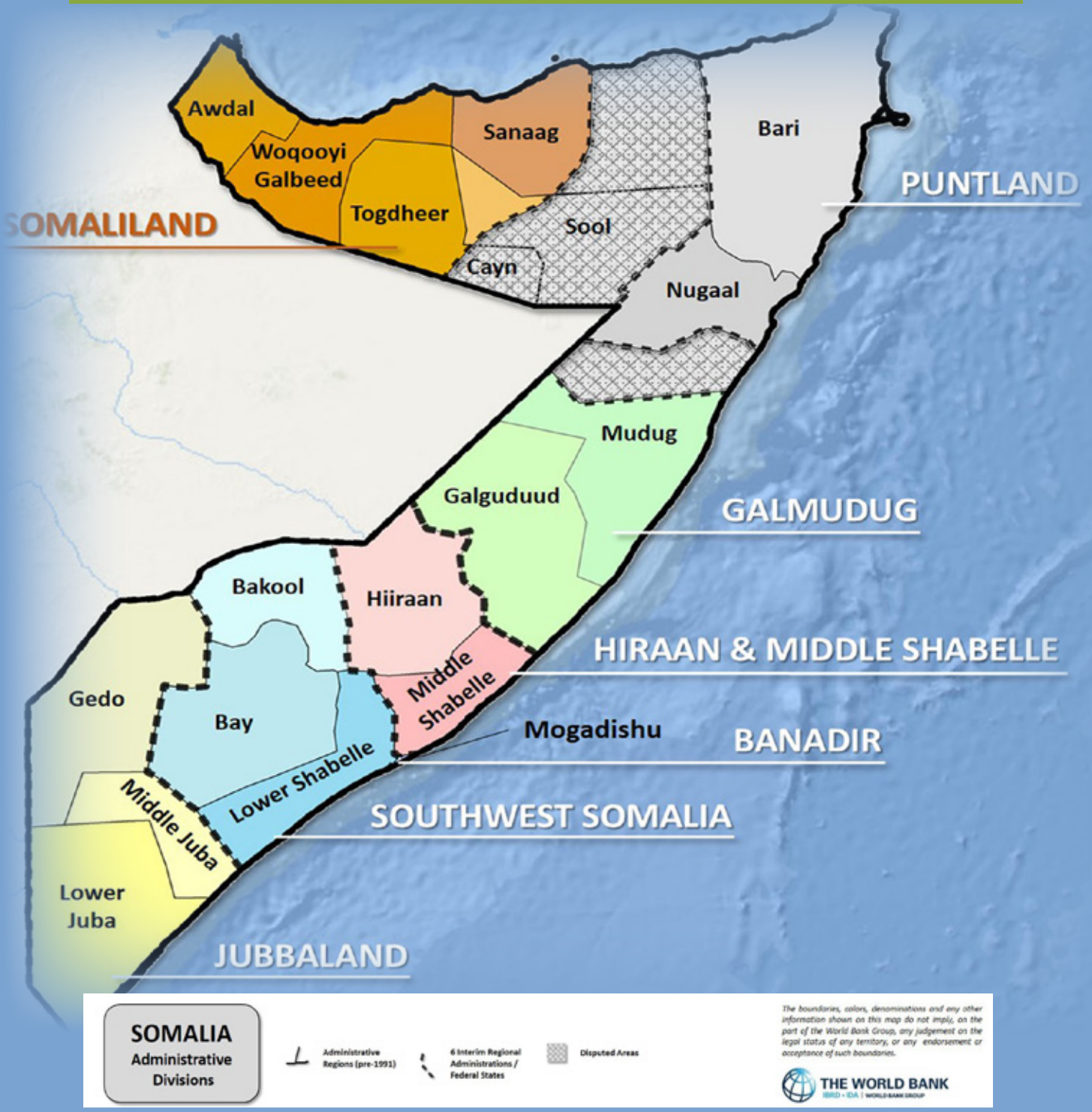
In the absence of government-supported educational institutions, community and privately supported schools and universities emerged throughout the country. Some offer degree programs in crops, livestock, and fishery sciences (see appendix D for a list of higher education institutions).[21] Despite these efforts, Somalia suffers from an acute shortage of skilled technicians and professionals, including in the agricultural sector.

Most schools and universities are located in large urban centers in Southern Somalia. High fees are a major constraint for poor families. In the northern regions, the governments of Somaliland and Puntland have sought to restore and expand public education, with free primary education reestablished in 2011 in Somaliland. Primary school enrollment has increased, but the transition to secondary education has been challenging, and at both levels there is still a shortage of places, qualified teachers, and resources. In Puntland, for example, 83 percent of teachers never received teacher training, and less than half of children attend school (Heritage Institute 2013). Opportunities for vocational training and higher education are limited to privately owned and operated institutions in urban areas, which are hard for students from rural households to reach and unaffordable for poor students.

Private higher education has grown, mostly since 2004. By 2013, Somalia had almost 50 higher education institutions of different sizes and capacities, in which more than 50,000 students were enrolled (Heritage Institute 2013). Several weaknesses undermine both the quality of their offerings and access by the poor. They include the absence of regulation by the governing authorities; attempts to establish universities in every region; duplication of faculties; lack of coordination; the shortage of adequately trained academic staff; limited research and teaching capacity; shortages of educational supplies (textbooks, periodicals, journals); and the lack of scholarships and educational support services for students from poor families. The private sector employs graduates; cash-strapped government institutions, including in the agricultural sector, do so only to a very limited extent.

Chapter 3

INSTITUTIONAL CONSTRAINTS AND CHALLENGES



KEY FINDINGS ▶

- The civil war resulted in extreme lack of security in Southern Somalia. Armed militias belonging to clans from the central regions with little farming skills and experience continue to occupy prime farmland in the Lower Shabelle region. Political (and taxation) control over much of the riverine and inter-riverine areas is still being contested between Al-Shabaab, a terrorist insurgency movement, and the national army (supported by the African Union and fledgling new regional administrations). The conflict makes access to farms and market outlets risky, costly, and unprofitable. Such conditions also make interventions by aid agencies extremely challenging.
- The long civil war and unrest have created a vacuum in the policy functions, monitoring, and services normally provided by government. Relevant ministries at the federal and state level (for livestock, crops, forestry and rangeland management, and fisheries) provide services in Southern Somalia in only a very limited, fragmented, and inefficient way, because of lack of skilled staff and funding and poor access to most rural areas.
- Grazing disputes between neighboring pastoral clans have become more common since the collapse of the pre–civil war government. Recent expansion of private enclosures on traditionally open rangelands, especially along livestock migration and transport corridors and urban centers, have exacerbated tensions.
- A complete registry of farms survived the civil war, but regardless of any evidence and rulings, landholders who left their farms in southern Somalia during the civil war are still unable to reclaim their land, because of insecurity, the weakness of traditional arbitration, and the absence of modern judicial institutions.
- There are very few farmland disputes in the northern regions, where prewar landholdings were never disrupted. Regional ministries of agricultures have issued proper lease certificates for newly allocated farmland (mostly to new, small farmers).

3.1 Security

The civil war resulted in extreme lack of security in Southern Somalia. In prime agricultural areas, such as the Lower Shabelle, armed militias belonging to clans from central regions with little farming skills and experience took over irrigated land from local farmers and state-owned agriculture land. They used local farmers as free or underpaid farm hands while continuing to engage in armed conflicts that damaged irrigation equipment and prevented maintenance and repairs of flood control and irrigation infrastructure and access roads. Al-Shabaab still controls vast areas of agriculture land in the Lower Shabelle region and often launches suicide attacks at government-controlled checkpoints and buildings. The national army, Al-Shabab, and clan militias all operate checkpoints, making access for farmers to market outlets difficult, costly, and unprofitable. Poor security also makes interventions by aid agencies to rehabilitate agriculture infrastructure in the Southern regions of Somalia extremely challenging.

Somalia has a large number of internally displaced people, estimated as of October 2017, at 2.1 million (UNOCHA 2017). Most live in camps outside urban areas, the largest of which is on the outskirts of Mogadishu. They supplement the humanitarian assistance they receive by supplying manual labor in nearby towns and throughout the country. Some of these people, especially those originating from farming areas in Southern Somalia, provide manual labor to small and medium-size farms in the northern regions, where they are contributing to the establishment and growth of irrigated agriculture.

3.2 Land Tenure

Historically, customary land tenure arrangements governed most cultivated land and nearly all pastoral land in Somalia. Until independence, in 1960, state leasehold tenure based on statutory law was widespread, particularly in riverine agriculture. Land legislation passed in 1975 officially transferred control of tenure rights on all Somali lands from traditional authorities to the government. Land registration procedure allowed landholders to register no more than 30 hectares of irrigated land and no more than 60 hectares of nonirrigated land as state leaseholds, with a 50-year lease, subject to renewal.

Land registration was closely linked with government programs aimed at establishing modern corporate agriculture. Various government laws and programs passed in the 1970s promoted the establishment of state farms, cooperatives, and large private plantations under state leasehold tenure. These policies concentrated land ownership, displaced landholders, and decreased tenure security for landholders without leasehold rights. The high costs of leasehold acquisition and complicated land registration procedures gave wealthier and better-connected individuals an advantage in acquiring leasehold title (Roth 1988). This system was nonetheless crucial for attracting domestic investors to farming and to the overall strong prewar performance of the sector.

The Department of Water and Land Management of the federal Ministry of Agriculture provided certificates for renewable 50-year leases of farmland to small and commercial large farmers. The certificates included the size, the map of the farm, and the borders with neighboring farms. Similar certificates also existed for government-owned farms. Land disputes were usually resolved by the farming communities themselves or by the Ministry of Agriculture.

Before the looting of the offices of the Ministry of Agriculture, one of its officials managed to get hold of and preserve the complete registry of farms in Somalia (he still holds these records). For a fee, farmers who lost their documentation can obtain copies of their land records, which can be used as proof of ownership in the case of land disputes. With all political institutions long reestablished at the federal level and its agencies in the process of rebuilding their administrative authority and service delivery capacity, the time has come for the Ministry of Agriculture to reclaim these important records and to manage new requests for land titles.

With most farmed land currently privately owned (under long-term leases), traditional and religious leaders' recommendations and decisions are usually accepted by parties in conflict in rural areas where there are no armed clan conflicts. However, many prime farms in the Lower Shabelle are still occupied by militiamen from outside the region who fought against the Siad Barre regime. Landholders who left those farms for safety after the start of the civil war are still unable to reclaim their land, despite documentary or traditional evidence and rulings, because of insecurity, the weakness of traditional arbitration, and the absence of modern judicial institutions. The displacement of farmers, deteriorated infrastructure, and continuing insecurity are among the major reasons for the reduction in the area cultivated and crop production in southern Somalia.

Unlike in southern Somalia, there are very few disputes over farmland in the northern regions, where landholding was never disrupted. Regional ministries of agriculture have issued proper lease certificates for newly allocated farmland (mostly to new small farmers). Even in the south, however, state institutions play only a limited role in resolving land or contractual disputes.

Under Somali pastoral traditional norms, local communities collectively use and share rangelands and forests. Grazing disputes that would lead to fighting between neighboring pastoral clans have become more common since the collapse of the pre–civil war government in all parts of Somalia, even at the borders with Ethiopia and Kenya. These conflicts are often resolved by local clan elders and religious leaders, however, with local district or regional authorities (including neighboring authorities in Ethiopia and Kenya) intervening only in the case of major risk of interclan fighting.

Disputes between farming communities are also usually mediated by clan elders and religious leaders. However, the civil war resulted in the takeover of prime farming areas in Southern Somalia by clan militias from other, more pastoralist areas. Traditional mediation attempts have not yet led to a resolution of this thorny issue, especially in the Lower Shabelle region, where local clans are involved in a bitter land dispute with a clan from central Somalia.

To improve land tenure management, the Department of Water and Land Management needs to be strengthened. One way to do so is to create a formalized land commission unit consisting of elders from various communities, religious leaders who are already engaged in land tenure resolutions, civil society engaged in conflict resolution, and the Ministry of Agriculture. The process should be led by community elders with experience in conflict resolution. Recovering the land registration data held by a former employee of the ministry would also improve land tenure management.

3.3 Government Institutions

Before the civil war, the Ministry of Agriculture; the Ministry of Livestock, Forestry, and Rangeland; and the Ministry of Fisheries formulated the legal and regulatory instruments and support services for their respective subsectors. The Ministry of Agriculture was responsible for land tenure; construction, maintenance, and rehabilitation of irrigation and flood control infrastructure; agricultural research and extension services; plant protection; and soil and water conservation.[22] The Ministry of Livestock, Forestry, and Rangeland provided veterinary services, managed forests, ranges, and livestock holding grounds; issued livestock certification; and protected natural reserves and wildlife. The Ministry of Fisheries protected coastal and marine resources, issued fishing licenses, and enhanced the fishery subsector production and marketing.

The three federal ministries now provide services in a very fragmented, limited, and inefficient way, because of lack of skilled staff and funding and limited access to most rural areas. A similar division of responsibilities exists in Somaliland, Puntland (box 3.1), Jubaland, Galmudug, and South West.

3.4 Civil Society Institutions

The knowledge vacuum created during the long civil war was filled by specialized agencies and programs of international development organizations such as the Somalia Water and Land Information Management (SWALIM, the Food Security and Nutrition Analysis Unit (FSNAU), and the Somalia Food Early Warning System (FEWS),[23] which monitor water and land availability, food security, and prices.

With support from external donors, civil society (local and international NGOs, professional associations, and the private sector) have also stepped up to provide some services. These services include the following:

- vaccinating livestock (provided by Somalia's Livestock Professional Association)
- digging wells and water storage systems
- training people in agriculture, livestock, and fishery
- distributing seeds, fertilizer, and tools to farmers
- rehabilitating flood control and irrigation infrastructure
- building agriculture markets and rehabilitating fish landing sites.

Box 3.1: Environmental Institutions in Puntland

In its comments over the consultation draft of this report, the Puntland government pointed out that its institutional framework for managing its environmental challenges was already in place, as it had enacted an Environmental Law and Environmental Impact Assessment Regulations and developed a five-year Environmental Strategic Plan, a Climate Change and Drought Management Strategy, and Draft Disaster Risk Management Strategy, in addition to policies on the environment, rangeland, waste management, and rural land.

Since its establishment, in 2009, the Ministry of Environment, Wildlife and Tourism has carried out massive environmental rehabilitation activities, including soil and water conservation; gully control; sand dune fixation; reforestation; rainwater harvesting through the development of water infrastructure (subsurface dams, improved earth dams, and so forth); and an environmental protection program, through the establishment of rangers who report to the district environmental offices. It decentralized some functions to the local governments of Qardho, Eyl, and Galkayo and to all communities across Puntland by establishing District Pastoral Associations and Village Environmental Committees. The main functions decentralized are environmental protection, awareness and trainings, and reforestation and rangeland rehabilitation.

With support from donors and development agencies like the FAO, the International Committee of the Red Cross, and World Vision, some international NGOs have distributed heavy machinery (tractors, water pumps, and farm implements) to agriculture cooperatives and sesame seed cleaning and processing equipment to farmers and exporters. All interventions were subject to the approval of relevant government institutions, local authorities' armed militias, and Al-Shabab, which collect taxes, informal fees, or zakat (obligatory charity payment under Islamic law) and alms from the communities in which they have a presence. Some of the NGO interventions resulted in measurable successes, but others failed, because of lack of security and experience and mismanagement of resources. In addition, the unconditional provision of aid created dependency on donor-supported interventions. Most of these interventions were also short term and unsustainable.

3.5 Gender Dynamics in Agricultural Production

Somali society maintains clearly delineated gender roles and responsibilities. Men are traditionally identified as protectors of family security, primary breadwinners, and the central decision makers in both public and private settings. Women are responsible for the bearing and raising of children, the full range of domestic tasks, and petty trading. During noncrisis periods, men and women in agro-pastoral communities also maintain a well-defined, synergistic partnership in livestock and crop production activities. Indeed, women account for 45 percent of people involved in livestock management and crop and natural resource harvesting (FAO 2010).

Men and boys are responsible for most activities related to camels, including buying, owning, grazing, milking, slaughtering, and selling them. Women are responsible for the sale and processing of camel byproducts, such as milk and ghee. They control at least 80 percent of the country's milk production and 100 percent of milk collection. Women and children are also tasked with raising and tending to sheep and goats (shoats). Men and women are jointly responsible for shoat trade and export. Men typically handle major livestock trade for export; women's engagement is usually local, at the subsistence level (FSNAU 2012).

Somali men and women have always shared crop-related responsibilities, especially in subsistence farming, where women provide more than 60

percent of labor. Women's productivity has been constrained by weak land tenure and limited access to extension services, with negative implications for food security, rural poverty, and overall economic growth. Before the war, only 28 percent of women in the Juba valley owned any livestock; only 14 percent owned farms; and the farms they owned tended to be the least productive, least secure, rainfall-dependent dryland plots (NRC, UN-HABITAT, and UNHCR 2008). The insecurity of land tenure for women partly reflects complex dynamics extending from the interaction of multiple legal systems and socio-cultural norms that undermine women's capacity and agency within Somali society. Agricultural extension did not reach women farmers effectively. To address this issue, USAID recommended that agribusiness initiatives include women agents (Quisumbing and Pandolfelli 2010).

Women and men maintain differentiated roles in the fisheries value chain. Most fishers are men, although there is evidence of women's engagement in fishing at least at subsistence levels. Women are engaged in processing, trading, and support activities. Additional research is needed to understand the gender dynamics of this subsector and identify potential opportunities for expanding the roles of both men and women.

Gender roles shift in the face of crisis, as men and women adopt different coping strategies to increase household resilience. Recurrent drought conditions and other climate-related events have contributed to the increasing sedentarization of pastoral populations. Several reports note increasing reliance on satellite systems of livestock management, as families engage in agricultural activities in permanent or semi-permanent households while male family members migrate with herds for pasture and water (FSNAU 2012). Women often remain home with children; the elderly; and pregnant, lactating; or sick animals (Ibrahim 2004). Family splitting thus constitutes an important survival mechanism (Gardner 2004). Women sometimes take children and move to a camp for internally displaced people for greater access to resources and security, although these migrations often increase their exposure to security threats. Men migrate to urban centers in search of economic opportunities. Women sometimes travel to towns to engage in petty trade and work in the informal economy.

These shifts have increased women's engagement in income-generating activities and broader business development opportunities. An assessment of livelihood activities in Baidoa reveals that women provide 20 percent of unskilled labor in the construction sector and 70 percent in petty trade (FSNAU 2012). Another study estimates that 60 percent of Somali business owners are women, although they are concentrated in the micro-sector, characterized by economic activities that are irregular, informal, and of low value (UNDP 2014). There is also evidence that Somali women are becoming increasingly active in nontraditional economic activities, such as livestock trading and marketing in various sectors (Ibrahim 2004).

Somali women confront numerous barriers to expanded economic engagement. They include lack of access to financial resources; extreme time poverty, linked to domestic and reproductive constraints; insufficient market research on viable opportunities; and lack of access to formal networks to provide business guidance.

Narrowing gender gaps in agricultural production would have significant benefits for growth, poverty reduction, and food security. If further developed and modernized, the milk sector in particular presents a promising opportunity for women's economic expansion (see chapter 5). A revived banana sector would create many jobs, including for women, as it did before the war (see chapter 6).

Chapter 4

ENVIRONMENTAL CONSTRAINTS AND CHALLENGES

KEY FINDINGS ▶

- Severe environmental degradation of rangelands and forested areas and climate change in the Horn of Africa region have severely affected the livestock and crop subsectors in the last few decades. By the late 1980s, virtually all of Somalia's floodplain forests had been cleared for irrigated agriculture production. Since 1990, Somalia has lost an average of almost 1 percent a year of its forests. By 2014, total forest cover was only 10 percent of the country's land area, down from 62 percent before 1980.
- The move toward more private enclosures for livestock grazing and semi-permanent family shelters has exacerbated these problems. This phenomenon is still gathering speed. It poses a major management and enforcement challenge to local government officials and traditional rulers.
- The main cause of large-scale deforestation of the rangelands has been the massive and unsustainable cutting of acacia trees to produce charcoal. Annual charcoal exports reached $56 million at their peak in 2011, from zero in the late 1980s through the mid-1990s. Since 2012, adoption and increasingly effective enforcement of charcoal export bans by the federal and northern regional governments, the introduction of gas stoves, and growing awareness of the devastating environmental consequences of continuing production have significantly reduced demand for and thus the production of charcoal in Somalia. Internationally supported export bans appear to have been effective, as recorded imports by the rest of the world of charcoal from Somalia fell to almost zero in 2013, but illegal exports continue. Until recently, the sale of charcoal provided a major source of revenue for Al-Shabaab.
- In the late 1980s, Somalia was the world's largest producer and exporter of frankincense and myrrh. Wide fluctuations in exports are related partly to overexploitation and poor harvesting practices by a new generation of tree owners and minders eager to maximize short-term earnings but unaware of the trees' long-term health needs.
- Severe deforestation and other environmental degradation of rangelands already threaten the viability of both the livestock and crop subsectors. It reflects unregulated human activity and overgrazing as well as erratic and diminishing water flows in major rivers from increasing use of water in upstream basins in the Ethiopian highlands.
- Weather phenomena—including fluctuations in temperature, rainfall, humidity, cloud cover, atmospheric pressure, and wind speed—have already become increasingly unpredictable and extreme across the Horn of Africa. Increases in air and sea surface temperatures have also been observed. Eight major droughts in the last four decades have severely affected crop and livestock production in Somalia. By early 2017, the cumulative impact of various failed successive rainy seasons had created a serious humanitarian crisis that threatened to become a famine in a few areas.
- The climate in the region is projected to become even drier, more erratic, and more extreme than in recent decades and thus less favorable to crop, livestock, fisheries, and forestry-based livelihood systems. Most but not all climate models predict higher rainfall rather than drier conditions, but all scientists agree on a warmer future, with increased variability and frequency of extreme rainfall events.
- The consequences of such climatic changes are dire. Higher air temperatures will increase evapotranspiration,[24] and more variable and extreme rainfall on already barren soils will reduce spatial infiltration and facilitate more run-off and erosion, resulting in less groundwater recharge and less water availability in the surface layers for plant growth. Other likely impacts include reduction of vegetation for grazing and more variable water availability, with grave impacts on livestock herding and related livelihoods. Rising sea temperatures and acidification will also reduce fish stocks and change their distribution.

4.1 Threats to Forests and Rangelands

The main type of vegetation on the open savannah and bushlands of Somalia is the acacia tree. It provides browse resources and firewood as well as material for house construction and livestock enclosures. Tree cover becomes denser in the south, as rainfall increases and soil types become more favorable for tree growing (and crop production), especially in the flood plains along the two major rivers.

The northeastern part of the country, where the soil is poor and rainfall low, has very little vegetation. In the remote northern Golis Mountains along the Gulf of Aden, the misty juniper forest was and still is a very important center of biodiversity and species endemism. This area, other hilly areas, and even richer riverine woodlands provide fodder and allow pastoralists to manage risk during the dry seasons and periods of drought (IUCN 2006).

Various trees of economic importance are found in Somalia. The northeastern region has Boswelia species, which produce frankincense. The southwestern and northeastern regions have Commiphora, which produces myrrh, and *Cordeaxia edulis* (now considered an endangered species), which produces *yicib* nuts. Various acacia species are endemic to Somalia. They produce gum arabic (known as *habag ma'an* in Somalia).[25] Other trees of economic value include Lawsonia inermis, which produces henna, and various fruit trees (for example, tamarind). Wild fruit trees that produce important medicinal products and are tolerant to water stress are valued both locally and internationally (UNEP 2005; IUCN 2006). They include *Zizysphus mauritiana, Boscia coriacea, Cordia sinensis, Balanites spp*., and *Dobera glabra*.

In 1980, Somalia's total forest resources—including the juniper zone in the high-altitude areas of the Golis range, the riverine and floodplain forests along the Juba and Shabelle rivers, and its savannah and bushland—were estimated to cover 39 million hectares or about 62 percent of the country's land area (Openshow 1982). Between 1990 and 20009, Somalia lost an average of 76,750 hectares, or 0.93 percent of its forests a year (FAO 2010). FAOSTAT estimates that by 2014 the total remaining forest coverage was only 6.4 million hectares, or 10.3 percent of the country's total land area.

By the end of the 1980s, virtually all the floodplain forest that once existed along the Shabelle and Juba rivers had been cleared for irrigated agriculture production; only the poorly accessible Middle Juba region retained areas of relic floodplain forest. Two recent developments contributed to large-scale deforestation on the rangelands: the move toward more private enclosures for livestock grazing and semipermanent family shelters and the booming charcoal production for illegal exports. The second phenomenon appears to have been partially addressed, but the first one is still gathering speed and poses a major management and enforcement challenge to governments and traditional rulers (see chapter 5).

4.1.1 Charcoal, Somalia's "Black Gold'

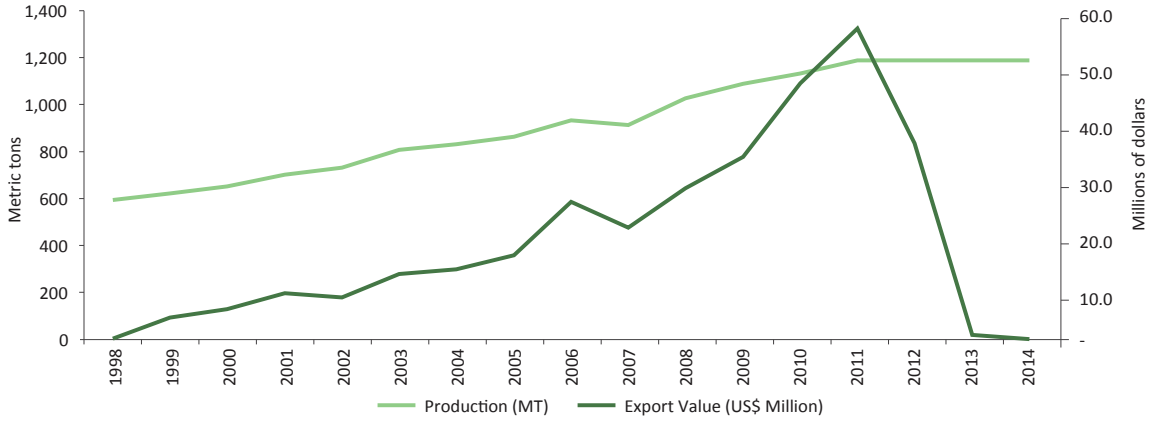
Since the end of the civil war, the most damaging exploitation of forest species has been the cutting of acacia species on the rangelands to make charcoal for export for shisha (hookah tobacco smoking), mostly to the Gulf States, in addition to its traditional use for local cooking. The Somali government banned charcoal exports in 1969. Soon after the collapse of the Barre regime, exports from the Bari and Sanaag regions to the United Arab Emirates began. They were followed by a rapid expansion of charcoal production throughout the country destined for export to Saudi Arabia and Yemen, in addition to the United Arab Emirates; smaller quantities were also exported to Oman and India. All of these countries highly prize Somali charcoal for its aroma.

Production of charcoal soared from about 180,000 tons in 1961 to 420,000 tons in 1991 and almost 1.2 million tons in 2013, according to FAOSTAT (figure 4.1). These estimates are unreliable, however, and the trend in the most recent years is inconsistent with the decline in recorded exports. In 1980–84, annual charcoal consumption in Mogadishu alone was estimated at about 32,000–45,000 tons; consumption in the rest of the country was estimated at 30,000–35,000 tons, for a nationwide total of only about 62,000–80,000 tons a year. Already by the end of the 1980s, all charcoal consumed in Mogadishu and other main urban centers was sourced from several hundred kilometers away, as all close-in locations had been depleted (Bird and Shepherd 1989). The estimated annual inflow of charcoal to Hargeisa was 65,000 tons in 1999, corresponding to daily household consumption of 4.2 kilograms and more than 1.6 million trees on about 4,000 hectares (Odouri and others 2011).

By the mid-2000s, charcoal production, driven by booming exports, had already become a concern in the areas around Hargeisa and major towns in the north, which sourced their charcoal from as far away as the Sool plateau. By the early 2010s, Kismayo and Brava, both under the control of Al-Shabab, had become the two major hubs for charcoal exports. By then, charcoal was dubbed Somalia's "black gold," as the sector generated combined domestic and export revenues of about $360–$384 million a year (UNSC 2014). Relatively reliable official trade data from partner countries (shown in figure 4.1) indicate a rapid and steady rise in charcoal imports by the rest of the world from Somalia, from virtually nil ($100,000) in 1998 to a peak of $56.7 million in 2011, before falling back to a still sizable $35.8 million in 2012. At its peak in the early 2010s, 80 percent of Somali production was exported, with about 41,000 people in Somalia and the Gulf engaged in its value chain. It was a major source of funding for terrorism (box 4.1).

The increase in production and exports of charcoal is the main cause of the massive deforestation and deterioration of both the southern and northern rangelands, which has led to intensified desertification, soil erosion, gully formation, and a reduction of land use for both agricultural and pastoral livestock production (World Bank and UNDP 2007). The extensive losses caused by charcoal burning have also led to rapid environmental degradation in the Sool-Sanaag plateau in northeastern Somalia (Puntland)—an extremely arid plateau, where recovery of tree cover is extremely slow. For 2001–06, an average annual tree loss of about 3 percent and a five-year cumulative decrease of about 13 percent was estimated by the FAO in

Figure 4.1: Estimated Annual Production and Export of Wood Charcoal by Somalia, 1992–2016



Source: FAOSTAT for production estimates, COMTRADE for exports.

Box 4.1: The Charcoal Trade and Terrorism in Somalia

The cafés on Abu Dhabi's seafront fill as soon as the sun sets and the heat abates. Men gather around water pipes, smoking tobacco flavored with a dizzying array of aromas and scents, including melon, strawberries, and cappuccino. A thin boy scurries from table to table with a bucket of hot charcoal made from Somali acacia trees. It is particularly prized in the Gulf states, because it burns longer than alternatives from other countries. This quality comes at a price: Somali charcoal retails for almost twice the price of inferior charcoal. The men enjoying such evening idylls may not have known it, but their love of smoking has helped fuel a bloody insurgency more than 3,000 kilometers to the south, in Somalia.

In October 2016, the UN Monitoring Group on Somalia and Eritrea noted that there had been some positive trends in terms of implementation of the charcoal export ban. As first noted in late 2015, Al-Shabaab continued its strategic shift away from the charcoal trade, attacking or jailing charcoal burners and traders operating within its territory but not paying the requested taxes to the group. Importing countries had improved their enforcement of the ban. (It has proved adept at offsetting declining charcoal revenue by increasing taxation of other natural resources and commodities, such as the illicit sugar trade, agricultural production in southern Somalia, and livestock in central Somalia.) As late as early 2016, the United Arab Emirates was still accepting fake certificates of origin that indicated that Somali charcoal originated in the Comoros Islands, Ghana, Pakistan, and other countries, however, and confiscated Somali charcoal was routinely sold at auctions at below-market prices and in quantities much lower than those actually confiscated. As of May 2016, however, the United Arab Emirates was enforcing its ban on charcoal exporters from Somalia.

Source: UNSC (2016) and press reports, including https://www.hiiraan.com/news4/2015/Mar/98481/somali_charcoal_funding_terrorism_through_de-forestation.aspx.

this area, which is frequently hit by droughts and famines. In southern Somalia, charcoal production typically occurred in the denser part of dry woodlands or woody savannah. The last average tree loss rate estimated by the FAO was about 2.7 percent for 2011–13, which is in line with the 7.2 percent reported by other studies over longer periods (such as in 2006–12). About 80 percent of the trees used for charcoal are acacia species; it is estimated that 25 percent of all prewar acacia trees have been chopped and made into charcoal (Ismail 2011).

The acacia species has traditionally been an important source of grazing for goats and camels, fencing of livestock in night enclosures, nitrogen fixation to enhance soil fertility, and (mostly) dead dry trees and tree branches for cooking. Before the war, charcoal production served only domestic urban households. Despite the lack of alternative sources of energy for domestic cooking, the use of inefficient cooking stoves, and the inefficient process used for making charcoal (box 4.2), such local use was sustainable. The large-scale logging of living trees for charcoal export after the start of the civil war is not, because the acacia trees do not grow quickly enough to replace the felled ones.[26]

In 2012, the FGS and the governments of Somaliland and Puntland imposed an export ban. UN Security Council Resolution 2036 (2012) called for international cooperation to stem the illegal export trade of charcoal from Somalia. These initiatives have led to a large reduction in exports (see figure 4.1), especially from the two major northern ports, where governments are capable of enforcing the ban. By 2013, recorded charcoal exports from Somalia (as measured by imports recorded by the rest of the world from Somalia) had virtually stopped, with only $0.8 million showing up in the COMTRADE database.

Box 4.2: The Profitable Business of Charcoal

Before the civil war, small-scale groups of cutters felled acacia trees for charcoal, but they felled only dead trees, yielding enough charcoal for local use. After the start of the civil war, when export became one of the few ways to earn foreign exchange, businesspeople, armed militias, and politicians combined forces to cut both dry and living trees. Their new integrated line of business expanded rapidly.

The incentives for charcoal exports are clear. In the domestic market, a 25-kilogram bag of charcoal sells for $8, with $2–$3 shared by the producer and vendor (generally women) and the rest captured by militias and traders. Charcoal exported to the Middle East is sold at $12 for a 25- to 30-kilogram bag. About $1–$2 is paid to the laborer producing the charcoal, and $10–$11 is shared among traders, militia groups, and transporters.

The charcoal trade is closely linked with sugar importation. Many vessels offload commodities at Kismayo before reloading with charcoal for their return journey. Export taxes on this trade generate $400,000–$800,000 a year for various state and nonstate groups, including Al-Shabaab.

Despite the booming trade, the making of charcoal remains artisanal. The felled trees are chopped and their trunks and branches stacked in piles and covered with sand; a fire is then lit from underneath that burns slowly to make charcoal. This process is a very inefficient method of making charcoal and results in considerable waste, including charcoal dust (FGS 2015).

Source: https://www.economist.com/news/middle-east-and-africa/21623793-unlikely-link-between-gulf-lounges-and-somalias-jihadists-charred-harvest

Illegal exports from the major southern ports continued for some years after the introduction of the export ban, as a result of collusion by state and local governments and their monitoring and enforcement agencies with charcoal traffickers. The Monitoring Group continues to receive reports of collusion between the southern governments (in particular the Jubaland administration) and their enforcement agencies and charcoal traffickers, and dhows laden with charcoal continue to depart from Kismayo and Buur Gaabo and arrive in Dubai. Customs authorities in importing countries in the Gulf were also slow to reject fake certificates of origin disguising Somali charcoal as being produced in other countries or export documentation misclassifying Somali charcoal as something else.[27] Although the commercial networks that sustain charcoal exports from Somalia into the United Arab Emirates remain in place, the developments noted in box 4.1 have reduced volume, particularly since May 2016. Recorded 2016–17 shipments are believed to have been small, and mostly exported not from major ports but from smaller, less-monitored ports.[28]

In 2014–16, gas stoves became very popular in major cities in Somalia, thanks largely to the influx of Somalis from the diaspora. Somali entrepreneurs have taken advantage of this business opportunity by marketing gas stoves imported from neighboring countries. The combination of the export ban, the introduction of gas stoves, and the growing awareness of the devastating environmental consequences of continuing domestic consumption among elders, clan leaders, government officials, and politicians represents a strong opportunity to reduce charcoal production and its negative impact on the environment. These factors will likely continue to significantly reduce demand for and thus production of charcoal in Somalia.

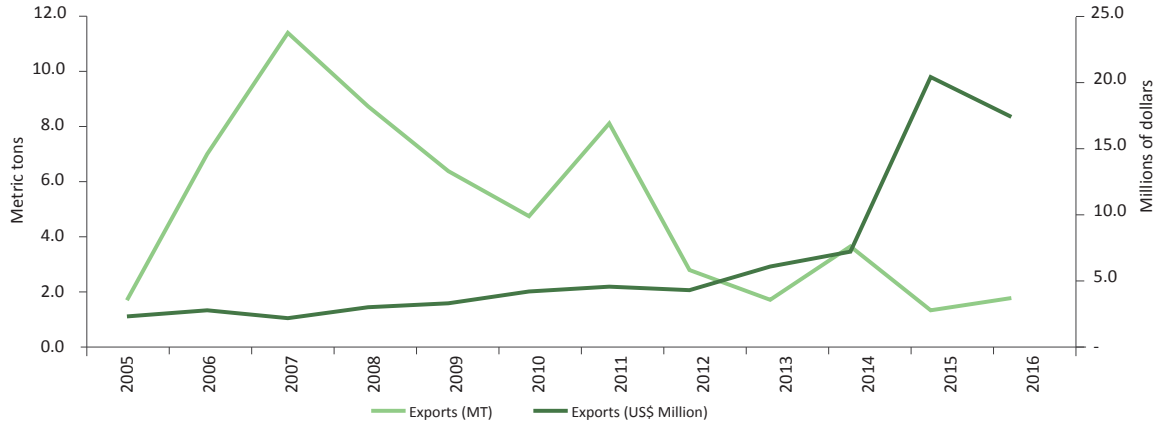
4.1.2 Resins

In the late 1980s, Somalia was the world's largest producer and exporter of frankincense and myrrh (box 4.3). It produced about 10,000–14,000 tons of frankincense a year and 1,500–2,000 tons of myrrh (World Bank and UNDP 2007). The combined export value of raw gums averaged about $7.1 million, representing the country's fourth-largest source of foreign exchange earnings (see the entry in table 1.4 in chapter 1 for crude animal and vegetable material).[29]

By the mid-2000s, average annual export volumes had fallen to about 4,000 tons, according to the FSNAU. They fluctuated between a peak of 11,400 tons in 2007 to less than 2,000 tons in 2013.

The value of exports of gums and resins was about $7.3 million in 2014 (figure 4.2). Estimates by the FSNAU of resin and gum export volumes are partial and unreliable; reported annual fluctuations in volumes may thus reflect faulty data monitoring and collection. Dollar export value estimates are more reliable than volumes, as they come from the customs records of importing countries. However, the gums and resins figures for 2015 and 2016 appear to reflect the new inclusion of (illegal) charcoal exports, as "wood and wood charcoal" exports, under which charcoal had been previously classified, suddenly dropped to zero in 2013 (as shown in table 1.4 and figure 4.1).

Figure 4.2: Exports of Resin and Gum by Somalia, 2005–16



Source: Volume figures are from FSNAU; dollar figures are from COMTRADE.

Box 4.3: What are Frankincense and Myrrh?

Frankincense comes from Boswellia trees, which grow at higher altitudes. Myrrh is extracted from commiphora trees, which grow on lower slopes. Both kinds of tree grow naturally in the rocky mountains of the Sanaag and Bari regions. They are harvested from three northern ecological zones: the Al Madow Mountains, a westerly escarpment that runs parallel to the coast; the Al Miskeed Mountains, a middle segment of the escarpment; and the Karkaar Mountain range or eastern escarpment.

Both kinds of resins are used in herbal medicines, essential oils, and perfume as well as in religious ceremonies, including in Europe (mainly France). China has become the largest market for all these resins, mainly for use in traditional medicine. Another important market is the Middle East, particularly Saudi Arabia, where a special type of frankincense is used as a naturally scented chewing gum. The high-quality grade of this resin, which is pure white in color, sells for $12 a kilogram—six times the price of the best inedible frankincense. Smaller quantities of a lower grade are also exported to the Middle East for burning in the home and to Catholic and Orthodox Christian churches all over the world for ceremonial burning.

Puntland and to a lesser degree Somaliland used to be the world's leading producers and exporters of frankincense, including of its rare high-quality *beyo* type.[30] Myrrh is a gum of lower value and less importance. Somaliland was, with Ethiopia, the largest exporter in the world before the civil war. Sudan and Chad are largely exporters of gum arabic, which is produced in small quantities in Puntland and exported from Bosaso.

Several factors are threatening tree growth in Somalia. In addition to land degradation and soil erosion from overgrazing and deforestation, they include overharvesting. Proper care requires and traditional stewardship ensured the tapping of resins every two years. Since the early 1990s, harvesting has increasingly been occurring annually. This practice was rampant in the early 2000s. This new phenomenon is linked to a new generation of people entrusted with the care of these trees by absentee owners living in cities or abroad or younger owners who are eager to maximize short-term earnings and are unaware of the long-term needs for the trees' health. Even worse for the trees, illegal harvesters also collect resins by making cuts in the bark only five months after their harvesting. Lured by the high price fetched in both the domestic market ($2–$10 per kilogram) and in Middle Eastern markets ($25–$50), youth sneak into these remote areas during the harvest season to take the resins before legitimate harvesters reach them. After distillation into essential oil, a 1-ounce bottle (obtained with less than 1 kilogram of resin) can fetch $70 or more in the West.

All state-owned processing and marketing collapsed at the start of the civil war; all distillation equipment was looted and sold for scrap metal. This subsector was one in which new private investment in processing took place after the start of the civil war, allowing it not only to survive but to thrive and expand. In the early 1990s, a joint Somali-Kenyan private venture initiated the extraction of essential oils through steam distillation in Nairobi from frankincense and myrrh resins gathered in the Bari region of Puntland. In early 2016, a Somali start-up (the Neo Trading Company), financed with both family and USAID grant funding, built a new processing plant in Hargeisa. It will extract and export essential oils using steam distillation. With stronger environmental stewardship of the country's forests and trees, this subsector retains good potential for expanded value addition and export revenues, though it would have a small impact on employment.

4.2 Climate Change Implications for Agricultural Growth

Shifts in air and sea temperatures and rainfall patterns linked to climate change portend an uncertain future for a country that already suffers from acute levels of economic, social, and environmental fragility. The Center for Global Development places Somalia at the top of its list of 167 countries ranked globally for overall vulnerability to climate change, after adjustment for coping capacity.[31] Increasingly erratic rainfall and prolonged periods of severe drought and flooding have already overwhelmed customary coping mechanisms and threatened the viability of traditional agricultural livelihoods. With few alternatives, many Somalis have also turned to unsustainable exploitation of natural resources, amplifying the country's exposure and vulnerability to future climate shocks.

The interlinkages between climate variability and climate change, environmental degradation and natural resource depletion, conflict, food insecurity, and poverty are more pronounced in Somalia than in almost any other country. Though broadly documented and scrutinized, these dynamics are little understood. As the country moves forward to consolidate peace dividends and gains from improved security, a better understanding of these linkages and the ways in which climate change is likely to affect agriculture in the coming decades will be critical. This knowledge can empower decision makers to identify appropriate policies and investments that can best support strong and resilient sector growth, poverty reduction, and sustained economic growth in Somalia.

In an effort to bridge this knowledge gap, the World Bank commissioned a background paper to assess the impacts of climate change on Somalia's agriculture sector. Prepared by the Horn of Africa Regional Environment Centre and Network (HoA-REC&N), the report surveys the literature on recent weather trends and climate change projections and discusses associated risks to the country's natural resource base (soils, rangelands, water, and forests) and traditional livelihood systems. This section draws in part from that report.[32]

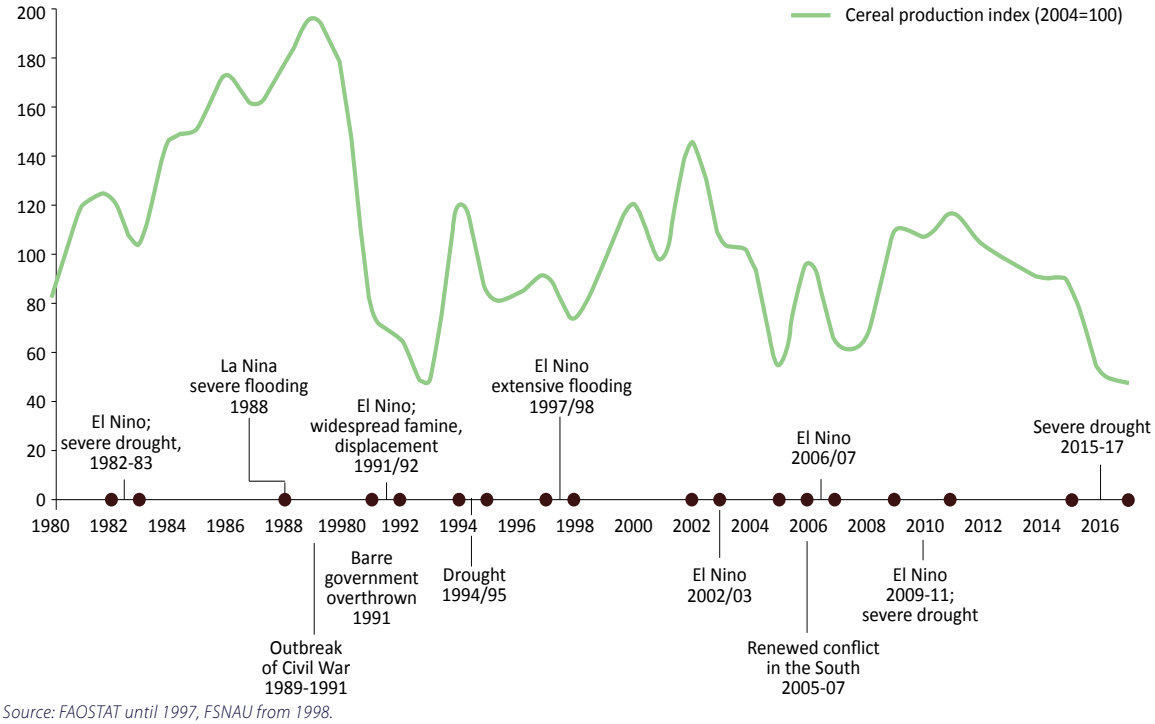
4.2.1 Risks to Agriculture

Taking stock of the sector's recent performance can help identify factors that adversely affected its performance and reveal trends. Figure 4.3 depicts a timeline of some of the most notable risk events that affected cereal production and jeopardized agricultural livelihoods between 1980 and 2017.

The impacts of broad-scale climate events are far more visible than the impacts of conflict. Between 1980 and 2017, eight major weather events affected cereal production (in 1982–83, 1991–92, 1994–95, 1997–98, 2002–03, 2006–07, 2009–11, and 2015–17). The last crisis created a major humanitarian crisis that still threatens to become a famine.

Periodic droughts continue to pose the greatest risk to Somalia's agriculture, but the opposite extreme can also cripple crop and livestock production. Periods subject to extreme El Niño Southern Oscillation (ENSO) variations are often associated with heavy rainfall and widespread flooding—ideal conditions for transmission of the mosquito-borne virus that causes Rift Valley Fever. Following outbreaks, Middle Eastern countries banned livestock exports from the Horn of Africa (in 1998–99 and 2000–02), causing estimated losses of $109 million and $326 million, respectively (Cagnolati, Tempia, and Abdi 2006; Antoine-Moussiaux and others 2012).[33] Falling livestock prices and terms of trade and the dramatic depreciation of the shilling (caused in large part by the sudden drop in export tax revenues) emaciated the purchasing power of pastoral households (Holleman 2002).[34]

Figure 4.3: Risk Events Affecting Agriculture in Somalia, 1980–2017



Source: FAOSTAT until 1997, FSNAU from 1998.

4.2.2 Historical Climate Patterns

Much of Somalia's landmass has long been prone to extreme weather conditions, including high mean surface temperatures, periods of extended drought and flooding, erratic rainfall, and strong winds (FGS 2013; UNDP and ICPAC 2013). Weather conditions during the year and from one year to the next tend to be highly variable and localized, driven by diverse physical processes and a dynamic and complex interplay of global and regional weather phenomena, which obscure both the accuracy of short-term seasonal weather forecasts and long-term climate changes. Weather phenomena, including fluctuations of temperature, precipitation, humidity, cloud cover, atmospheric pressure, and wind speed, have become increasingly unpredictable across the Horn of Africa in recent decades. Noteworthy shifts in rainfall patterns and increases in air and sea surface temperatures have also been observed. Historical trends suggest that climate conditions in the region are becoming drier, more erratic, and more extreme—and thus less favorable to crop and livestock production, fisheries, and other livelihood systems.

Tierney, Ummenhofer, and deMenocal (2015) and others highlight an overall drying in the region. Other studies find that lower rainfall in eastern Africa during the critical March, April, and May "long rains" season in recent decades is linked to a warming of the Indian Ocean (Funk and others 2008; Williams and Funk 2011; Lyon and DeWitt 2012).[35] Increasing ocean temperatures are already taking a toll on ocean circulation, chemistry, and marine life. A 2016 study highlights a decline of up to 20 percent in the number of marine phytoplankton in the Indian Ocean over the past six decades (Roxy 2016). In addition, ongoing ocean acidification threatens the region's coral reefs and entire groups of shellfish and zooplankton and thus the broader food chain and marine ecosystem.[36] Other studies point to declining summer (June–September) monsoonal precipitation throughout much of the Horn of Africa (Williams and others 2012) and growing frequency of extreme weather events over the last 30–60 years (Funk and others 2008; Williams and Funk 2011; Shongwe and others 2011; Lyon and DeWitt 2012).

While aggregate rainfall amounts appear to have fallen, air surface temperatures have climbed. The Horn of Africa region registered a 1.0°C increase in surface temperatures between 1901 and 2005, under the combined influence of natural drivers and anthropogenic forces, according to the Intergovernmental Panel on Climate Change (IPCC 2007). Much of this increase occurred over the last 50 years, as highlighted in reports by FEWS NET (Funk and others 2010). In addition, warming of the near surface temperature and an increase in the frequency of extreme warm events was observed between 1961 and 2008 in countries bordering the western Indian Ocean (Vincent and others 2011).

4.2.3 Projected Climate Patterns

All global and regional climate model projections point to a warmer future. One scenario predicts warming of surface temperatures by as much as 4°C by the end of the century (IPCC 2007). Sea surface temperatures in the Indian Ocean and elsewhere are expected to increase in coming decades along with increased acidification.

There is far less certainty about rainfall. In contrast to the drying that occurred in the 20th and early 21st centuries, most global climate models predict that the Horn of Africa will become wetter as global temperatures rise (Christensen and others 2007; Shongwe and others 2011; Williams and others 2012). The 2007 assessment by the Intergovernmental Panel on Climate Change notes that 18 of 21 models predict increased rainfall in the Horn of Africa.[37] Climate predictions for Somaliland and Puntland, based on IPCC AR4 projections, project increases in mean annual precipitation of 15–20 percent (Petersen and Gadain 2012). Whether rainfall increases or decreases, seasonal variability and the frequency of extreme rainfall events (droughts and

floods) are expected to increase (Kay and Washington 2008; FGS 2013a; UNDP and ICPAC 2013), with far-reaching implications for Somalia's agriculture and economic growth potential.

For Somalia, as for other developing countries, climate change represents a major obstacle to achieving the Sustainable Development Goals (SDGs) and reducing poverty and hunger. By jeopardizing agricultural production, it poses a severe and direct threat to national food security. By amplifying environmental stressors, it threatens the long-term viability of the fragile ecosystems on which the sector and the majority of Somali livelihoods depend.

Climate change impacts also have strong potential to cause massive damage to human and animal health, water availability, terrestrial biodiversity, forests, and coastal and marine resources. For crop production, increased temperatures will likely favor increased evapotranspiration. More variable and extreme rainfall will reduce spatial infiltration and facilitate runoff and erosion, resulting in less groundwater recharge and less water availability in the surface layers for plant growth. Other likely impacts include reduction of vegetation for grazing and more variable water availability, with grave impacts on livestock herding and related livelihoods, in particular. Rising sea temperatures and acidification could substantially reduce fish stock numbers and distribution, upending the Somali fishing industry.

Chapter 5

THE LIVESTOCK SUBSECTOR

KEY FINDINGS ▶

- Livestock remains the traditional repository of household wealth in Somalia. It provides about three-quarters of total exports by value and is an important source of livelihood for a large part of the country's population.
- In addition to the main production systems of nomadic pastoralism and agro-pastoralism, large livestock-rearing operations with dairy animals (mostly camels) have been on the rise in settled mixed farming in urban and peri-urban areas. They market only fresh milk, however, with no or minimal processing.
- The predominant feed production systems rely mostly on natural pastures on the country's vast rangelands, with little or no external inputs provided, and on stalks that make straw of low nutritional value. Demand is high and growing for good-quality fodder along trading routes, in market centers, and at terminal ports. Hay production from native grasses is very limited, and storage practices are so poor that its nutritive value very quickly drops to that of straw. At peak demand periods, maize, sorghum, other fresh crops, and even emergency relief food for human consumption are also sold as livestock feed.
- While well adapted to the harsh geographical and climatic environment, Somali livestock is characterized by low weights and milk yields, mainly because larger and heavier animals are selected for slaughter or live export rather than breeding. In the absence of government animal health programs and institutions, the private sector and local veterinary associations funded by development partners have provided many critical services. Such efforts remain insufficient to address the serious risk of animal diseases and consequent import bans (the latest imposed by Saudi Arabia at the end of 2016 and only temporarily suspended during July–September 2017).
- Despite the challenges, the sector has shown remarkable resilience. Following a sharp decline immediately after the start of the civil war, the stock of animals (estimated at 53 million in 2014) is well past the peak level registered in the late 1980s (about 40 million). As of 2016, Somalia had more camels (7.1 million) than any country in the world.
- Substantial investment in quality improvements supported an impressive growth in livestock exports, with both volumes and values (peaking at $533 million in 2015) considerably higher than before the civil war. Since the war, Somalia has also developed exports for breeding.
- Milk production, especially from camels, has risen steadily since the late 1980s, reaching a gross market value estimated at about $3.3 billion in 2014, before the recent drought. Somalia nonetheless still imports dairy products while exporting none. Constraints that have kept the dairy sector from reaching its potential include the same ones that affect the welfare and health of live animals, as well as poor or no enforcement of low and outdated prewar hygiene standards, lack of processes to preserve milk quality, inefficient marketing channels fraught with excessive intermediaries, the poor state of transport infrastructure, rapid spoilage from high temperatures and humidity, and the absence of economies of scale.
- Production of fresh red meat has also been on the rise, to meet rising domestic demand, but it remains well below potential. Commercial meat processing is limited to very small quantities of chilled goat and beef meat for export. Growth has been hampered by the constraints listed above and mismanagement.
- Production of hides and skins was comparable in the early 2010s to levels of the late 1980s, at about 7 million pieces a year. Processing is minimal (sun-drying), however, and well below prewar levels. Hides and skins are of poor quality, and improper preservation and storage often leaves them damaged by vermin. Domestic leather production is miniscule.
- All livestock products suffered severely from the most recent drought, with early 2017 milk yields cut by more than half for camels and up to two-thirds for cows and goats.
- Poultry keeping is widespread among poor households, for both self-consumption and resale, and imports of day-old chicks and sometimes eggs for local hatcheries is increasing. Commercial poultry farming is on the rise, particularly in urban areas, almost exclusively to supply eggs to nearby towns, as there is stiff competition in chicken meat from Brazilian frozen imports. Expansion is constrained by shortages and the costs of inputs, including poultry feed and feed concentrates.

5.1 The Livestock Economy

Livestock is the main repository of household and national wealth in Somalia, and the export-oriented pastoralist production system provides an important source of livelihood and resilience. Many areas in Somalia offer few livelihoods other than pastoral livestock production and marketing.

Livestock provides a source of income, and home consumption of meat and other animal products represents an important source of food security. Pastoral communities get many of their calories from milk and meat consumption, which complement cereal and noncereal foodstuffs, which are often financed by income from animal and milk sales. Livestock also plays an important role in Somali culture, with animals exchanged to consolidate social ties and reciprocal relationships.[38]

About 26 percent of the population is classified as nomads, according to the most recent population estimates (UNFPA 2014). Many others living in both rural and urban areas derive major parts of their livelihoods from the livestock subsector, bringing the total number of people benefiting directly from the sector to 65 percent.[39]

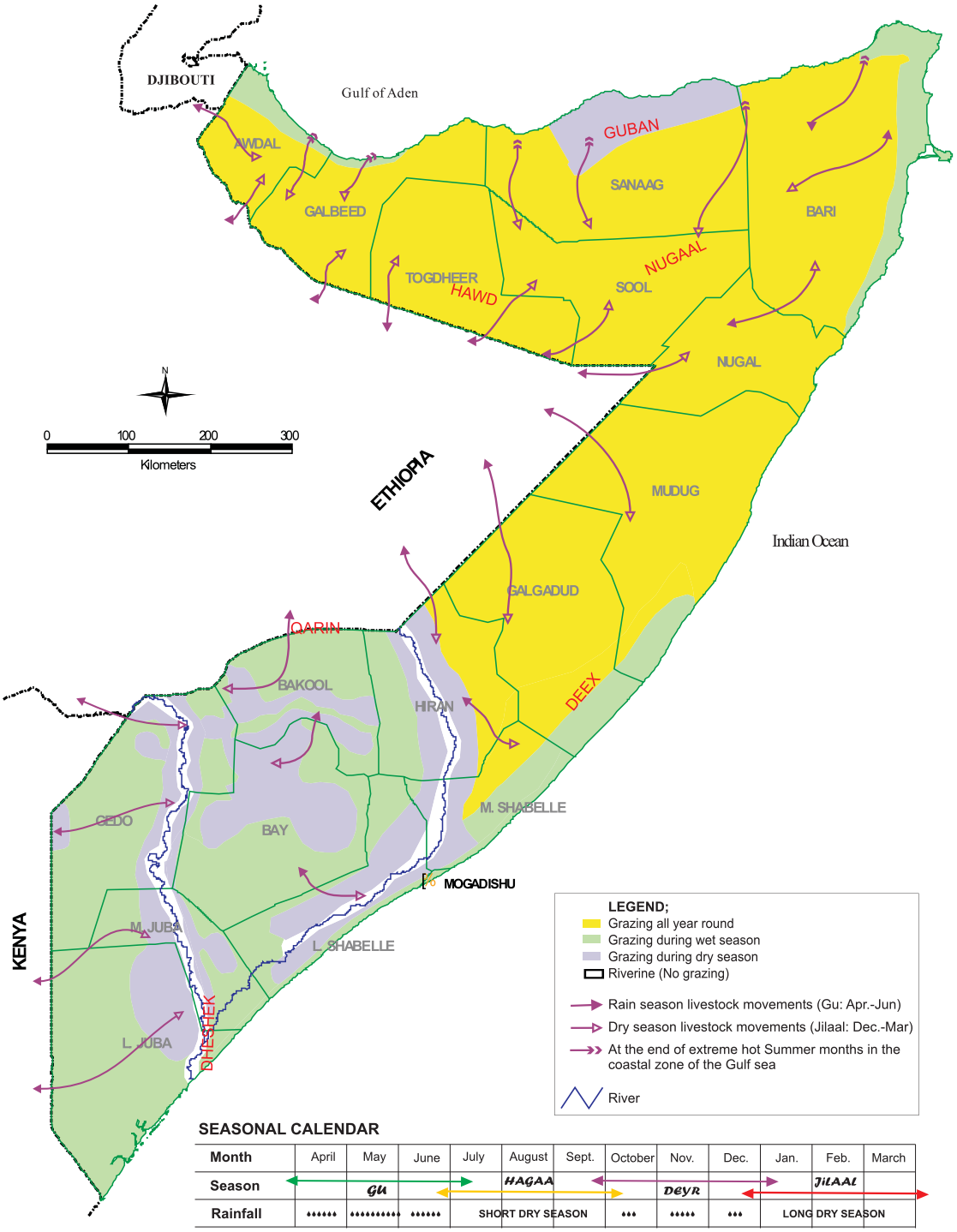
In 2011–14, the livestock subsector accounted for about 75 percent of total exports. The figure has fluctuated, interrupted by droughts and international export bans, in the last three decades.

Many traditional constraints associated with livestock production have intensified in recent decades. They include water shortages; lack of availability of and access to good pasture; invasion of unpalatable plant species (for example, *Prosopis juliflora [mesquite], Parthenium hysterophorus,* and *spiny cacti*); deforestation and other forms of land degradation; and natural shocks, such as drought and floods. Other persistent constraints include transboundary animal diseases, with occasional flare-ups of epidemics, and fluctuating market prices for livestock and livestock products.

Despite very little, if any, government involvement since the civil war began, the sector has shown remarkable resilience, resulting in high offtake rates and impressive growth in exports in recent years. In the early 2000s, the FAO estimated offtake percentages at 27.3 percent for sheep, 23.3 percent for goats, 11.3 percent for cattle, and 1.6 percent for camels (FAO 2004).[40] A significant number of animals are marketed domestically, generating employment for the local population, especially women, who often sell domestic meat and produce animal byproducts, including milk, soaps, and jewelry from bones.[41] Figure 5.1 illustrates the domestic marketing routes.

Much livestock production and trade is guided by traditional institutions and practices, including kinship and ethnic groupings, clan affiliations, identity, and religious practices, which serve as alternatives to formal contracting (Carr and Landa 1983). In recent years, however, substantial diaspora investment, limited external donor support, and foreign investment by Saudi-controlled companies have supported both safety and quality improvements and expansion of livestock exports.

Figure 5.1: Migration and Seasonal Pattern of Livestock Movement in Somalia



Source: FSNAU (http://www.google.it/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwi4zrfhrt_QAhVIXhQKHXDfCZUQFggoMAA&url=http%3A%2F%2Fwww.fsnau.org%2Fdownloads%2FLivestock%2520Seasonal%2520Migration.pdf&usg=AFQjCNGR_f_3LRwMU3HSje7fYTScGGW62A).

5.2 Livestock Production Systems

Several types of livestock production and management systems are found in Somalia, determined by factors such as the natural resource endowment, the availability of labor and pasture, and the sizes and types of livestock raised. The three main production systems are nomadic and transhumant pastoralism, agro-pastoralism, and urban and peri-urban rearing systems.

Nomadic pastoralism, the predominant production system in Somalia, is characterized by little or no agriculture and high mobility of people and animals in search of grazing and water. Transhumant pastoralism is based on more or less regular seasonal migrations from a permanent homestead or settlement. Nomadic and transhumant pastoralists are found throughout Somalia; the highest concentrations are in the northern rangelands of Somaliland and Puntland and in the central rangelands.

Pastoralism is an economic and social system that is well adapted to dry land conditions. It can generate significant returns from areas with low rainfall and scanty resources. Pastoralism is characterized by a complex set of practices and knowledge that historically permitted the maintenance of a sustainable equilibrium among pastures, livestock, and people.

A variety of factors made it increasingly difficult to maintain a sustainable equilibrium in Somalia during the past decades. They include a changing political landscape and land use systems that fostered sedentary agriculture and urban human settlements, territorial disputes, local communal conflicts, severe environmental degradation, and increasing climate-related shocks, including recurrent, more frequent, and longer-lasting droughts.

Pastoral households in Somalia generally maintain a distinct division of labor among family members, in which young men herd camels while women, children, and the elderly take care of cattle and small ruminants. Splitting herds is a common strategy used to optimize the use of scarce resources. Both pastoralist households and traders use a grading system to increase their incomes by increasing their animals' weight. Efforts include finishing animals before sale and buying poor-grade and low-cost animals, which are then finished for sale at higher prices.[42] Animals are often finished by grazing in communal land during the wet season, when pastures are more nutritious, and/or through the use of purchased feeds (usually imported concentrates).

Agro-pastoralism is becoming increasingly common in all parts of the country, even in drier regions, as many households find it increasingly difficult to rely only on livestock for their livelihoods. Agro-pastoralists combine livestock production and grazing with dryland or rainfed cropping and the feeding of animals with crop residues. Most agro-pastoral households produce sorghum, maize, and beans.

Subtypes of agro-pastoralism range from farmers who own large herds and keep some of their animals on the farm and some on the rangelands to small-scale-farmers who own only a few animals. Split herding based on a division of labor is common. In this practice, part of the family (mostly the men and boys) moves with most of the herd while other family members remain on the farm to cultivate crops. Lactating or heavily pregnant or sick animals are also usually left behind on the farm.

In agro-pastoral areas, nutrient cycling through the integration of a crop-livestock system and the use of crop residues and byproducts as animal feeds and animal manure as crop fertilizer are common. Use of draught power is still limited.

Agro-pastoralism is most common along the Juba and Shabelle river valleys in southern farming regions characterized by higher land productivity and higher rainfall. The main systems are found in both the low-potential livelihood zone and the high-potential "sorghum basket" of the Bay and Bakool

regions, where sorghum, maize, cowpea, sesame, and groundnut production is combined with livestock keeping, mostly of cattle. In the coastal cowpea belt zone, shifting cultivation agriculture is also usually combined with livestock keeping, mainly of camel and goats.

Agro-pastoralism is also practiced in selected areas of the north, where water is sourced from harvesting rain water, natural springs, oasis, and nonsalty shallow wells.[43] The northwestern part of Somaliland receives relatively high rainfall, allowing for some sorghum, maize, millet, and cowpea production, combined with transhumance livestock keeping. In Puntland, agro-pastoralism is practiced on a more limited scale in irrigated farming areas; livestock kept include camels, goats, and sheep. Forage conditions in these areas are generally good, with springs and shallow wells the main source of water for animals.

In addition to pastoralism and agro-pastoralism, livestock rearing systems have emerged in settled mixed farming in urban and peri-urban areas. Animals graze in areas containing natural pasture and browse trees and shrubs for most of the year and/or are partially confined in stalls, where they are fed conserved fodder and concentrate supplements. Water supply is also available on-site. Some farms have integrated dairy camels and cattle. Some farmers have imported mating bulls of superior exotic breeds, such as Friesian, including from Ethiopia. Their farms target the emerging local fresh milk consumer markets in the main urban areas of Somaliland (Hargeisa, Berbera, and Burao); Puntland (Bosaso, Garowe, and Galkayo); and Southern Somalia (Mogadishu and Kismayo).[44]

5.3 Livestock Feed Resources

The predominant feed production system relies on the natural pastures on Somalia's vast rangelands, which are covered by grass, herbs, shrubs, and sparse trees; palatable fresh crop residues for fodder; and high mobility by both pastoralists and agro-pastoralists in search of forage. This system is characterized by low levels of inputs and production.[45] Increasing loss of traditional grazing lands to environmental degradation and enclosure of rangeland, overgrazing by increased number of livestock, and the lack of law enforcement have led to lower resilience to shocks, intensified conflicts, and growing demand for commercially produced fodder.

Demand for feed along trading routes, in market centers, and at terminal ports is high and rising, as the trend for keeping animals, especially camels, in confined grounds near major cities is growing. Demand for fodder is largely seasonal, because it is closely linked to the celebration of the main Islamic celebrations, when exports soar. Prices of fodder are highest during the dry season, when pasture is scarce and fodder production generally low. Price information on fodder is not collected in a coordinated manner, but local assessments report average prices for a bale of fodder (20 kilograms of natural grass) of about $3. A truckload of 90 bales of fodder sells for about $100–$350, depending on the season (the figure if higher during droughts). The seasonality of demand for fodder underlines the need to invest in postharvest processing and adequate storage. In general, most fodder is still sold in unprocessed form, though postharvest fodder is usually collected in 20-kilogram bales or boxes and transported in trucks. Efficiencies could be gained by using box baling rather than bundling.

Fodder production from all sources—including grasses, shrubs, and the leaves and fruits of wild trees (including the invasive *Prosopis juliflora* tree and many imported varieties)—can and should be a very important part of the agriculture system in Somalia. It remains very underdeveloped, with technical know-how either absent or very limited.[46]

The most commonly used and traded fodder is crop residues, mainly stalks, which produce straw of low nutritional value. At peak demand periods, when prices are highest, various fresh crops, including maize and sorghum, are also sometimes sold as livestock feed. Super Cereal, which the World Food Programme distributes as relief food aid, is sometimes resold as fodder in Somalia. This low-quality but inexpensive product stifles incentives to develop the domestic fodder market. Hay production is limited to a few new commercial farms whose storage facilities and practices are so poor that the nutritive value of stored hay very quickly drops to that of straw.

Native grasses grow and are harvested mostly after water recedes in plains and valleys that are irrigated by natural floods overflowing from permanent or dry rivers or deliberately directed into the grass growing areas through feeder canals. These areas are found in Beer village south of Burao, in Borama in Somaliland; Gardo and Garowe in Puntland; and along the Shabelle and Juba rivers in Belet Wayne and Dollow in Southern Somalia. Community-based fodder production also takes place on open rangelands on which designated areas are assigned for grass regeneration.

Parts of the flooded dry river valleys in Somaliland and Puntland, where native grasses grow naturally, are protected from grazing by thornbush enclosures with restricted grazing, governed by local customary structures. In some areas, such as the Togdheer region, cooperatives have been set up that produce and market fodder in enclosed areas. An increasing number of pastoralist families are constructing their own private enclosures, within which they grow fodder, often in combination with small-scale crop production.

In addition to native grass species, some improved imported varieties have recently been grown under irrigation, particularly along the riverine areas of the Lower Shabelle. In peri-urban areas of Bosaso and Garowe in Puntland, some livestock farmers are growing fodder under irrigation using borehole water.[47] Private companies have yet to venture into large-scale fodder commercialization, possibly because of limited know-how and poorly developed marketing channels.

5.4 National and Regional Livestock Policies

The Siad Barre government nationalized and monopolized the export trade of hides and skins In the 1970s. It continued to control it until the late 1980s, when the World Bank and IMF got it to liberalize the subsector in exchange for badly needed external financial assistance.

The government imposed a puzzling array of restrictive regulations on private exports of livestock. The most taxing were strict foreign exchange controls in the 1980s, which required all private exporters, including exporters of livestock, to exchange at least half their foreign exchange earnings at the overvalued official foreign exchange rate, which in 1988 was less than half the market rate. This requirement benefited the rich political patrons who consumed imports and undermined Somalia's export industry. State control of industries also created inefficiencies, described elsewhere in this chapter.

After the collapse of the Somali state, in 1991, the capacities of government institutions in the northern regions (and recently of the federal and state governments formed in Southern Somalia) remained limited, particularly in regulatory services and in transforming export market opportunities into higher incomes and broader development outcomes. To fill the gap left by government, the private sector (including individuals and civil society organizations) has grown substantively to facilitate trade, by providing animal transport and health services and holding infrastructures.

The main and most recent policy framework for this subsector is the livestock chapter of the National Development Plan 2017–19. Its main aim is to support a vibrant and commercially competitive livestock subsector that contributes to sustainable livelihoods, inclusive economic growth, and the delivery of essential services. To achieve its objective, the plan set out four operational goals for the livestock subsector:

- strengthening institutional capacity and public infrastructure
- increasing animal health services and the productivity of small and large producers
- enhancing trade in livestock and livestock products
- improving national food security, nutrition, and food safety within the livestock subsector.[48]

The federal Ministry of Livestock, Forestry, and Rangeland prepared a draft Livestock Policy (2015–20), with input from Puntland and the other recently created states in Southern Somalia. It is currently undergoing a consultation process and is expected to be finalized and approved in 2018 by the newly elected members of parliament. The document spells out public and private sector core functions and addresses issues related to livestock disease and trade, land degradation and range management, institutional framework and coordination, and infrastructure for animal health and marketing. To maintain production levels, it also reaffirms the longstanding prohibition on the export of female animals.

In 2006, Somaliland adopted a National Livestock Policy (2006–16). It recognizes the involvement and comparative advantage of the various sector actors and spells out the roles and responsibilities for public institutions, the private sector, pastoral associations, research institutions, and development partners. This still-current policy emphasizes the following:

- improvement of animal health service delivery and diagnostic services to protect the state's herd
- improvement of veterinary public health services to protect and safeguard consumers, locally and internationally
- maximization and commercialization of animal production where possible, to meet the cash income needs of producers and national nutritional requirements
- fostering of trade in livestock and livestock products
- promotion of research, continuous professional development, and strengthening of institutional capacity (public and private) for service delivery.

5.5 Environmental Degradation and the Spread of Private Enclosures

Most pastoral and agro-pastoral livestock production in Somalia takes place on open rangelands in the northern and central regions and in the areas along the Ethiopian and Kenyan border in the southern regions. Production involves little or no external inputs.[49]

Before the collapse of the Somali state, a national rangeland agency was responsible for managing rangelands. In consultation with pastoral clans, it designated dry and wet season grazing areas.

In low rainfall areas (below 400 millimeters), rangelands are dominated by annual grasses and herbs, which "bloom" after rains and provide critical wet-season grazing for livestock. As rainfall is unevenly distributed spatially and temporally, pastoralists move to make optimal use of the range, which can be very productive until the grasses and herbs set seed and die. At that point, herds move to dry-season grazing areas, where perennial grasses grow in areas that get more than 400 millimeters of rain a year, most of them open wood and bush lands. Allowing grasses and herbs to set seed and not overgrazing them beyond their regenerative ability are critical to the sustainability of such ecosystems.

High mobility on wet- and dry-season grazing areas, including communal drought-time grazing reserves, has always been part of the traditional and once well-respected natural resource management system. Pastoral clans enjoyed and enforced their right to graze in their traditional areas of influence, but pastures on the rangelands were never privately owned, and in the case of a localized drought emergency, livestock were customarily allowed to move to better pastures, even if other clans controlled them. Such customary courtesies, reciprocated by clans living in different areas, were an important coping mechanism for livestock to survive even extended but localized periods of drought; only on rare occasions did such movements result in clan warfare.

A survey conducted three decades ago found that as much as half of Somalia's northern rangelands were seriously degraded, as a result of the steep topography and the large number of livestock (almost 50 million head), especially near ports (World Bank 1987). Since then, rangeland governance, either traditional or formal, has broken down and become scattered, with different clan-based groups taking responsibility for managing rangelands under their control. This failure of governance to guide arrangements for access to water sources, grazing areas, and trees on the rangelands; persistent insecurity in the southern regions; and intensifying stress on rural livelihoods from climate change have led to uncontrolled exploitation of these natural resources (see chapter 4 for analysis of the impact of charcoal exports and climate change). They have also allowed or fostered further changes in land use patterns, with significant negative impacts. These changes include the spread of private enclosures, the expansion of cultivated areas into rangelands, and overgrazing even in areas that were previously avoided, either because they were contested or because they were held in reserve for dry-season and drought grazing.

As a consequence, the health of Somalia's rangelands and the traditional high mobility of its pastoralists have dramatically deteriorated, and conflicts over natural resources have become and are expected to become more frequent. A 2016 study in three pastoral districts of Gedo region (Dollow, Luuq, and Belet Hawa) documents the rise in communal conflicts, including livestock thefts and violent clashes between clans, as a result of intensified competition over the use of shared resources, such as water, pasture lands, and humanitarian aid (FAO 2016a). Particularly in the northern and central areas, pastoral mobility is now practiced on increasingly degraded rangelands that are extremely sensitive to drought. Permanent grasses on once-safe dry season grazing areas are often replaced by seasonal (annual) grasses also affected by seasonal droughts. Various assessments by the Somalia Water and Land Information Management (SWALIM) in recent years have found widespread land degradation across the country, especially near water holes and wells. The result is major losses of vegetation (composition and cover) and topsoil, increased water source scarcity, and declines in soil moisture.

The rapidly growing number of nomadic communities (usually large extended families) that build their own private enclosures, often on large tracts of land close to urban centers, has undermined the historical resilience of Somali pastoralist systems in recent years. Large tracks of productive, once-open grazing areas, especially in fertile depressions that benefit from floods and slowly receding water to regenerate grasses and shrubs, have been and continue to be fenced for rainfed crop or fodder production during the wet season and for semipermanent living settlements. In these new settlements some family members are assigned to guard their enclosures and to forbid livestock of families, communities, and clans from grazing on them in the dry seasons or at times of drought emergencies. This practice has significantly reduced the available communal grazing areas and hampered the movement of livestock along the traditional routes used by pastoralists searching for potential pastures in other areas. The issue has become increasingly contentious, especially in Somaliland, where the authorities and elders describe it as a new and very serious source of conflict and insecurity.

5.6 Animal Health and Services

Animal diseases are common in Somalia. The most significant are transboundary in nature. They include *Peste des Petits Ruminants*;[50] contagious caprine pleuropneumonia; contagious bovine pleuropneumonia, which occurs mostly in the southern areas; foot and mouth disease; sheep and goat pox; and lumpy skin disease. Other commonly found diseases include anthrax, blackleg, brucellosis, fowl pox, hemorrhagic septicemia, camel pox, trypanosomiasis, salmonellosis, and New Castle Disease.

Climate variability has had a negative impact on livestock and human health, by increasing the incidence of vector-borne diseases and spreading them into cooler areas at higher altitude (Thornton and others 2007). Because of the large number of livestock in common grazing areas, at watering points, in markets, and along trading routes, the likelihood of disease transmission remains high.

Somalia had a veterinary code before the war. The federal parliament enacted an updated code in 2016.[51] Somaliland adopted a revised national veterinary code in 2008. Both codes include advances in veterinary legislation and reflect the guidelines of the World Organization for Animal Health (OIE). Several other acts and regulations related to livestock product quality, sanitary measures, and control exist or are under development. There is still need for harmonization of policies, strategies, policies, legislation, and regulations to adhere more fully to OIE standards and to ensure more coherence with neighboring countries' policies and frameworks.

The presence of transboundary animal diseases, the absence or weakness of veterinary services, and the constant mobility of animals within the region increase the risk of disease transmission and subsequent export bans by importing countries. In the absence of a strong public sector to take the lead in protecting animal health, the private sector is providing many services, often but not always with funding from development partners. These services include mass vaccination campaigns, training, and institutional capacity development.

Six livestock professional associations are delivering animal health services. They deliver vaccinations, treatments, and disease investigation and disease detection, generally with external funding. They also manage agro-vet stores and train community-based animal health workers on diagnosing and treating livestock diseases, administering veterinary drugs, and performing basic surgical procedures.

In recent years, international development agencies and foreign private investors have made substantial investments to improve animal health and welfare and meet the requirements of importing countries. Through Somalia's livestock professional associations, the FAO has carried out mass vaccination campaigns, covering more than 62 million shoats between 2012 and 2017 (table 5.1).[52] Other development partners have also conducted vaccination campaigns and treated animals, on a smaller scale.

The private sector has also built several quarantine stations, with two main areas (one for keeping healthy animals ready for export, the other for hosting animals suspected of being infected with disease). One in Berbera, in Somaliland, can hold up to 2 million animals. Another, in Bosaso, in Puntland, can hold more than 1.5 million head of livestock. Both were constructed by a Saudi company (SEIVQMC). A new, locally owned private quarantine facility was also established in Jazeera (near Mogadishu) in 2011, with a holding capacity of 250,000 animals. Like the facilities in the northern ports, the Jazeera holding ground is equipped with a laboratory to perform blood tests, including tests for brucellosis (also known as undulant fever), a highly contagious disease. At these quarantine stations, animals are tested for specific diseases before certification, based on the requirements of the importing countries. Each station has a government veterinarian who issues health certificates that meet importing country requirements.

Table 5.1: Number of Sheep and Goats in Somalia Vaccinated for Main Animal Diseases in 2012–17

Year/Disease	Number of shoats treated	Number of households reached
2012		
Veterinary treatments	2,570,426	125,462
Contagious caprine pleuropneumonia	7,476,391	251,572
Peste des petits ruminants	19,666,847	422,804
2013		
Vector control	880,327	22,635
Peste des petits ruminants and sheep and goat pox	11,814,414	253,964
2014		
Contagious caprine pleuropneumonia	11,860,193	296,505
Peste des petits ruminants and sheep and goat pox	11,873,321	296,833
2015		
Peste des petits ruminants and sheep and goat pox	13,821,212	345,530
2016		
Contagious caprine pleuropneumonia	14,006,923	350,173
2017		
Veterinary treatments	21,289,330	532,233
Peste des petits ruminants and sheep and goat pox	14,362,091	359,052

Source: FAO and FGS.

Animals are also inspected in some regional markets, such as in Galkayo (Puntland), before healthy animals are trucked to the quarantine stations near export ports. The combination of a livestock certification system and quarantine stations at the tail end of the market chain has dramatically enhanced the confidence of importers in the safety and quality of livestock from Somalia. It led to the lifting of the old livestock import ban and the temporary lifting in July–September 2017 of the latest import ban (introduced in December 2016) by the Saudi government, and to reductions in livestock handling time and overall marketing costs (Khadijah and Kabue 2012; Godiah and others 2015).[53]

Significant room remains for improvements in ensuring and certifying animal health to avoid costly, though temporary, disruptions to established export channels and destinations. All vaccination campaigns are driven by and paid for by donors, meaning vaccinations take place only when funds are available. Moreover, vaccinations target only transboundary animal diseases; vaccines for other important diseases, such as anthrax, are not even available in Somalia. There have also been challenges related to the timing of the administration of vaccines, especially live vaccines (such as the vaccine for Rift Valley Fever, the disease linked to the 2000–09 export ban to Saudi Arabia), for which it is difficult to distinguish between a recently vaccinated and an infected animal (see endnote 57 for more on Saudi Arabia's export bans from Somalia). The unregulated nature of the animal health care system in Somalia makes it difficult to regulate vaccinations (by, for example ensuring that animals are not vaccinated too close to the point of export) and to inform receiving countries of the vaccination campaigns and the fact that tests might show false positive results.

The lack of good-quality veterinary drugs is another challenge. The bulk of veterinary drug trade is undertaken and controlled by businessmen or traders rather than agro-vet stores or veterinarians. Despite adoption of the Somali Veterinary Code, there still is no licensing procedure for veterinary drugs—and in any case enforcement of this procedure would be challenging. Large-scale dumping of expired, substandard, and counterfeit drugs is common. Most livestock owners, community-based animal health workers, and veterinary drug traders are not fully literate and often purchase drugs based only on price. Many livestock owners buy drugs from traders who offer the lowest price, rather than from veterinarians, community-based animal health workers, or agro-vet stores. Decades of donor-funded veterinary projects, including the distribution of free veterinary drugs, has also eroded the willingness to pay for good-quality drugs, making the development of a veterinary drug supply system challenging.

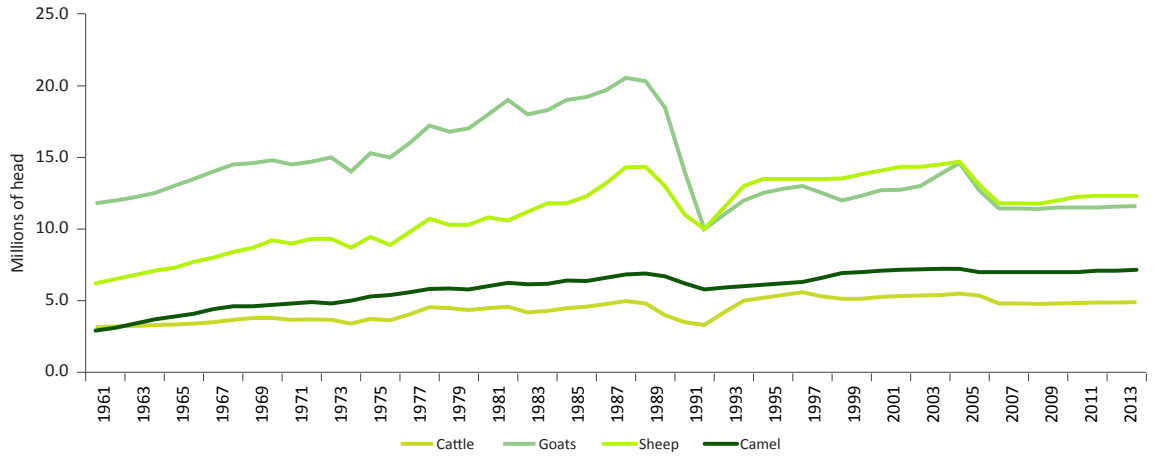
Many veterinary workers across Somalia are aging, and few new ones have been trained in the last decades. Because of this lack of capacity, many livestock-exporting companies use veterinarians from outside Somalia. The Intergovernmental Authority on Development sponsors regional vocational institutions in Somaliland, and a few private universities in Somalia offer training programs in animal health and veterinary science, but the quality and quantity of graduates falls far short of the needs of the country's largest economic and export sector.

5.7 The Decline in the Livestock Population

Until the late 1980s, the government conducted reliable surveys of the livestock population, which was estimated at about 40 million (FGS 1989; FAOSTAT) (figure 5.2). Since then, animal population estimates have been based largely on projections and extrapolations by external agencies with very limited current information or access to many parts of the country. One estimate suggested a livestock population of 39 million in 1998 (FAO, World Bank, and EU 2004).

The most recent and reliable figures are the ones estimated by the FSNAU in October 2017 and agreed to as predrought baseline figures by the FGS and its international partners for the Drought Impact Needs Assessment (FGS 2017a). It estimates the country's livestock at 52.9 million head, including 28.7 million goats, 13.6 million sheep, 6.6 million camels, and 3.9 million head of cattle (see table 5.2 for the regional breakdown).[54] The FSNAU figures for shoats are much larger and the figures for camels and cattle somewhat smaller than previous estimates by other sources. Their regional distribution is also different.

Figure 5.2: Livestock Population in Somalia (including Somaliland), 1961–2014



Source: FAOSTAT.

However, the FSNAU estimate cannot be compared with the 2004 estimate by the FAO, World Bank, and European Union because different methodologies were used. All sources nonetheless document a sharp decline in the 1990s, largely because of the civil war, followed by a solid recovery interrupted only by a sharp decrease in shoats in 2007–08.

Even after mortality from the recent drought, Somalia has the world's largest camel population, with more than twice the camel population of Kenya and Ethiopia combined in the early 2010s (Mahmoud 2013). Camels are found in all agro-climatic zones of the country (see table 5.2). Cattle are concentrated in the southern regions, particularly in the Juba River valley. Large numbers of sheep are found in the northern and central regions. Goats are found predominantly in the northern regions, especially in Puntland, and in the southern regions.

The most recent livestock figures estimated independently by the Somaliland government and including the northcentral regions (whose control is in dispute with Puntland) are roughly consistent with the regional FSNAU estimates shown in table 5.2. They show a steady increase in all types of livestock since 1998. Almost 90 percent of all livestock are shoats (table 5.3).

Table 5.2: Livestock Population in Somalia by Region, 2014 *(before Drought)*

Region	Goats	Sheep	Camel	Cattle	Total
Juba River valley	***3,036,320***	***1,636,204***	***1,258,271***	***1,477,458***	***7,408,254***
Juba Hoose (Lower)	732,224	492,673	322,042	620,654	2,167,593
Juba Dhexe (Middle)	478,247	393,329	165,335	520,175	1,557,086
Gedo	1,825,849	750,202	770,894	336,629	3,683,575
Inter-riverine regions	***2,630,485***	***525,837***	***979,467***	***1,170,565***	***5,306,354***
Bay	1,171,477	117,007	361,562	800,964	2,451,010
Bakool	1,459,008	408,830	617,905	369,601	2,855,344
Shabelle River valley	***4,076,419***	***1,666,869***	***1,081,843***	***1,068,031***	***7,893,163***
Shabelle Hoose (Lower)	981,022	464,193	286,770	535,447	2,267,433
Shabelle Dhexe (Middle)	1,099,778	521,759	156,138	185,540	1,963,214
Hiraan	1,995,619	680,917	638,935	347,044	3,662,516
Northeastern region	***7,544,817***	***3,695,449***	***1,363,688***	***47,048***	***12,651,001***
Galguduud	2,031,000	850,953	461,495	33,978	3,377,426
Mudug	2,057,841	881,057	437,672	13,070	3,389,640
Nugaal	1,959,593	1,217,801	377,872	0	3,555,266
Bari	1,496,383	745,638	86,649	0	2,328,669
Northcentral region	***4,384,489***	***3,312,691***	***470,202***	***0***	***8.167,383***
Sool	1,541,657	1,267,790	236,260	0	3,045,707
Sanaag	2,842,832	2,044,901	233,942	0	5,121,676
Northwestern region	***7,030,849***	***2,810,858***	***1,458,364***	***167,281***	***11,457,352***
Togdheer	1,952,918	582,689	496,815	5,018	3,037,441
Woqooyi Galbeed	2,745,465	1,139,224	564,659	96,567	4,545,914
Awdal	2,332,466	1,088,945	396,890	65,696	3,883,997
All regions	**28,703,379**	**13,647,910**	**6,611,835**	**3,930,383**	**52,893,507**

Source: FSNAU estimates for the Drought Impact Needs Assessment (FGS 2017a).

Table 5.3: Number of Livestock in Somaliland, by Type, 1998–2009

Year	Goats	Sheep	Camel	Cattle	Total
1998	6,072,250	6,909,123	1,443,625	340,950	14,765,948
1999	6,367,169	7,146,030	1,475,560	348,493	15,337,252
2000	6,519,981	7,267,513	1,491,791	352,326	15,631,611
2001	6,676,460	7,391,060	1,508,200	356,202	15,931,922
2002	6,836,695	7,516,708	1,524,791	360,110	16,238,304
2005	7,341,000	7,906,000	1,578,000	373,000	17,198,000
2006	7,517,000	8,041,000	1,596,000	378,000	17,532,000
2007	7,698,000	8,178,000	1,614,000,	384,000	17,873,000
2008	7,883,000	8,317,000	1,630,000	389,000	18,219,000
2009	8,072,000	8,458,000	1,646,000	394,000	18,570,000

Source: Somaliland National Development Plan 2012–16, Ministry of National Planning, Republic of Somaliland.
Note: Figures are not available for 2003 or 2004.

Herd sizes and composition vary across livestock production systems and hence regions. Average herd sizes are large to very large in the nomadic pastoral system and medium size in the mainly transhumant agro-pastoral system. In contrast, mixed crop/livestock farming households may have only a few animals. Different species are generally held together, to make the most efficient use of range vegetation, because camels and goats are primarily browsers while cattle and sheep are largely grazers. Combining different types of livestock also provides pastoral groups with a wide array of animal products. Herd diversification is an important risk management strategy for protecting against diseases, drought, and lack of drinking water or forage (Dahl 1981).

Animal ownership, ownership of other productive assets, and income-generating activities differ across wealth groups. Many better-off households are involved in small-scale trading and fodder production and receive remittances. Most of the animals owned by households in all wealth categories, especially pastoral households in the central and northern regions, are shoats; they are more prevalent among poor households.[55] In some (agro-pastoral) areas in southern Somalia, cattle are of primary importance.

Pastoralists respond and adjust to new market demands and opportunities as well as to evolving environmental conditions, as evident from changes in herd composition. In the 1980s, for example, many pastoralists shifted the composition of their herds away from camels toward cattle, in response to export demands (Al-Najim 1991), particularly in the southern areas, which export mainly to Kenya. Reflecting a rise in camel prices and increased export opportunities, including to Egypt, since the 2000s, a shift in herd composition has been observed back to camels (Mahmoud 2013). In recent decades, there has been a shift toward hardy browsers (camels and goats)—a savvy risk-mitigation strategy in view of increasing and recurrent pasture shortages. Few poor households can afford to purchase even a single camel, however.

Somalia's livestock population has stabilized genetically. Animals are well adapted to the harsh geographical and climatic environment, but their weight and milk yield are low. The traditional breeding system, in which the best animals were exchanged for breeding purposes, has been negatively affected by the move toward more commercial production systems, in which animals with larger frames, and therefore heavier body weights, are selected for sale for slaughter or live export, because they attract better prices. Genetic improvement, an area devoid of any public and private investments in the past three decades, would have a positive effect on livestock trade.

5.8 Trade in Live Animals

5.8.1 Main Livestock Trading Routes

Animal marketing—for domestic meat consumption, exports, or reexports—is mainly a private sector affair (box 5.1). [Cattle sales dominate many of markets in the Horn of Africa, particularly the southern Somalia–Garissa route and the Moyale market on the border of Kenya and Ethiopia. Before the collapse of the Somali state, a common cross-border trading route included livestock movement from Ethiopia and northern Kenya into Somalia for exporting through the port of Mogadishu. Collapse of the state caused a reversal in the direction of livestock trade, leading to an increased outflow of livestock, particularly camels and cattle, from Somalia to Kenyan and Ethiopian markets (Mahmoud 2013). In contrast, small stock dominates northern trading routes through Somaliland and Puntland to the Gulf countries (Mahmoud 2013).

Many of the animals shipped through the northern ports still originate in Ethiopia, particularly its Somali-inhabited Ogaden region, as they did before the civil war. Cross-border livestock trade is largely unofficial and unrecorded, and figures on cross-border trade are largely unavailable. However, estimates from the 1990s indicated that up to 80 percent of the animals exported through Berbera and Bosaso originated in Ethiopia. A 2011 study by Oxfam estimated that 50–65 percent of livestock exported from the Berbera port originated in the Somali-inhabited region of Ethiopia.[56] In the three months of October–December 2011, 355,151 head of livestock were reported to have been traded across monitored borders in the Horn of Africa; 62 percent were cattle (Eid 2014).

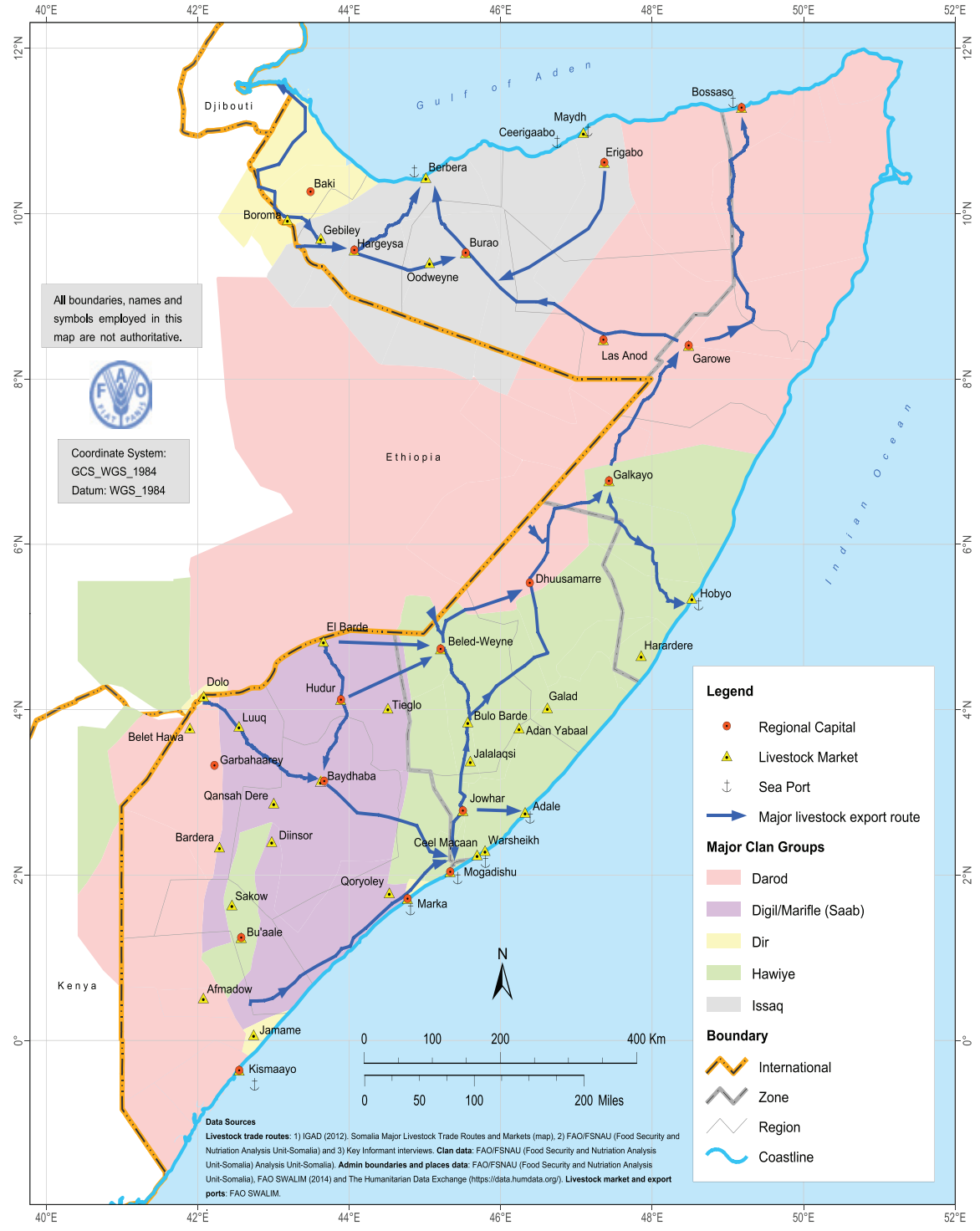
Most of the livestock exported through Berbera and Bosaso ports transit through Burao and Galkayo, two of the largest livestock markets in the Horn of Africa, especially for transshipment of shoats from the Ogaden region of Ethiopia, the Sool plateau in northcentral Somalia, the Nugaal valley and the Adun area in the northeastern and central Somalia, and parts of southern Somalia (figure 5.3). Beletweyn is the main connection hub between the southern regions and the main markets. Most cattle raised in the southern agro-pastoral livelihood zones and trekked to Garissa, Kenya, transit through Dinsor, Bardera, and Afmadow (Afmadow is the largest cattle market in Somalia). Because of the wide catchment area and the large distances to be covered, most animals are trucked from the minor and major inland markets and the main urban markets and Somali ports. At both the export ports and the holding grounds where animals rest along major trekking routes, water and fodder requirements are substantial.

Box 5.1: Many Actors in the Livestock Value Chain in Somalia

The pastoral-based livestock subsector is estimated to directly employ more than 55 percent of the country's labor force and to provide indirect employment for another large segment of the labor force along the livestock value chain. In total, more than 65 percent of the population is estimated to be engaged in some way in the livestock subsector, from production to domestic marketing, including livestock products, to live exports (FAO 2013a).

The trading chain includes many small-scale traders with little capital (gedisley in Somali), who buy animals, fatten them, and resell them in the same or nearby local markets. Large traders usually have capital, their own trucks, and contracts with major end-buyers. Brokers (*dillaal*) play a central role in the livestock trading chain throughout the country, facilitating virtually all small and large transactions that are concluded both in and outside markets. The sector also employs trekkers, hired by producers to move animals to market; feedlot operators, who fatten animals for sale; loaders, who operate at major market places and load animals onto trucks; lorry drivers; and workers in market sale yards, who brand or mark animals after sale to prove new ownership.

Figure 5.3: Main Livestock Trade Routes in Somalia



Source: FAO (2017)

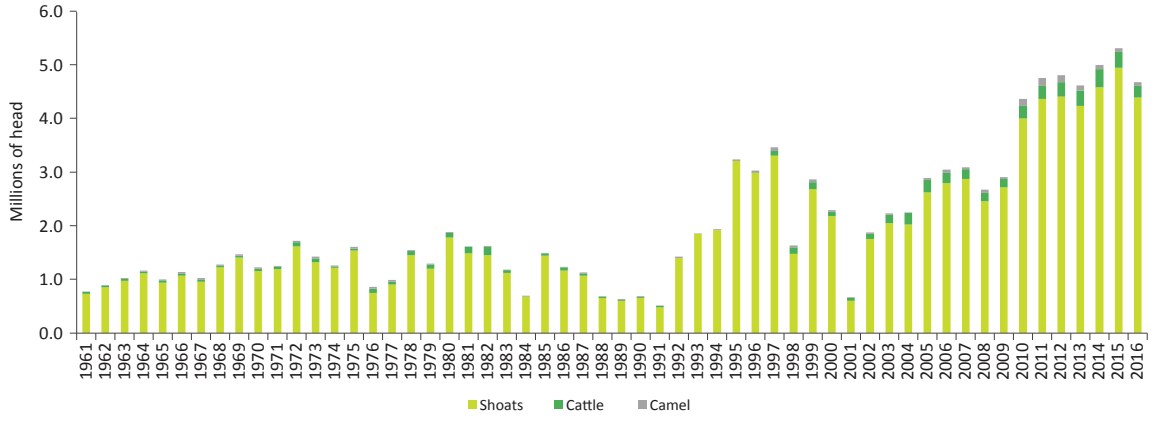
5.8.2 Livestock Exports

The Somali livestock subsector supplies a thriving export market (figure 5.4 and able 5.4), with more than 5.3 million livestock exported in 2015 (figure 5.5).

Livestock are exported year-round, although the *haj* represents a peak in exports, because the Gulf region is Somalia's primary export destination. Saudi Arabia accounted for almost 65 percent of all livestock exports from Somalia in 2015, followed by other Gulf countries. On the Arabian Peninsula, there is a strong preference for Somali livestock and meat, because of both similar and familiar halal handling requirements and similar genetic characteristics between shoats in Somalia and the Gulf. Animals have similar body shapes and taste and cooking properties, unlike animals from Australia, New Zealand, Europe, and the Americas (FAO 2013a).

To ensure steady and sustained growth of livestock exports, Somalia needs to diversify and reduce both its product concentration and its heavy reliance on a few export markets, which make the live animal export sector very vulnerable to events in Saudi Arabia for shoats, Yemen and Oman for cattle and shoats, Kenya for cattle, and Egypt for camels (Godiah and others 2015). In response to past import bans by Saudi Arabia, Somali traders showed a remarkable capacity to redirect their exports to other countries in the region (from where, it can be assumed, some

Figure 5.4: Livestock Exports by Somalia, by Type, 1961–2016



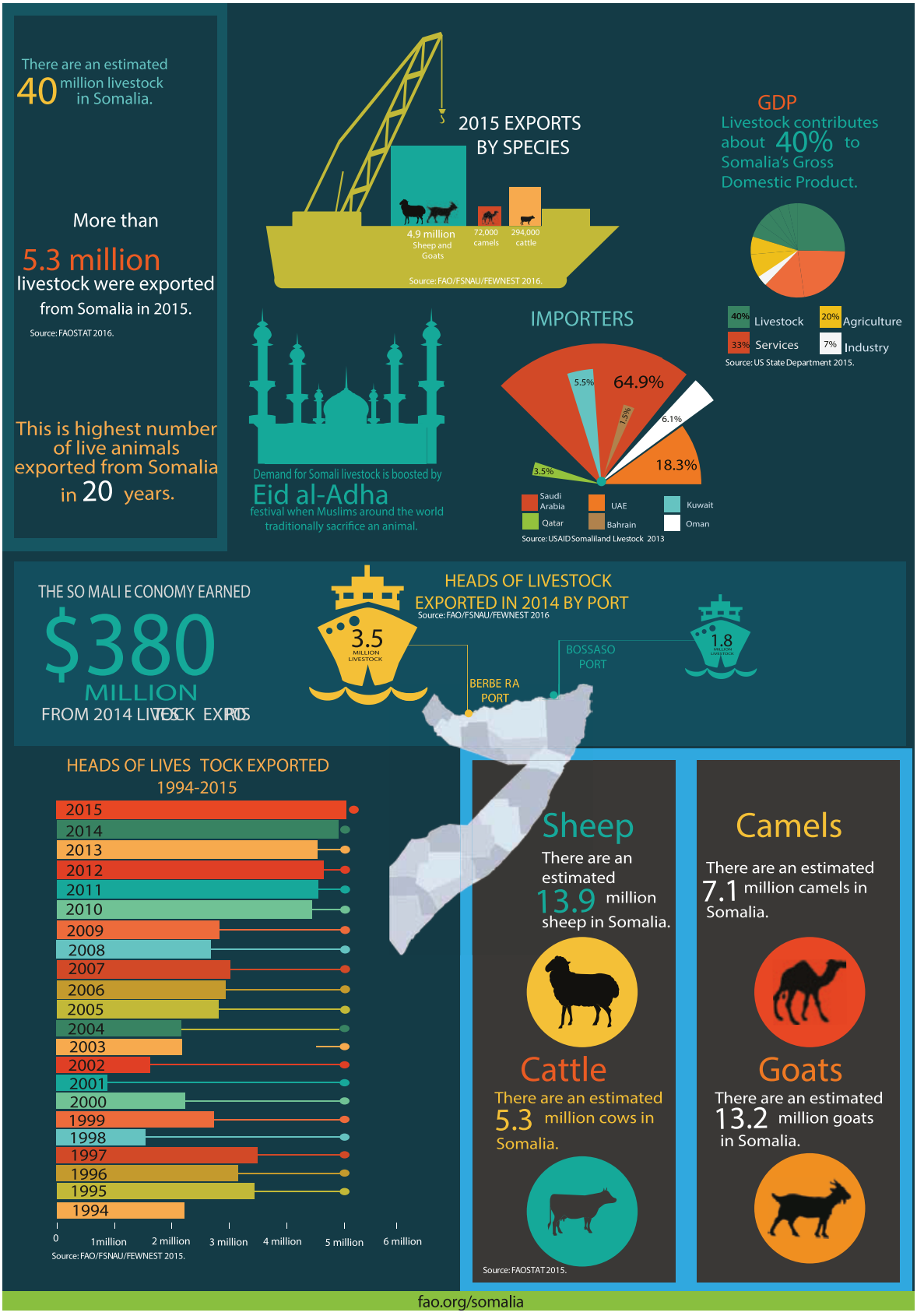
Source: Data for 1961–88 are from FAOSTAT and reflect official government data. Data for 2002–16 are from FSNAU. Data for interim years are as reported in the FAOSTAT database, but they are unofficial figures, projections, and estimates, whose source and methodology is unknown. Export figures for cattle are missing between 1992 and 1994. Shoats are sheep and goats.

Table 5.4: Number of Livestock Head Exported from Ports in Somaliland, Puntland, and Southern Somalia, 2012–17

Year	Sheep and goats	Camel	Cattle	Total
2012	4,411,787	124,952	266,397	4,803,136
2013	4,238,078	94,760	279,229	4,612,067
2014	4,582,703	76,829	340,156	4,999,688
2015	4,946,602	72,420	294,992	5,314,014
2016	4,387,967	67,985	220,838	4,676,790
January–June 2017	508,485	960	19,696	529,141
July–September 2017	—	—	—	1,900,000

Source: FSNAU online database through 2016; internal, unpublished reports by FAO Somalia for 2017.
Note: Figures for 2017 are preliminary estimates for January–June and guesstimates for July–September that include haj days (which in 2017 fell at the end of August and the beginning of September), when the vast majority of sheep and goat exports traditionally take place.
— Not available.

Figure 5.5: Infographic on Livestock Exports by Somalia, 2015



still reached Saudi markets).[57] Following the lifting of the second import ban by Saudi Arabia in 2009 and the opening of new, modern quarantine centers in Somaliland and Puntland managed by a Saudi company, the Somali livestock subsector reverted to its previous highly concentrated export pattern. As a result, the most recent import ban, imposed by Saudi Arabia in December 2016, took a massive toll on Somalia's livestock exports. The number of animals exported during July–September 2017 (the 2017 *haj* season), when Saudi Arabia temporarily lifted its ban from the northern ports of Berbera and Bosaso, reached only about 1.9 million head, a fraction of the more than 4 million sold in recent years. During the last quarter of 2017, livestock were exported directly only to Oman, Yemen, and the United Arab Emirates from the northern ports and to a lesser extent to Kenya from the southern port of Kismayo.

Steady and increasing demand from the Gulf States has provided and will continue to provide an important market for live animals. Saudi Arabia is able to meet only 56 percent of its meat demand from domestic supplies, and its demand for fresh and chilled meat is projected to grow at a compounded annual rate of 7.4 percent over the next five years. As part of its food security plan, the Saudi government is investing heavily to narrow this gap and achieve self-sufficiency; its production capacity is targeted to double by 2020. Private investment is expected largely in the poultry sector, however, and Saudis have a strong consumer preference for Somali fresh meat from shoats. These changes in Saudi Arabia are thus not likely to reduce Somalia exports, according to FAO sector experts. The biggest challenge is meeting the strict quality checks and phytosanitary norms, either mandated by governments or voluntarily adopted by private retailers in importing countries.

Export volumes and values before the war were lower than they are today. A peak of almost 1.8 million head was reported in 1980. The figure declined to about 65,000 head in the late 1980s and plummeted to 48,000 in 1991, after the collapse of the Siad Barre regime. Since then, exports have soared (figures 5.4–5.7). Despite some short-lived hiccups (notably in 1998 and 2001, coinciding with the initial years of the import bans by Saudi Arabia), recorded exports rose to more than 4 million head by 2011 and more than 5 million head in 2014 and 2015. In 2015, the latest full year of available data, a record 5.3 million livestock were exported from Somalia to markets on the Arabian Peninsula, including 4.9 million shoats, 294,000 cattle, and 72,000 camels. The increase reflected heavy investments in animal disease control programs. This figure was the highest level of livestock exports in the last 20 years. Preliminary estimates by the FAO for 2016 suggest that up to 5.5 million animals were exported, representing a 4 percent annual increase over 2015.[58]

Paralleling the increase in the numbers of animals exported, the estimated value of annual exports of live animals for slaughter jumped from an average of about $56 million in the late 1980s to an average of $378 million year in 2011–14 and a peak of $455 million in 2014 (the latest year for which complete data are available in the COMTRADE database). The additional value of live animals exported for breeding purposes also jumped between the two periods, from nil to an annual average of $43 million in 2011–14 and a peak of $81 million in 2014.

Before the civil war, most livestock export trade passed through the two major northern ports, first Berbera and also then-underdeveloped Bosaso, and on a smaller scale also through the two southern ports of Mogadishu and Kismayo. Smaller ports south of Mogadishu (for example, Merka and Brava) also handled modest volumes of livestock trade.

Livestock exports from southern ports came to a complete stop at the start of the civil war. Only in 2013 did exports of shoats resume from Mogadishu; cattle exports resumed from Kismayo in 2016, thanks to improved security conditions and the entrepreneurship of the private sector, supported by substantial diaspora contributions and external

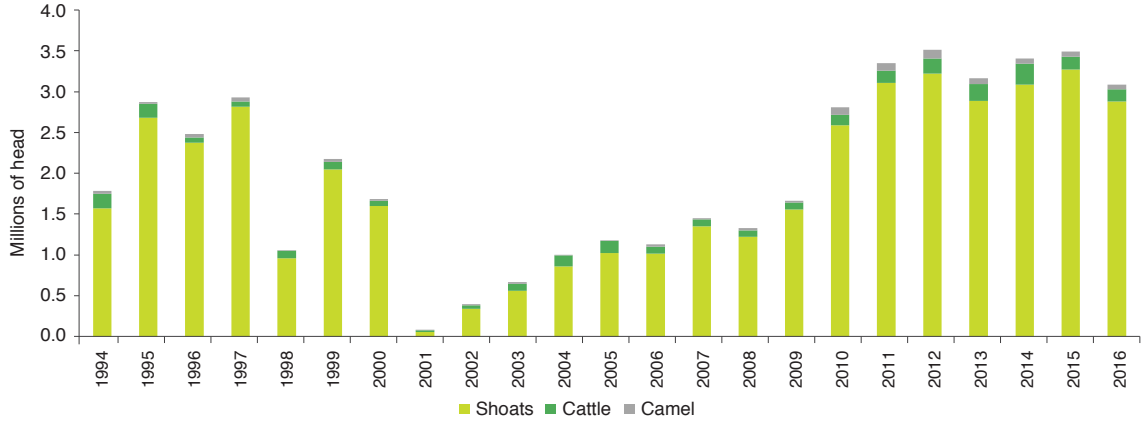
donor funding. Exports are bound to rise further as livestock operations at Mogadishu and Kismayo improve. Export of shoats dominates Somalia's two main northern export ports (figures 5.6 and 5.7).

Exports of camels and cattle also rose steadily beginning in the early 2000s. Camel exports soared between 2009 and 2011, rising from 35,000 to 140,000, mainly to Egypt. The increase may have reflected political tensions in Sudan, Egypt's traditional camel supplier, and between Sudan and Egypt. The plight of Sudan and the new demand from Egypt has created market opportunity for Somalia. As Berbera is the larger and more modern port, its exports for both camels and cattle are higher than Bosaso's. However, 2015 saw a marked increase in cattle exported from Bosaso and a decrease at the Berbera port.

Despite its strong performance in live animal exports, the development of Somalia's livestock sector continues to face several constraints:

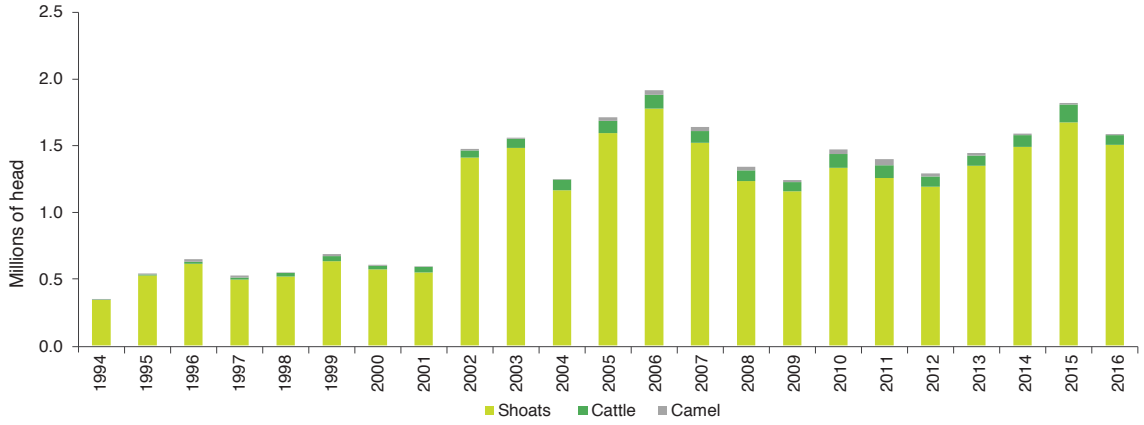
- overreliance on only a few export market outlets
- overreliance on live animal exports
- inadequate protection of animal health
- the limited and largely informal organization of the Somali livestock value chain and the lack of coordination and integration among its actors
- poor linkages and trade negotiations with trading partners
- the lack or poor quality of fodder at export ports and along transit routes to them
- persistent transport and market infrastructural and logistical weaknesses.

Figure 5.6: Livestock Exports from Berbera, 1994–2016



Source: FSNAU online database.

Figure 5.7: Livestock Exports from Bosaso, 1994–2016



Source: FSNAU online database.

5.8.3 Livestock Prices and Marketing

The market value of animals is proportional to their body condition. During wet seasons (a proxy for improved body condition), livestock prices therefore normally improve. Another factor driving up market prices is the seasonal spikes in demand coinciding with the occurrence of Islamic festivals (*haj* and Ramadan).

The FSNAU has been collecting market prices for various livestock types in main and local markets since 2000. Initial evidence on prices between 2000 and April 2016 (see appendix E), suggests that there is strong market integration, as livestock price trends in different regions seem to follow similar patterns. Prices increased steadily over the years, including during export bans (except in their first years).

Prices for shoats seem to have levelled off in the past two years in most markets. The effect of drought on their price cannot always be clearly observed, because some livestock producers and traders have become large-scale commercial players who increase their purchases even during drought periods, when pastoralists tend to increase their sale volumes, flattening their price fluctuations. Price fluctuations can also be expected for hardy browsers, which are less susceptible to drought. In the southern areas, particularly in the Juba valley, where cattle are dominant, price increases right after recent major droughts were more pronounced than in other regions.

Somaliland initiated a Livestock Marketing Information System (LMIS) in 2007, to try to reduce high market information costs. Results from a regression analysis show that external market shocks (notably the Saudi import bans) had significant negative impacts on prices of small ruminants but not camels (Godiah and others 2015).[59] Camels are exported from Berbera to several countries, including Saudi Arabia, Egypt, Oman, and Yemen; small ruminants are exported mainly to Saudi Arabia.

The impacts of seasonality were more evident in the prices of camels than in the prices of small ruminants, possibly because most small ruminants are exported for sacrificial purposes whereas most camels are sold on commercial markets, which are more driven by quality than the sacrificial chains.

Unlike shoat and camel prices, which have been increasing in recent years, cattle prices did not change over the study period. The prices of cattle reflected events at local markets, especially the number of exporters.

The quality grading system for both export and slaughters is well established and widely understood by Somali pastoralists (Negassa and others 2012). Price information is also generally available to all actors along the chain, given the widespread and pioneering use of cellphones in the country. A study of livestock producers in Somaliland (Wanyoike and others 2015) confirms these findings (and the importance of small ruminants as sources of cash income for pastoral families) but concludes that such knowledge does not have significant effects on the level of market participation. Other factors—including the number of animals kept by the household, the gender of the sales decision maker, the age of the household head, and the livelihood zone in which the household resided—appear more important in pastoralists' decisions about sales volume of small ruminants.

5.9 Value Addition from Animal Products

A growing population in peri-urban and urban settlements needs to be fed with nutritious, safe, and affordable animal products, such as milk, meat, and eggs. Value addition and processing of animal products to enhance shelf life and food safety and to meet niche market demands domestically and for exports are extremely limited, however. They provide an excellent opportunity for livelihood diversification, income generation, and employment opportunities.

5.9.1 Dairy

The production, collection, and marketing of milk already provide employment and income for people in both rural and urban areas, especially women, who traditionally dominate its trade. Milk is a major food source for pastoralists, who tend to increase their home consumption during the lean dry seasons. It also makes an important contribution to the nutritional intake of the rest of the population.

Fresh raw milk production in Somalia has been rising steadily since the early 1990s (figure 5.8). Camel milk is by far the most important. In 2014 Somalia produced more than 1.1 million tons of camel milk, according to FAOSTAT, with a gross market value of $1.65 billion. Total milk production brought in an estimated $2.7 billion. The Drought Impact Needs Assessment (FGS 2017a) estimates milk production at a much higher level: $3.3 billion for the baseline before the drought (which for the livestock subsector was in 2014), with camel milk accounting for $2.7 billion of the total.

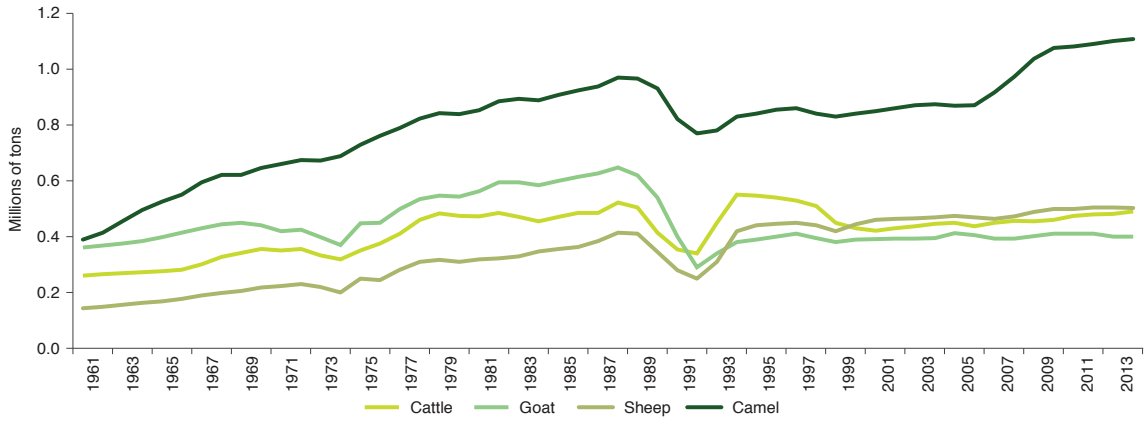
Somalia is the world's largest producer of camel milk, which Somali consumers prefer to milk from cows. Camels can produce more milk from poor feed than any other livestock species, with average yields of about 2.5–3.5 liters a day.

Somalia maintains only a milk subsector, not a dairy subsector (box 5.2). It is a net importer of dairy products, which averaged $62 million a year in 2011–14, rising to $82 million in 2015. Somalia produces only raw milk, which is subject to rapid spoilage; milk from camels lasts longer than other types of milk.[60]

Many small players operate in Somalia's milk subsector. Milk for urban consumption is sourced through a matrix of informal yet interlinked regional networks of producers, collectors, transporters, and vendors. Women, who are responsible for more than 80 percent of milk production and 100 percent of primary milk collection, dominate the chain. Men dominate the transport of milk from pastoralist areas to urban areas, though some women are also involved in transport. Supporting the dairy value chain would, therefore, provide a real possibility to promote women's economic empowerment.

Figure 5.9 and table 5.5 show the findings from the dairy value chain studies by the FAO in Maroodi Jex Region, Somaliland, as well as a study by the Somali Agriculture Technical Group (SATG) in various regions. Prices of milk are inversely related to the production level; when production is higher (in the *Gu* and *Deyr* wet seasons), prices are low; during the low-production Hagaa and *Jilaal* dry seasons, prices are high. As most animals are kept on the open range, seasonal accessibility and the availability of milk in towns is a major challenge. During the dry seasons, when animals are moving in search of pasture and water, milk is less available and its price tends to rise.

Figure 5.8: Production of Fresh Raw Milk in Somalia, by Milk Type, 1961–2014



Source: FAOSTAT.

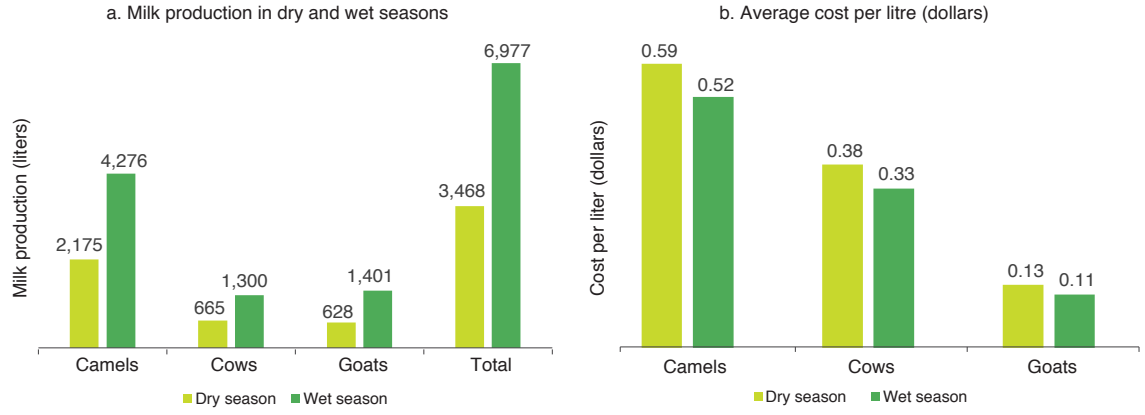
Box 5.2: From a Dairy Subsector in the 1980s to a Raw Milk–Only Subsector Today

Before the civil war, Somalia had a modern milk-processing facility. The parastatal Mogadishu Milk Factory, established in 1965, had 150 full-time employees, who operated dairy processor/pasteurizer machines from Denmark. Capacity was 2,000 liters an hour. Milk production fluctuated, with peaks reached during May–June and October–November, coinciding with the Gu and Deyr rainy seasons. During these peak months, the company used to produce a daily average of 30,000 liters of pasteurized milk, 50 kilograms of cheese, and 200 liters of yoghurt. While pasteurized milk was sold exclusively to local retail markets in Mogadishu, the rest of its production was for domestic sales nationwide.

A recent market analysis of the milk subsector in Somaliland estimated that total milk consumption in Hargeisa in 2012 was 254.8 million kiloliters, with demand expected to grow to 490.3 million kiloliters by 2023. Of the milk consumed in Hargeisa in 2012, however, 57 percent was raw milk and 43 percent was imported powdered milk, mainly from the Gulf countries and Europe. Of the raw milk, about 40–50 percent was imported from Ethiopia; the remainder was produced locally, according to an unpublished 2012 report by Oxfam. The situation in other major cities across the country is similar, though reliance on Ethiopian milk imports may not be as pronounced in all regions.

Strong market opportunities exist for value addition of dairy products, such as pasteurized milk, sour milk, yoghurt, and cheese, for both small low-cost artisanal processers and medium-size commercial enterprises. Development and expansion of the dairy-processing sector are constrained by the high cost of all industrial activity, in large part the result of the high cost of electricity, as well as the seasonality of milk production and the low quality of raw milk (because of lack of refrigeration and unhygienic handling, which lead to high bacteria count).

Figure 5.9: Production and Prices of Milk in Maroodi Jex Region, Somaliland



Source: FAO 2014b.

Addressing the seasonality of production and increasing the accessibility of milk has the potential to increase dairy incomes and expand opportunities for dairy processing, if the cost of production is well managed. To take advantage of such opportunities, various camel dairy farms were recently established near major cities. Producers are keeping their lactating animals close to urban areas (the Mogadishu milk catchment area is a 50–100 kilometers from its center), often on privately owned pastures. New production strategies are being applied, such as combining livestock keeping with intensified milk production and crop farming.

Table 5.5: Price of Raw Camel and Goat Milk in Abudwaq, Baidoa, and Beletweyne (Dollars per Litre)

Season/type of livestock	Abudwaq/ Galmudug	Baidoa/ South West	Beletweyne/ Hiran
Gu			
Camels	1.0	0.7	0.6
Goats	0.6	..	0.5
Hagaa			
Camels	1.5	0.9	0.7
Goats	1.0	..	0.7
Deyr			
Camels	1.0	0.7	0.6
Goats	0.6	..	0.5
Jilaal			
Camels	1.5	1.3	0.9
Goats	1.0	..	0.7

Source: UNDP and SATG 2016a.
Note: FSNAU-reported prices, averaged over different markets and districts, are considerably higher than shown in this table. For instance, according to the FSNAU price database, retail prices during 2010–16 were $0.44–$0.57 per liter for goat milk and $1.50–$1.87 per liter for camel milk across all Somali regions ($2.31–$2.88 per liter of camel milk in Somaliland).

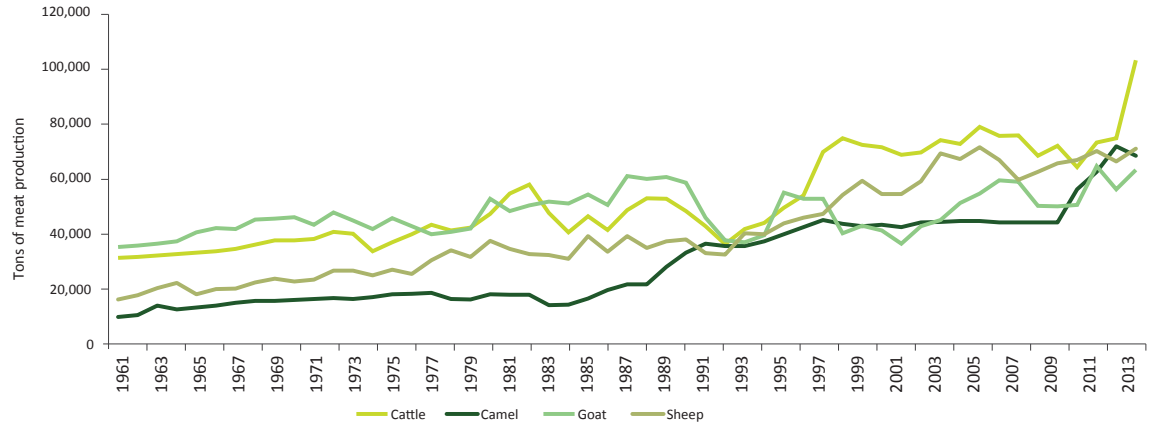
In the face of high domestic demand and long-term export prospects, Somalia has limited or no experience in managing permanent pastures for professional milk production. Structural challenges that have kept the Somali dairy sector from reaching its full potential (FAO 2014b) include the following:

- scarcity or high cost of fodder during dry periods
- animal health problems, including brucellosis and tuberculosis, and limited knowledge of the use of veterinary drugs
- inadequacy of public support services
- low technical capacity
- low phyto-hygienic standards and lack of processes to preserve milk, resulting in contamination, rapid souring, and oftentimes spoilage of the milk before it reaches urban consumers
- inefficient marketing channels that are fraught with excessive intermediaries and poor linkages between stakeholders
- lack of reliable market information
- weak agri-business management skills
- weak or absent institutions, policies, and regulatory systems for dairy products supporting production, handling, storage, marketing, and consumer awareness
- poor enforcement of milk quality standards
- poor state of transport infrastructure
- high temperature and humidity in most parts of the country, which contribute to rapid spoilage, making surplus milk virtually unmarketable
- the absence of economies of scale, with the very few milk cooperatives or producer groups generally poorly organized and lacking business skills and financial means (including no access to credit from financial institutions).

5.9.2 Fresh and Processed Meat

Meat production in Somalia has been increasing, in response to growing demands for meat and meat products, mostly from its own increasingly urbanized population (figure 5.10). Beef represents the largest share of production.[61]

Figure 5.10: Production of Indigenous Meat in Somalia, by Type, 1961–2013



Source: FAOSTAT.
Note: Figures exclude poultry.

Meat trade is almost exclusively for the local market, where there is a strong preference for fresh (not chilled or frozen) meat. Meat is supplied by slaughterhouses, sometimes private but often owned and managed by local governments.

The meat trade is relatively profitable in all urban markets and offers employment opportunities for women, who dominate meat marketing. Margins are about 50 percent higher for trading camel meat and beef than they are for sheep and goat meat (1.4–27.2 percent), according to Ombui, Mogoa, and Matete (2014).

The major constraints facing domestic meat marketing relate to the poor design and hygiene of slaughter facilities and meat markets. A 2011 survey in Somaliland revealed that many slaughter facilities were in poor hygienic state, lacking drainage facilities, roofs, running water, and lighting. In many instances, meat was not inspected because of inadequate numbers of meat inspectors and lack of a legal framework to enable the veterinary department to enforce regulations. The poor hygiene conditions in most meat markets leave meat vulnerable to contamination.

Some facilities have been renovated and managed. They include the Hargeisa slaughterhouse, which was renovated under a public-private partnership (PPP) tripartite arrangement involving the municipality, which owns the facility; a private firm; and the community (Ombui, Mogoa, and Matete 2014).

Somali households produce traditional home-cured (or sun-dried) meat products, such as *mugmud* and *otka*. Commercial meat processing is very limited (box 5.3), confined mostly to small quantities of chilled meat for exports. Extending and upgrading local processing and value addition could create employment opportunities, generate local revenue, improve meat quality and safety, and meet domestic demand.

Sufficient demand for chilled meat from Somalia appears to exist in Middle Eastern countries. Since the late 1990s, Somali livestock traders and businesspeople invested in abattoirs for export of chilled meat to the Gulf countries, but most of the ventures failed. Data on exports are sketchy and available only for 2006–10 (table 5.6).

The reasons for this high failure rate are multiple. The main problems are poor operational management and livestock supply constraints. Management failures included disputes over profit-sharing between active and passive investing partners and failures to provide adequately for amortization and eventual replacement of physical assets, especially factory equipment. A rapid appraisal undertaken in 2007 (Negassa and others 2012) identified uncertain

Box 5.3: Current Limitations and Past Failures in Meat Processing

Before the civil war, the Kismayo Meat Factory (KMF) was the only meat factory in Somalia. The plant was funded by the Soviet Union and constructed between 1964 and 1968, to produce about 9 tons a day of stewed canned meat and meat in its own juice. In 1974–75, a canned corned beef line was added and the canned meat line expanded. Daily production capacity after 1975 was 13 tons of stewed canned meat or beef in own juice (40,000 cans), 6.8 tons of corned beef (20,000 cans), and 2 tons of sausage.

During 1969–76, the factory operated at close to capacity, slaughtering 200 head of cattle a day. In 1973, KMF purchased 1,291 tons of cattle for sale as frozen sides. During 1980–84, it produced only 1–700 tons of fresh and frozen cooked meat.

Canned output had already begun to fall in 1977. Since then, KMF has operated only sporadically, working less than 50 days a year during 1983–85. Because of the gap between the free market cattle prices and its sale prices, which were controlled by the government, the company never covered its costs of production in any year since its establishment. Other factors hampering its operation included depletion of physical capital and the lack of spare parts from the Soviet Union.

Like all other state-owned factories, its facilities collapsed and its remaining physical assets were looted right after the start of the civil war.

One of the few still thriving private ventures is the Somali Meat Company, which started operations in Mogadishu in 1996. The company employs 300 workers, 260 of them seasonal, and exports 98 percent of the fresh meat it processes. It exports 3,840 tons of chilled meat to Oman weekly. The company has a modern slaughterhouse, with machinery sourced from and installed and maintained by Italy. It can slaughter 100–120 animals an hour. Over the years, the company has expanded significantly. It faces little or no competition in Somalia.

Source: ISTI (1986) and Hussein (2017).

Table 5.6: Chilled Meat Exports by Somalia, 2006–10 *(Number of Shoat Carcasses)*

Slaughterhouse	2006	2007	2008	2009	2010
Burao, Somaliland	121,858	70,318	151,471	58,440	20,077
Galkayo, Puntland	—	31,639	77,992	44,104	—
Belet Weyne (Southcentral)	116,344	—	10,055	28,021	—
Mogadishu Abattoir	81,200	—	252,979	—	—
Mogadishu Modern Abattoir	120,000	—	140,000	180,000	220,000
Total	**439,402**	**101,957**	**632,497**	**310,565**	**240,077**

Source: FSNAU (unpublished survey data).
Note: — Not available.

seasonal changes in the supply of slaughter animals as the major factor negatively affecting the chilled meat value chain. Other constraints include high domestic livestock prices and low demand, although low demand is probably related to the relatively high prices but low quality of Somalia's slaughter animals.

Somalia's proximity to the Gulf State markets provides a strong opportunity for value chain diversification and upgrading (Negassa and others 2012). The export of meat products offers better opportunities for increased earnings and domestic employment than does the live animal trade.

Developing the meat export value chain in Somalia requires better knowledge of foreign markets and foreign sanitary and phytosanitary regulations. The economics of meat marketing—including abattoir use, economies of size, capacity utilization, location, and economic gains that processing could generate—have not been extensively studied. However, a 2009 assessment of costs of capital and maintenance required for implementing hazard analysis and critical control points (HACCP) in Somali slaughterhouses showed positive returns on investments. To seize opportunities for growth, the Somali meat industry needs to adopt internationally accepted quality and hygiene standards.

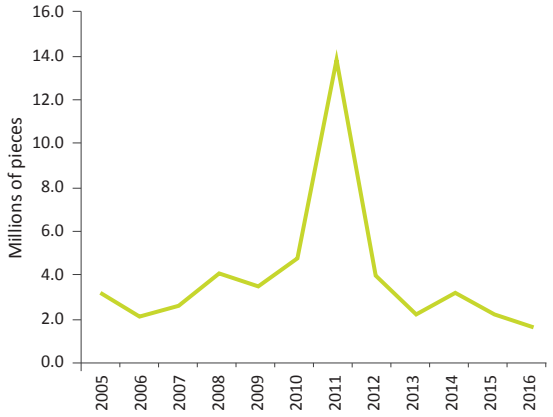
5.9.3 Hides and Skins

Hides and skins are byproducts of animal slaughter for domestic consumption. Current production levels of hides and skins are comparable to those of the late 1980s, about 7 million pieces a year. They reflect increased animal offtake rates from a lower overall animal population than three decades ago (figure 5.11).[62]

Production of hides and skins generally takes place at two levels: production by pastoralists in villages where animals are slaughtered for home consumption and production at designated slaughter facilities. Small traders collect hides and skins from villages and slaughterhouses, which are sun-dried before being resold to wholesale traders, who either export or sell them to the few tanning companies operating in Somalia.

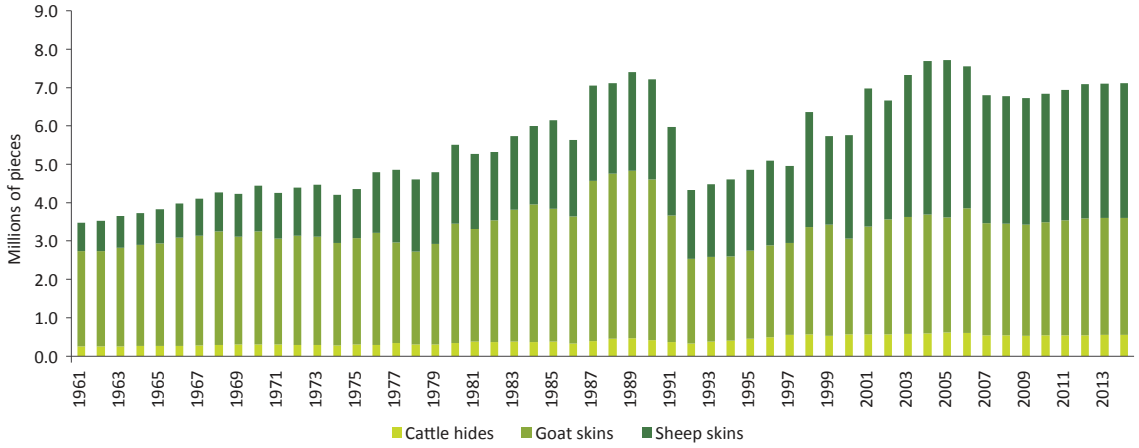
Exports of hides and skins were a significant foreign income earner before the civil war and remain an important source today. In the late 1980s, annual average exports were about $5.3 million, making hides and skins the fourth-largest export item. In the last decade, they averaged about $8.6–8.7 million a year (figure 5.12) but represented only the fifth-largest export category, thanks to much larger exports of sesame seeds and charcoal.

Figure 5.12: Exports of Hides and Skins from Northern Ports of Somalia, 2005–16



Source: FSNAU.
Note: Exports of hides and skins through Berbera port are in pieces; exports through Bosaso are in bundles. Missing data for December 2010 were interpolated.

Figure 5.11: Production of Hides and Skins in Somalia, 1961–2013



Source: FAOSTAT.

Meat production generally determines the volume of hides and skins. However, the jump in exports in 2011 can be directly related to the major drought that hit Somalia that year. As many animals perished, the number of hides and skins exported shot up. At the time of this report's finalization, data on hide and skin exports were not available with which to assess the effect of the most recent drought.

Underscoring the below-potential performance of this subsector, importing countries often reject Somali hides and skins because of poor quality and damage by vermin, caused by improper preservation and storage (Ombui, Mogoa, and Matete 2014). There is hardly almost no processing beyond sun-drying of raw hides and skins in the country (box 5.4).

Price data on hides and skins are not systematically collected in Somalia. The Somaliland Chamber of Commerce found market prices in October 2016 in Burao and Hargeisa of $0.45–$2 for sheep, $4–$10 for cattle, and $0.90–$3 for camels, depending on the grade and the market. These prices represent about 2–3 percent of the live animal's retail value. A 2016 study commissioned by the FAO in the Gedo region indicates that hides and skins provide a significant economic contribution to the regional economy. One basic processing facility at Dollow alone is projected to generate gross revenues of $125,400 a year (FAO 2016a).

Potential international demand for Somali hides and skins is solid. To operate successful ventures, however, herders and traders need to treat raw hides and skins as valuable commercial assets; the entire subsector must be modernized and professionalized to provide higher-quality and higher-value products; and private investors must invest in tanneries that do not pollute the environment, hire knowledgeable management, and ensure good corporate governance and business structure (FAO 2009).

5.9.4 Poultry

Only scanty information is available about the poultry sector. No imports of poultry or poultry products were recorded during the prewar years or the first decade of the civil war. By 2010, Somaliland was importing 11 tons of frozen chicken and 178,000

Box 5.4: The Sad State of Hide and Skin Processing in Somalia

Like all processing factories before the civil war, the Somali Leather Agency was also a public monopoly. Established in the late 1970s and headquartered in Mogadishu, it handled the marketing and export of raw hides and skins and owned tanneries. It paid herders less than half the market value of their goods, however, and therefore had trouble procuring enough hides of sufficient quality for processing. Like most other all factories, the prewar tanneries were looted and completely destroyed.

New tanneries emerged during the civil unrest. Among them was a Chinese joint venture between Hargeisa and Berbera, which folded in early 2016 after only a few months of operation, because of a strong backlash by the local population over contamination of the underground water used for drinking and small-scale crop irrigation.

The Bosaso Tannery is the only one currently in operation. It processes wet salted, dry salted, wet blue, limed, pickled, and air/frame-dried sheep and goat hides and skins (only natural chemicals are used in the production of the pickled variety). Daily turnover is 5,000 skins and 300 camel hides, with about 90,000 tons of hides and skins exported every year to Gulf States (mostly for reexport to other markets), Ethiopia, Turkey, Pakistan, India, China, and Italy. In 2012, the company also started leather production. It is currently exploring export to markets in the Middle East and other areas.

Source: Hussein (2017).

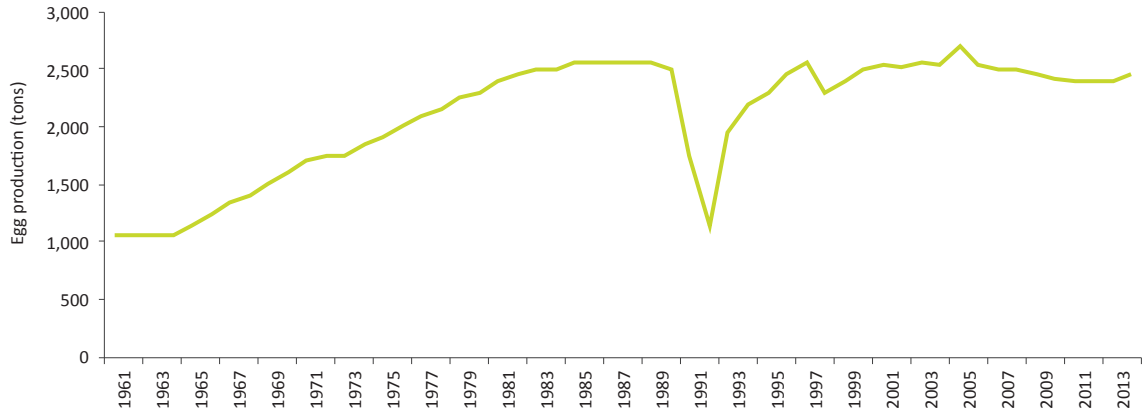
dozen of eggs a year, from Brazil, Yemen, Oman, and the United Arab Emirates (Somaliland 2012). By 2015, Somalia as a whole was importing $3.4 million worth of live chicks and $0.5 million of birds' eggs a year, according to COMTRADE data.

According to official national accounts and FAOSTAT data, production of eggs was about 2,500 tons (just below 60 million eggs) a year in the late 1980s (figure 5.13). Subsequent estimates indicate a relatively stable production level of eggs following a full recovery after the major dip immediately after the start of the civil war. Poultry production rose steadily through the 1990s. It was estimated at about 3,603 tons a year in 2014, slightly above prewar level of about 3,000 tons.

Poultry production is concentrated mainly in agro-pastoral livelihood zones and peri-urban areas. It is widespread among poor households. Households keeping local chickens do so for both consumption and income generation. Unreliable production estimates are shown in figure 5.14. A number of commercial poultry enterprises have also been established or are in the process of being established, mostly to supply nearby towns. They receive support from the Promoting Inclusive Markets in Somalia (PIMS) project funded by the U.K. Department for International Development (DFID).

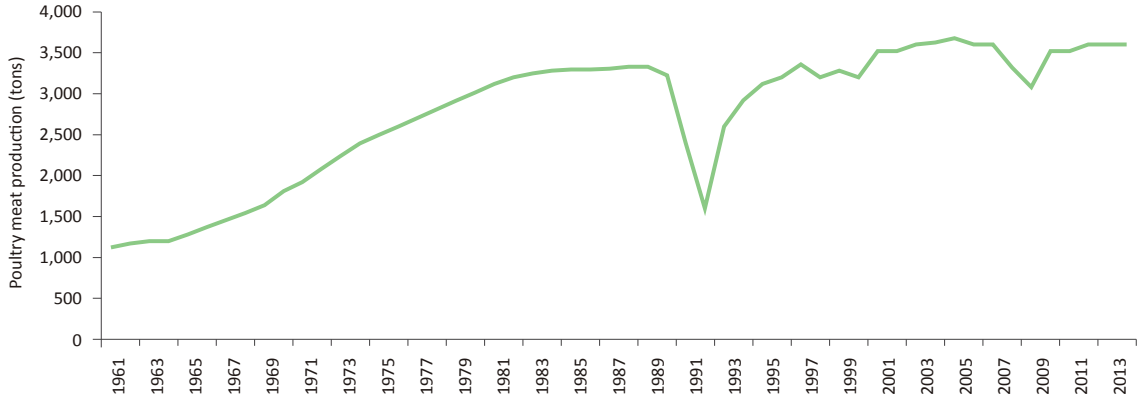
One of the largest such businesses, Ubale Poultry, near Hargeisa, recently expanded from 5,000 to 35,000 hens. It produces about 30,000 eggs a day,

Figure 5.13: Production of Eggs in Somalia, 1961–2014



Source: FAOSTAT.

Figure 5.14: Production of Poultry Meat in Somalia, 1961–2014



Source: FAOSTAT.

which it sells in major urban markets (Hargeisa, Burao, Borama, and also Djibouti) for $5.50 per 30-egg crate (see appendix H). As of March 2017, a handful of similar poultry farms were being built on the outskirts of Mogadishu. Further expansion of poultry production is still constrained by shortage and the costs of skilled labor and inputs, including poultry feed and feed concentrates, poultry stock, and drugs and vaccines.[63]

5.10 Impact of the 2016/17 Drought on the Livestock Subsector

Periodic droughts have severe effects on the livestock subsector (table 5.7).[64] The northwestern regions' livestock economy was affected by a severe drought in 2015. Since then, several consecutive seasons of below-average rains combined with an almost complete lack of rain at the end of 2016 to cause a major drought affecting all regions, resulting in much reduced water and pasture availability for livestock, high mortality of animals, and a major decline in the products of surviving animals. Crops were also hurt.

Almost three decades of civil conflict and insecurity have weakened governance institutions to the point that there is virtually no capacity to handle emergencies of this magnitude. In normal years, the country's pastoralists cover 60–80 percent of their food consumption from market purchases and the remaining 20–40 percent from their own production (milk, ghee, and meat). The recent drought has had a devastating effect on the livelihoods and food security of pastoralists and agro-pastoralists alike.

Table 5.7: Drought-Related Damage to and Losses in Somalia's Livestock Subsector, October 2016–September 2017

Region	Total Livestock Damage (Death) Value (Millions of dollars)	Total Livestock Loss Value (Millions of dollars)			Total Livestock Damage and Loss value (Millions of dollars)	Percent from Total Damage and Loss
		Milk Loss	Live weight	Total		
Awdal	10	21	28	49	59	3.7
Woqooyi Galbeed	15	23	46	69	84	5.2
Togdheer	30	61	61	122	152	9.4
Sool	42	32	44	75	117	7.3
Sanaag	37	35	72	107	143	8.9
Bari	22	14	43	57	79	4.9
Nugaal	40	47	80	127	168	10.4
Mudug	34	53	68	121	155	9.6
Galgaduud	31	59	63	122	153	9.5
Hiraan	17	33	48	81	98	6.1
Shabelle Dhexe (Middle)	4	5	21	26	30	1.9
Shabelle Hoose (Lower)	9	10	33	44	52	3.2
Bay	13	18	29	47	61	3.8
Bakool	14	22	36	58	72	4.5
Gedo	21	38	56	94	115	7.1
Juba Dhexe (Middle)	4	6	16	22	26	1.6
Juba Hoose (Lower)	6	17	25	43	49	3.0
Total	**351**	**495**	**767**	**1,262**	**1,613**	**100**

Source: Somalia 2018.

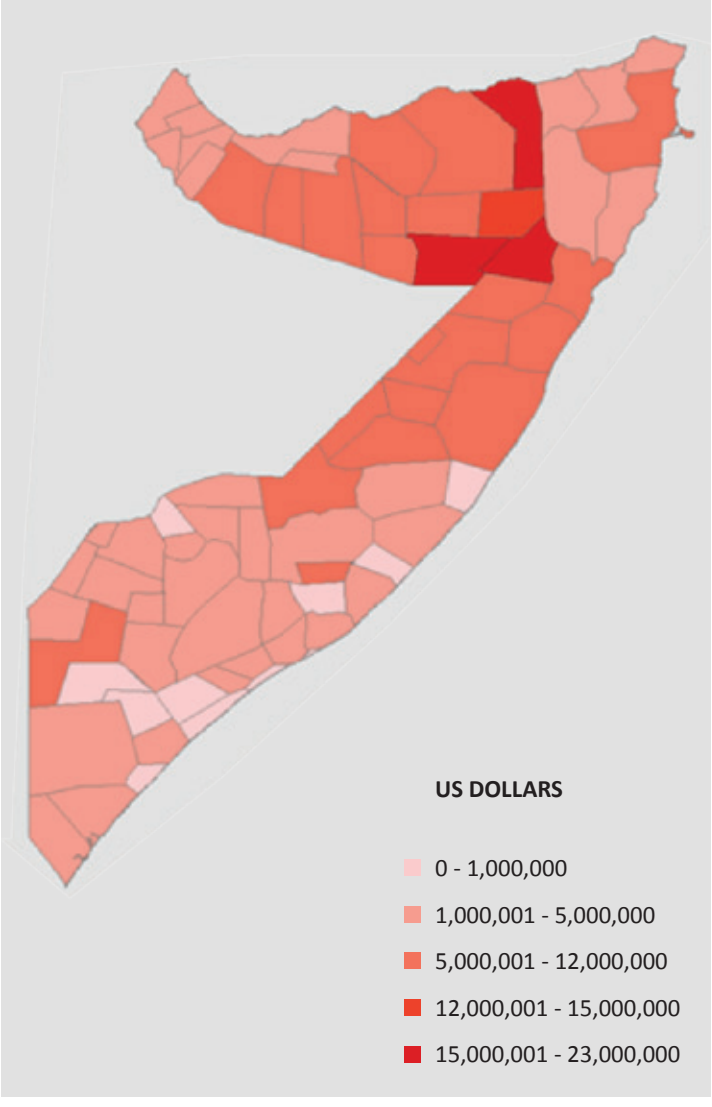
In the northwestern regions of Somaliland, the rain shortfall of the 2016 *Deyr* season either heavily or moderately affected 29 percent of the grazing area in Woqooyi Galbeed and 14 percent of the grazing area in Togdheer, according to remote-sensing estimates commissioned by the World Bank. During the most recent *Gu* season, the areas affected by drought in these two regions were much lower (13 percent and 2 percent, respectively). The situation in the northcentral regions of Sool and Sanaag as well as in the northeastern regions of Bari and Nugaal is similar.

Just south of these regions, in the Mudug region, 36 percent of grazing areas were highly or moderately affected by drought conditions in late 2016, and 19 percent were affected in the most recent months. In Southern Somalia, the drought hit grazing areas hardest, with 63–93 percent of grazing areas between the Juba and Shabelle rivers affected. During the *Gu* season (April–June), the share of affected areas ranged from 16 percent (in Hiraan) to 35 percent (in Bakool).

The much-reduced pasture and water availability for livestock at the end of 2016 caused severe morbidity, lower resistance to common diseases, and large-scale mortality of animals and large production losses. During the *Deyr* 2016 and *Gu* 2017 seasons, more than 6.4 million head of livestock (12 percent of the predrought livestock population of about 52.9 million) died, causing damage of more than $350 million. Production losses from the drought in terms of lower milk output (from reduced productivity per surviving animal and a reduced livestock population) and lower body weight of the surviving animals were valued at about $1.2 billion.[65] Damages and losses together were an estimated $1.6 billion.

Although the proximate cause of these losses was the drought, the root cause was the lack of preparation and risk-mitigation strategy, especially of feed and stored water, which could have contained the impact of the drought. The effect of the drought was worst in the north-central areas, severe in many other central and northern areas, and less severe in the southern part of the country (figure 5.15).

Figure 5.15: Map of Estimated Economic Damages and Losses from 2016/17 Drought



Source: Public Affairs Department, Ipsos, based on estimates for the Drought Impact Needs Assessment (Somalia 2017a).

5.11 Growth Opportunities and Prospects for the Livestock Subsector

Even before the civil war, livestock officials and experts voiced strong concerns about the sustainability of further growth of a large livestock population on already fragile and overgrazed rangelands. Since then, the rangelands have experienced further environmental degradation; the absence or failure of traditional or modern governance for access to water sources and grazing areas; and the combined impact of higher temperatures, decreased rainfall, and more extreme drought events linked to climate change.

Most sector experts are convinced that the predrought livestock population of almost 53 million head already surpassed the carrying capacity of the rangelands, even if effective governance mechanisms were reestablished. Recovery and resilience strengthening from the recent drought and further growth prospects for the sector are therefore not to be found in restocking to the predrought herd size (except for the poorest agro-pastoral households) and spurring increases in the size of the animal population. The solution lies in improving the health and quality of the current stock and in raising productivity (offtake for exports and domestic consumption) and value added (from processing of animal products).

Overreliance on a few market outlets with a relatively narrow product range is a significant risk to the Somali livestock export sector. The recent opening up of other exporting ports, such as Mogadishu and Kismayo, presents new opportunities for diversification.

Somalia should also leverage ongoing discussions (particularly under the guidance of the Intergovernmental Authority on Development and to some extent the African Union) on diversifying market outlets from countries in the Horn of Africa. However, most analysts believe that there will be a steady and increasing demand for live animals and meat from Saudi Arabia and other Gulf States, which will remain by far the largest export market from Somalia. In 2016, the Economic Intelligence Unit projected a compounded annual growth rate of 7.4 percent over the following five years for Somalia's exports of livestock and livestock products, despite a projected economic slowdown in the Gulf region, current efforts by Saudi Arabia to reduce its import dependency, and political instability in Yemen.

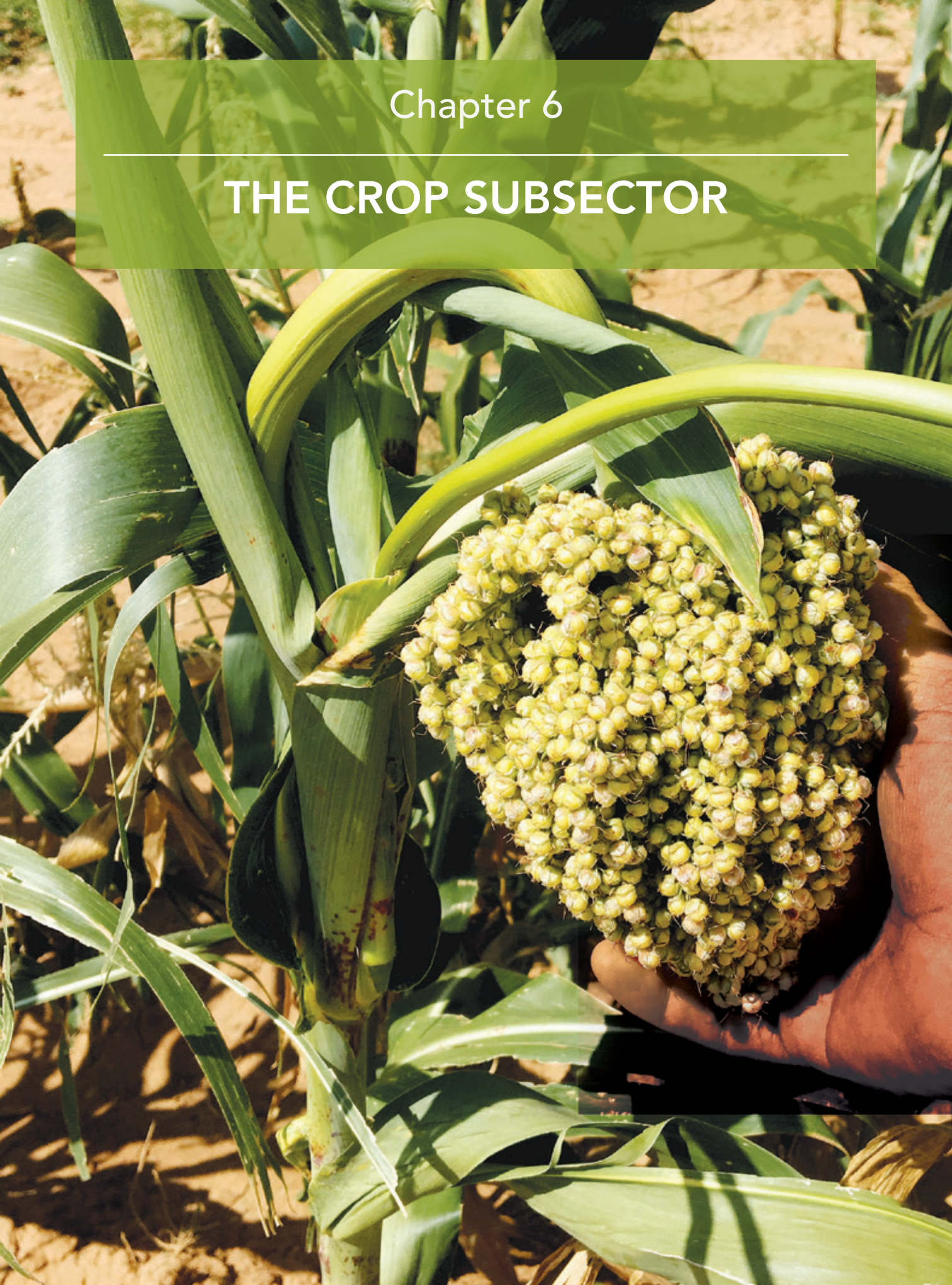
Growth prospects for the Somali livestock subsector are limited largely by supply-side constraints rather than domestic and foreign demand. In addition to the priority needs of improving rangeland management (as discussed in chapter 4) and animal health, there are ample opportunities to improve animal welfare along all transit routes and at all market centers and export ports. Animal quality is expected to improve as the ports in Mogadishu and Kismayo expand their activities, reducing transport distance and feed demand for livestock exports from southern regions. However, substantial investments in road infrastructure from small rural towns to primary inland markets to ports of exit are required to ease the movement of livestock along the entire supply chain.

The demand for water and fodder in markets and along major transport routes is substantial and will continue to increase, as domestic urban consumption and exports grow and extreme weather events become more frequent. Enhancing the effectiveness of the feed supply chain, to bring down costs and improve the quality and variety of feed that is being supplied to market centers and ports, would help improve the sector's competitiveness.

In some markets, especially in the Gulf countries, there is a strong preference for younger animals, especially goats, with lower weight for immediate consumption and for local fattening. Reductions in shoats' age of sale would increase annual offtake

rates while curbing animal population growth and pressure on grazing resources. Such a strategy should be carefully promoted, so that a more rapid turnover of male animals does not lead to a poorer selection of breeders the following year, limiting the genetic pool. Some studies have also found evidence of economies of scale and financial advantage for both herders and traders in species specialization, especially toward goats (Negassa and others 2012).

Ample opportunities also exist in expanding and modernizing the supply chains for all livestock products, from raw milk and hides and skins to hygienic slaughterhouses for chilled meat exports, small- and medium-scale dairy production, and poultry keeping. Gradually moving up the value chain would have the strongest impact on improving nutrition, increasing incomes and employment (including of youth and women), and contributing to economic diversification.



Chapter 6

THE CROP SUBSECTOR

KEY FINDINGS ▶

- Before the civil war, the crop subsector was the second-largest contributor to GDP and exports, after livestock. It remains crucial for food security, but its contribution to the economy is much smaller than it was before the war. Over the past three decades, the volume of cereal production declined by almost 60 percent from its 1989 peak (53 percent compared with the average for the 1980s). Even before the current drought, food aid and food imports were already larger than domestic production of grains.
- Some 3 million hectares (about 5 percent of the total land) are cultivable, with 2.3 million under rainfed conditions and 700,000 hectares suitable either for pump or recession-controlled irrigation. Before the most recent drought, only a fraction of irrigable land was irrigated and cultivated (less than 20 percent of potential and about half of irrigated land before the war).
- Almost two-thirds of cultivable lands, both rainfed and irrigated, is in the fertile areas along and between the two major rivers in the southern regions. A smaller cultivated area in the northwestern regions and some oasis and coastal cultivated areas in the northeastern regions constitute the remaining third. They rely mostly on groundwater extraction, rainfall harvesting, and moisture retaining techniques. The recent drought affected very large parts of these areas.
- Irrigated farming systems—which grow maize, sesame, bananas, other food crops, fruits, and vegetables—face many constraints. They include (a) much diminished and inconsistent surface water availability in southern Somalia, as a result of the dilapidated state of its prewar irrigation and flood control infrastructure and minimal rehabilitation efforts because of persistent insecurity; (b) lack of water use planning and regulation, which has led to inefficient water use, increased salinization, and water logging; (c) poor soil fertility management, as inputs such as manure, fertilizer, and pesticides are either used in a suboptimal way or not used at all, because of lack of adequate funds and inputs availability in remote areas; (d) low-quality seeds and the availability of only very limited varieties on the market; (e) limited and unreliable mechanized equipment (most farmers use handheld tools to till the land, because of the high cost of machinery); (f) badly deteriorated roads, which increase the time and costs of transporting crops to markets, undermining incentives to expand horticulture crops; and (g) inappropriate farming techniques, as a result of the absence of extension and research services.
- Another, potentially overwhelming, constraint is agricultural development upstream in the Ethiopian basins of the Shabelle and Juba rivers. The Shabelle River dried out completely twice, in March 2016 and between late December 2016 and early April 2017. Full implementation of the Ethiopian water master plan could eventually cause a drastic reduction in river flows downstream, possibly by more than 80 percent for the Shabelle River, and alter prevailing stream flow patterns, including flood intensities, jeopardizing most of Somalia's irrigated crop production.
- Under rainfed farming, a production system geared mainly to meet subsistence needs of rural households, the major crops grown are sorghum, cowpea, and, to a lesser extent, maize and sesame, as well as khat and millet in the northwest corner of the country. The main constraints faced by rainfed farming systems include (a) lower and more erratic rainfall than in the past, resulting in more frequent and intense cycles of droughts and floods; (b) deteriorated water harvesting and storage infrastructure, with minimal investment in new facilities; (c) poor soil management, resulting in very low moisture retention and inadequate internal drainage, which cannot support crops to maturity; and (d) very-low-input farming techniques and a traditional, low-risk response to erratic rainfall conditions.
- Even in normal years, average yields are very low. However, if the constraints summarized above were fully addressed, the expert consensus is that average yields could increase by a factor of four to six for maize and three for sorghum.

6.1 Production Systems for Food Crops

Before the civil war, crop production was second in importance to livestock with regard to its shares of GDP and exports; it was also crucial to food security. Lack of consistent and updated information on the importance of different economic sectors makes it difficult to assess its current contribution to the economy, although it is believed to remain second, albeit a distant second, after livestock.

Mean annual rainfall in Somalia ranges from less than 100 millimeters in the coastal arid and semiarid area to 600–800 millimeters at higher elevations along the Juba and Shabelle river systems in the south and in some parts of Awdal in the western part of Somaliland. The areas with the highest rainfall constitute the major farming zones of the country. The rainfall pattern is divided into two cropping seasons: the *Deyr* season (October–December) and the *Gu* season (April–June). However, the increasingly unpredictable nature of rainfall, in both time and geographic distribution, represents a much stronger challenge for agriculture production and rural livelihoods than it once did.

The FAO estimates that only about 3 million hectares of land—about 5 percent of the total—is cultivable. Of this total, almost 2.3 million hectares produces or could produce crops under rainfed conditions, and almost 700,000 hectares could produce crops under pump or recession-controlled irrigation, mainly along the two main rivers, the Shabelle and the Juba. Only 110,800 hectares are currently irrigated, which is less than half the 222,950 hectares under irrigation just before the civil war and only about 15 percent of the total potential irrigable land (EU 2010; SWALIM and FAO 2014). Almost two-thirds of cultivable land (rainfed and irrigated) is in the southern parts of the country (see EU 2010) (figure 6.1). Apart from the fertile areas along and between the two major rivers and a small cultivated area in the northwest of the country, Somalia is primarily rangeland, with low productivity potential for crops, as a result of very low and unreliable rainfall.

Most crop production is undertaken in the Southern regions by small-scale subsistence farmers with an average of 0.2–3.0 hectares of land. Major cereal crops are maize and sorghum. Other crops of economic importance are fruits, vegetables, legumes, and sesame. Among fruit crops, bananas used to be very important, with exports to Italy and Middle Eastern markets. Sugarcane was also of major commercial importance, with exports to the United Arab Emirates. In recent years, sesame seed and lemon have become important export commodities. According to the FAO, the smallholder-farming subsector accounts for 80 percent of total crop output and 70 percent of marketed agricultural produce. Use of appropriate technologies and inputs, such as hybrid seeds, fertilizer, and pesticides, and good agriculture practices, is very limited, a problem that is at the root of low agriculture productivity.

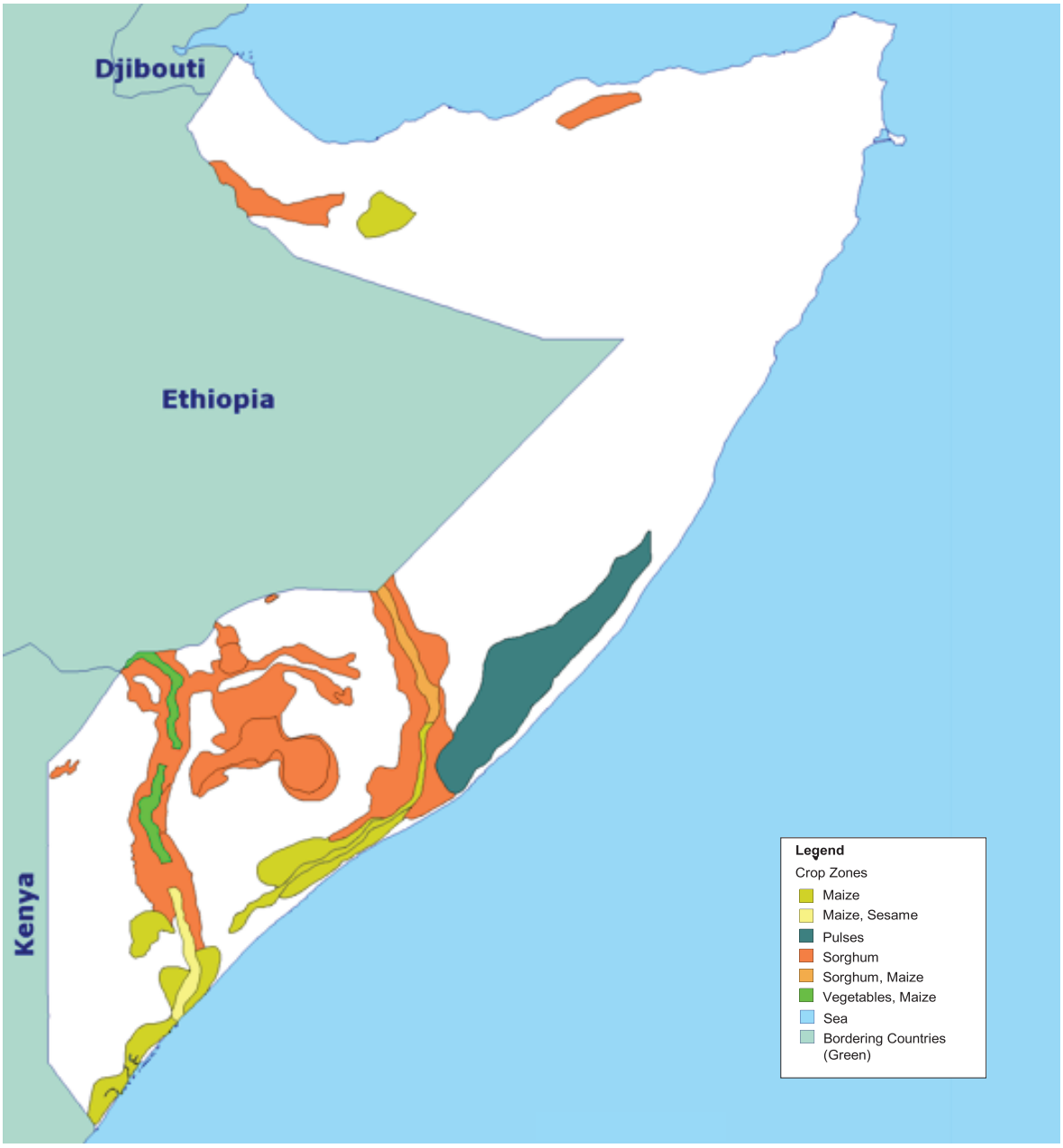
6.1.1 Irrigated Farming Systems

Irrigated agriculture is found in three locations:

- along the banks of the Juba and Shabelle rivers in southern and central Somalia, the only perennial streams in Somalia, covering a catchment of about 220,872 square kilometers and 296,972 square kilometers, respectively
- a limited area in western Somaliland
- scattered oases along dry river beds and underground streams in Puntland, both of which rely on surface water from springs and shallow wells with small one-piston pumps (figure 6.1).

Irrigated farming systems are based mainly on small and medium-scale gravity and pump irrigation, which are used to produce maize; sesame; fruits (banana, lemon and other citrus fruits, guava, mangoes, papaya, watermelon, and dates); and vegetables, for both subsistence and markets. Sesame and dry lemon are the only two crops current exported.

Figure 6.1: Map of Somalia's Crop-Growing Zones

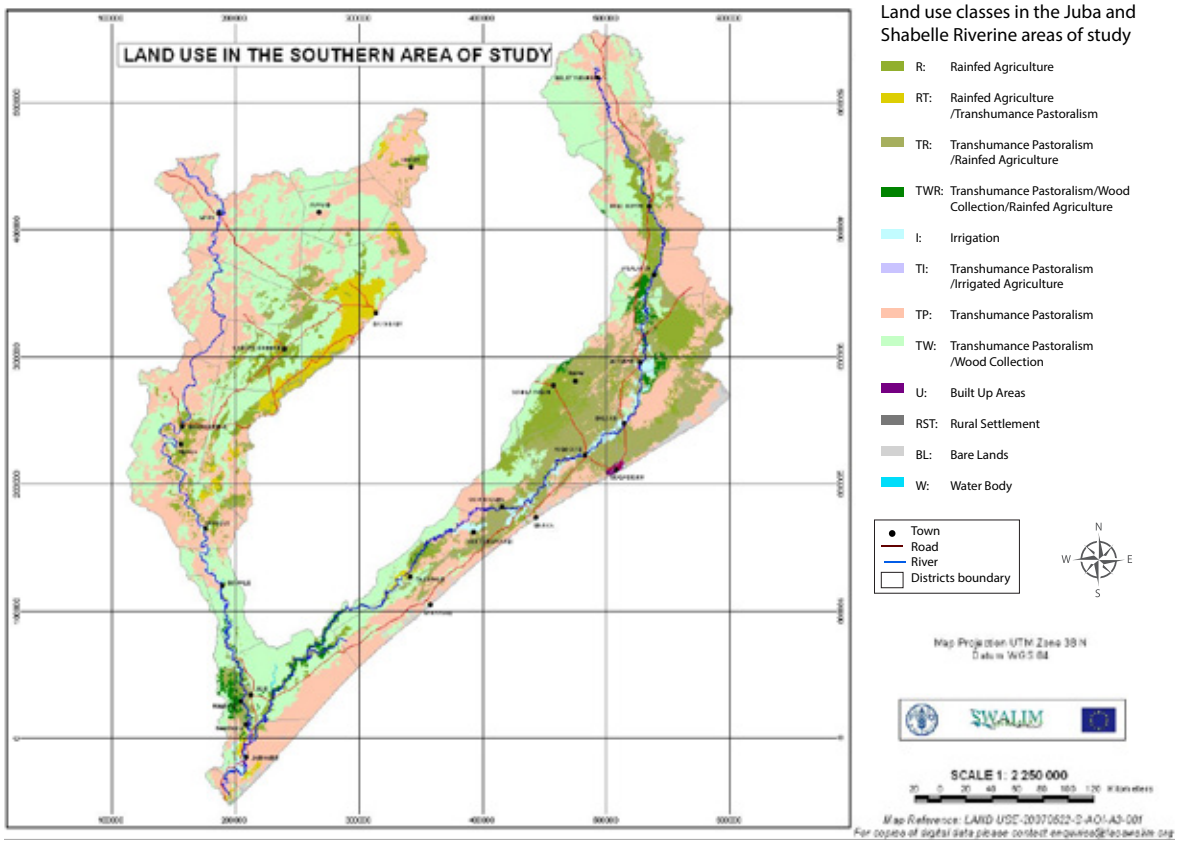


Source: Public Affairs Department, Ipsos, based on estimates for the Drought Impact Needs Assessment (Somalia 2017a).

Other than seeds, which are generally sourced by seed traders for vegetable crops and farmers' own seed savings for cereal crops, farmers use very few inputs. Yields for most crops are very low, because of low input levels, moisture stress, poor farming techniques, pests and diseases, and poor seed quality coupled with an almost nonexisting extension and research service.

In the Shabelle River basin, crop cultivation takes place mostly in the flood plains adjacent to the Lower and Middle Shabelle. It is irrigated mainly by gravity, though pumps are also used (figure 6.2). The Lower Shabelle was the most productive area for bananas, maize, and sesame before the civil war. The main prewar irrigation systems are no longer functioning, however, and many farms have been

Figure 6.2: Map of Land Use in the Shabelle and Juba River Basins



Source: SWALIM and FAO 2007c.

abandoned. (Chapter 2 describes the extensive network of infrastructure in southern and central Somalia in the late 1980s, its current dilapidated state, and the large reduction in land area under controlled irrigation.) Because of the fluctuating level of rain in the eastern highlands, water projects and intensified use for own agricultural development in Ethiopia's Shabelli catchment area, and the disrepair of barrages upstream, the Lower Shabelle has become very vulnerable to alternating floods and river water shortages. Farming in this area has declined significantly since the start of the civil war, with many more subsistence farmers than before the war. Some commercial farmers sell cereals, bananas, other fruits, and vegetables in Mogadishu and other large regional markets.

The Middle Shabelle is a very productive area, with heavy rainfall (492–545 millimeters a year). Before the war, old sugarcane and rice plantations were located here. Mixed cereal and sesame crops are produced in this area, despite many abandoned fields.

The Upper Shabelle, located in the Hiraan region, in the center of the country, is the least productive part of the Shabelle River basin, because of a narrow flood plain, sand dunes in some parts (Jalalaqsi), and obstacles to gravity irrigation because of the deep river valley. However, mixed agro-pastoral farming systems exist here, with vast fields of cereals used as pasture for grazing.

In the Juba River basin, crops are irrigated mainly by flood recession along the river. Water is allowed to flood the low-lying lands close to the river; crops are then planted in the newly exposed soil as the flood water recedes. Before the civil war, this area had large banana plantations. Today, the main crops

are sesame, maize, beans, peas, watermelons, vegetables, and groundnuts. The most productive part of the area is in the Upper Juba, where riverine agriculture based on pumped irrigation produces onions and tobacco for the major urban markets of Mogadishu, Kismayo, and Baidoa. Tomatoes and peppers are also important cash crops in this area.[66] Maize yields are estimated to be about 1 ton per hectare on better soils with irrigation and 0.6 ton per hectare on poorer soils with limited irrigation; sesame yields are 0.3–0.4 ton per hectare in normal years (SWALIM and FAO 2007c).

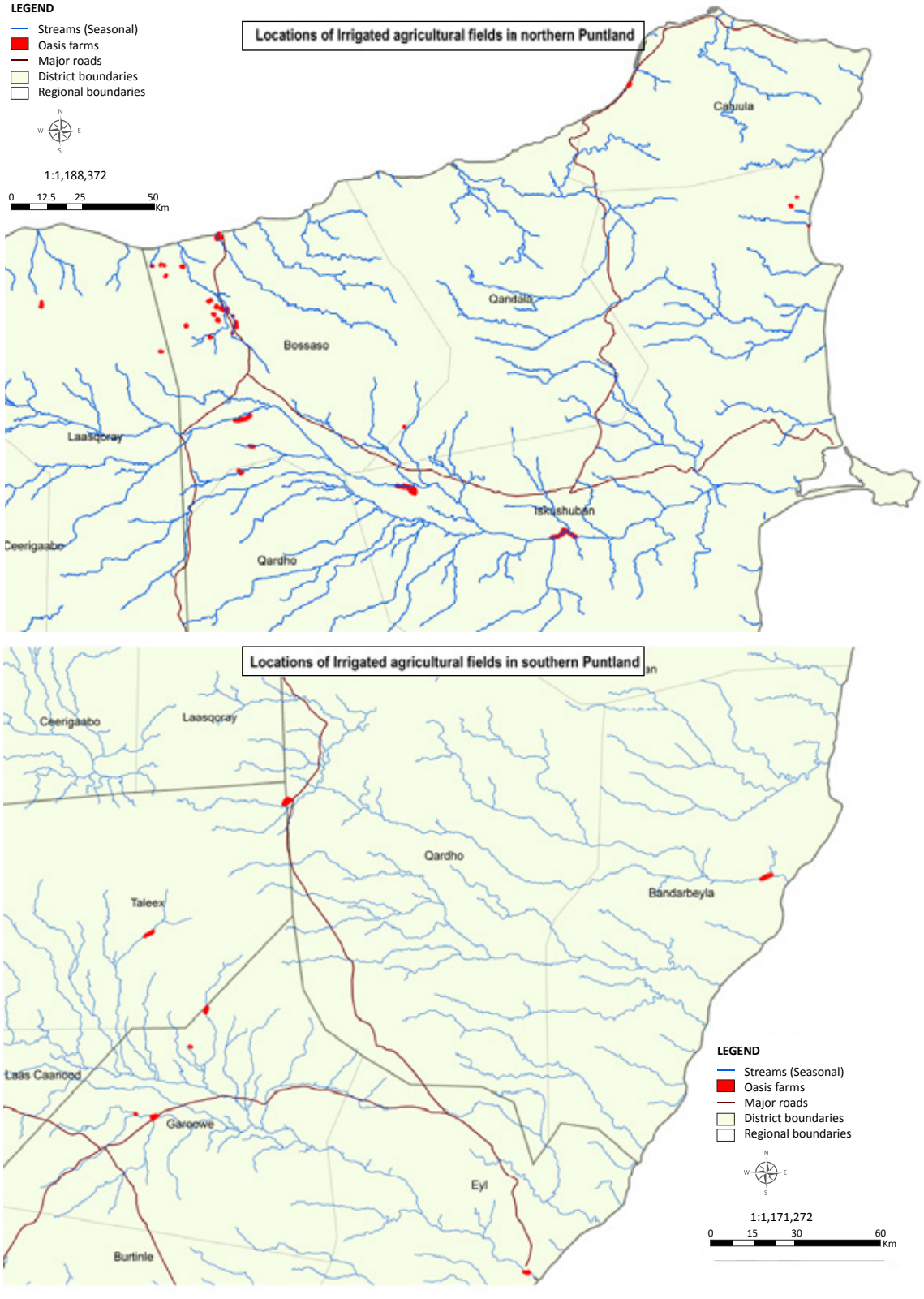
In Puntland, all irrigated agricultural farms are along the seasonal streams. Water is channeled directly from the springs and/or shallow wells constructed close to the streams in the valley bottoms. The total area covered by irrigation is about 2,848 hectares. Numerous small oasis farms are located in the Bosaso and Daroor basins (figure 6.3; see appendix F for the size of irrigated farms by district). The major crops grown are fruit trees (date palm, citrus, and tamarind) and vegetables, mainly for the local market and some limited fodder. The average field is less than 2 hectares and has limited intercropping, low soil fertility, and increased salinity and pest management issues.

Irrigated agriculture constitutes only 10 percent of Somaliland's total area cultivated, supporting about 4,000 farm families (figure 6.4). Farming systems are based on irrigated fruit trees (citrus, banana, guava, mango, papaya, date palm, and tamarind) intercropped with vegetables (tomato, chili, onion, watermelon, cabbage, and lettuce) and coupled with transhumance pastoralism (camels, goats, cattle, and donkeys). Spate irrigation (an ancient method that uses seasonal floods from normally dry river beds to fill irrigation canals and which is well developed in Eritrea and eastern Tigray) is limited to very small areas in the Beer and Oodweyne districts for the production of cereals and fodder for livestock, and in Alaybaday, southwest of Hargeisa, for the production of vegetables and fruits.[67] Pump irrigation is limited to small commercial units producing vegetables and fruits near major towns. Supplementary water for irrigation is obtained from hand-dug shallow wells and dams and along the alluvial plains. Water-harvesting mechanisms such as diversion furrows, check dams, and wells are used to maintain soil moisture. Vegetables and fruit trees are grown in a few pockets of oasis farming in the Dur valley of the Awdal and Erigabo area. Watermelon is the only crop that is exported (from Somaliland to Djibouti).

In addition to still unresolved security-related issues in the rural southern regions of Somalia, the main constraints faced by the irrigated farming systems include the following (in order of importance):

- Much diminished and inconsistent surface water availability in (still insecure) Southern Somalia, because of the dilapidated state of its prewar irrigation and flood control infrastructure along its two main rivers and the absence of new projects in the past 25 years.
- Weak water management, on and off farm, because of the absence of water use planning and regulation, which results in inefficient water use, increased salinization, and land that is more prone to water logging.
- Poor soil fertility management, because inputs such as manure, fertilizer, and pesticides are used in a suboptimal way or not used at all, partly because of their high cost and limited availability in remote areas, as a result of badly deteriorated roads.
- Low-quality seeds and the lack of diversified varieties available on the market.
- Inappropriate farming techniques, in the absence of extension and research services.
- Limited mechanized farming. Most farmers use handheld tools to till the land, because of the high cost of machinery. The machine park available for land preparation, supplementary pump irrigation, and maintenance of its irrigation systems is in a poor state, costly to operate, and inefficient.

Figure 6.3: Map of Irrigated Farms in Puntland



Source: SWALIM 2010.

- Difficult and costly market access, largely because of the badly deteriorated road network, which make transporting crops to nearby villages and main regional markets costly, undermining incentives to expand horticulture crops.

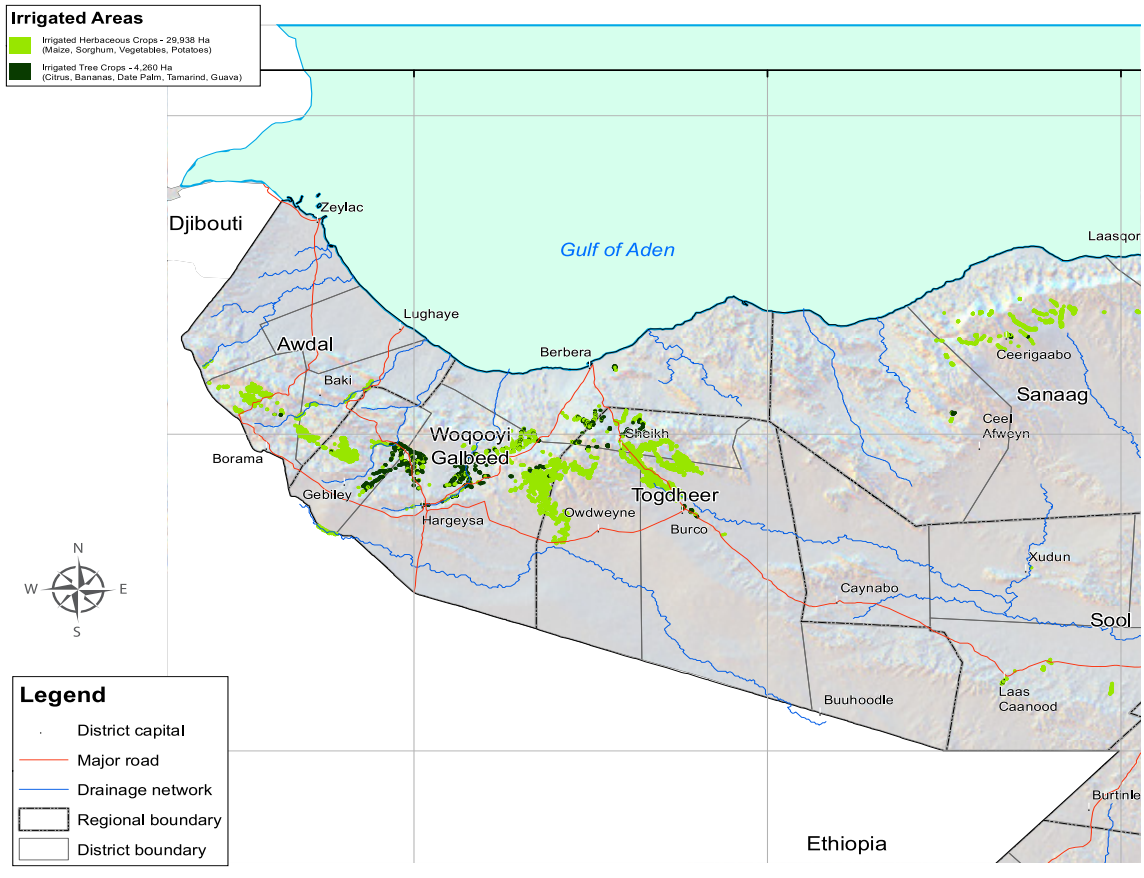
6.1.2 Rainfed Farming Systems

Rainfed farming systems are low-input agriculture systems geared mainly to meeting the subsistence needs of rural households. Rainfed farming is common throughout the country where irrigation is not feasible, except on the coastal sandy plains and in high limestone areas.

The major rainfed crops are sorghum, cowpea, and, to a more limited extent, maize. These crops are grown in four main cropping systems in Southern Somalia and another system in Somaliland (see the map showing Somalia's agro-ecological zones in appendix C).

- **Somalia's sorghum basket** zone is located in the Bay agro-pastoral high-potential livelihood zone, which covers the Qansahdhere, Baidoa, and Dinsoor districts as well as some areas of the Burhakaba district. This area is characterized by good fertility with productive vertisols (soils with a high content of expansive clay that forms deep cracks in drier seasons or years) and calcisols (soils with a substantial secondary accumulation of lime).[68] It also has some of the highest rainfall in Somalia (500–600 millimeters) and an altitude of 100–500 meters above sea level. This region produces about half the sorghum production

Figure 6.4: Map of Irrigated Areas in Somaliland



Source: SWALIM (2012b).

of southern Somalia. It also produces maize, cowpea, sesame, and groundnut. Farming systems are largely agro-pastoral, with cattle reared more than other species.

- The **Bay-Bakool agro-pastoral zone** is equally dependent on crop and livestock production to sustain low-potential livelihoods. The existing crop production system consists of rainfed agriculture combined with farming in flood-recession areas (runoff water from higher land areas, particularly Burhakaba and Dinsoor districts). The rainfall pattern tends to be highly cyclical, with a pattern of sufficient rains for a number of years followed by years of lesser rains resulting in droughts and crop failure (as has been the case since early 2016).
- The **Shabelle and Juba riverine valleys** have rainfed sorghum, sesame, and cowpea crops combined with irrigated crops, such as maize, sesame, fruit trees, and horticulture.
- The **coastal cowpea belt zone** is mainly dependent on livestock (mainly camel and goats). It is classified as an agro-pastoral food economy zone. With no limitation with regard to access to land in this zone, shifting cultivation is practiced on farms that are abandoned after three years and returned to only after 30–35 years. Cowpea is the major crop grown in both the *Gu* and *Deyr* seasons, because it is more resistant to water stress. Sorghum cultivation is rare; it takes place mainly in the *Deyr* season, because it is more resistant to water stress. Both crops are often intercropped with watermelon.
- **Somaliland's sorghum belt** is in the northwestern agro-pastoral region, encompassing the four main rainfed cereal-producing areas of Somaliland, around Borama and Baki in Awdal and Gabiley and Hargeisa in Woqooyi Galbeed. Annual rainfall can exceed 500 millimeters. Farming systems are based on a combination of rainfed agriculture, transhumance pastoralism, wood collection for charcoal, and fodder production. The most common crops grown are maize and sorghum, as well as *khat* and millet. Crop production is based purely on rainfall and the harvesting of rain water (in bunding, *berkads*, check dams, and diversion furrows). Farming systems are predominantly subsistence in nature. However, some farmers produce large surpluses of grains from high-yielding, local, late-maturing sorghum landraces (six-month maturing Elmi Jama sorghum variety), whose products are consumed as a staple, sold locally, and stored in underground pits. Crop residues and failed sorghum and maize sowings contribute significantly to livestock feeding, and the heavy sowing rates used for both crops (10–32 kilograms per hectare for sorghum in 2011) reflect the dual-purpose nature of household planting policies (FSNAU 2011). Farmers normally intercrop maize with sorghum to reduce the risk of total crop failure because of the sensitivity of maize to dry spells and to the maize stalk borer.

The main constraints faced by the rainfed farming systems include the following:

- lower and more erratic rainfall than in the past, resulting in more frequent and intense cycles of droughts and floods
- deteriorated water harvesting and storage infrastructure, with minimal investment over the last three decades in new facilities, even under the more established governments in Somaliland and Puntland
- poor soil management, resulting in soils with very low moisture retention and inadequate internal drainage, which cannot support crops to maturity
- low- or no-input farming techniques for staple foods, a traditional low-risk response to increasingly erratic rainfall conditions.

6.1.3 Water Constraints to Crop Production

Increased water scarcity and poor water management are at the top of the lists of constraints for both irrigated and rainfed crop production. Already before the civil war, Somalia's physical infrastructure, built mostly in the 1970s and 1980s, had started suffering from underinvestment in new construction, underspending in operations and maintenance, and mismanagement. Nonetheless, at the eve of the civil war, a large water infrastructure network supported high and rising crop production levels. After the collapse of the central government, most public infrastructure fell into disrepair. Even under the more established governments in the two northern regions, minimal or no new investment has taken place in water infrastructure, and weak institutions have meant few improvements in water management.

The frequency and intensity of both major and flash floods in the river basins of Southern Somalia increased in the last two and a half decades, especially in recent years, unlike In the decade before the civil war, when an extensive network of flood control infrastructure had made such events rare (see chapter 2 for a discussion of infrastructure and chapter 4 on the impact of climate change on the weather). These floods cause extensive damages during the rainy season and affect far more people within a short period than other natural disasters in the basin. According to a 2016 study, about 900,000 people in Somalia are exposed to disastrous floods (SWALIM 2016).

The Shabelle River channel no longer has the capacity to carry much more than the typical annual flow. Above-average rains upstream (including in Ethiopia) easily result in flash floods. Reasons for this new phenomenon include the following:

- the complete disrepair of flood control and river infrastructure and regulation
- the growth of unregulated new settlements in flood plains
- the deliberate breaching of river embankments for informal, unregulated flood irrigation and recession cultivation
- particularly unfavorable topography in the lower reaches of the Middle Shabelle to contain the river, as the wider, natural riverine overflow area is higher than the surrounding flood plain
- sedimentation, which leads to rising levels of the river bed, particularly upstream of weirs and barrages.

Drought and flood events are predicted to become more extreme and more frequent along the Juba and Shabelle rivers because the flow of both rivers depends mainly on rainfall and runoff upstream in Ethiopia. According to long-term climate projections made for Ethiopia, rainfall events there may become heavier, making floods more frequent in the river basins downstream (UNDP 2012). If this happens, recession farming will remain feasible only if crops are highly flood- and drought-resistant and farmers can cope with the irregularity of the recurring floods.

Only a limited number of irrigation projects has been implemented in the Juba and Shabelle catchment areas in Ethiopia, where 90 percent of the rivers' downstream flows originate. Several dams for hydropower generation and irrigation are being built, and more are envisioned under Somalia's Water Resources Master Plan.

For the first time on record, the Shabelle River dried out completely (figure 6.5)—twice in the space of a year, in March 2016 and in December 2016–March 2017. An Ethiopian government official admitted that his country "had deliberately stopped the Shabelle River water flow behind a dam to store the water for irrigation of the farming fields in the Somali region of Ethiopia."[69]

The two rivers not only provide water for much needed irrigation, they are also critical to maintaining the very fertile Somali flood plains, where crops are grown for domestic and foreign

Figure 6.5: Dry Bed of the Shabelle River

Source: Puntland News24, February 5, 2017.

markets. Under the full master plan development scenario, by 2035, more than 80 percent of the water resources of the Ethiopian Shabelle basin would be used to upscale and supply Ethiopian agriculture, livestock, and domestic water needs. The plan would drastically reduce water availability in the Somali part of the basin (both river water flow and potentially groundwater recharge), diminishing the potential for recession farming and increasing competition for water among Somali farmers and pastoralists.[70]

Water availability is decreasing in both Somaliland and Puntland.[71] Given the lack of perennial streams, the mostly arid climate, and low annual rainfall, groundwater represents the sole permanent water resource. Spate floods are a regular seasonal feature, with potential for future expansion, but aquifers are deep, low-yielding, and often highly saline. Their salinity means either lower quality or less water for irrigated agriculture. Groundwater levels are also declining in both shallow wells and deeper boreholes, a trend that is expected to continue and possibly increase with further population pressure and climate change. There is a general consensus that climate events will become more extreme. Increased downpour intensities will cause increased water runoff and decreased water infiltration, reducing water availability for plant growth.

The population of Somalia continues to grow at a very rapid rate, increasing demand for both surface and groundwater by household and industrial users. In the northern regions, population growth has already resulted in declines in per capita water quality and availability. Table 6.1 shows projections of population growth and water demand in the Juba and Shabelle River basins.

Table 6.1: Projected Population Growth and Water Demand in the Juba and Shabelle River Basins, 2005–55

Year	Population in the basin	Rural share of population (percent)	Annual water demand (million cubic meters)
2005 (base year)	4,480,780	62	51.2
2020	6,682,059	54	82.2
2035	9,964,762	48	130
2037	10,510,123	47	138
2055	16,977,581	40	235.7

Source: SWALIM (2013).
Note: Population figures are based on annual growth of 2.7 percent.

6.2 Trends in Crop Production

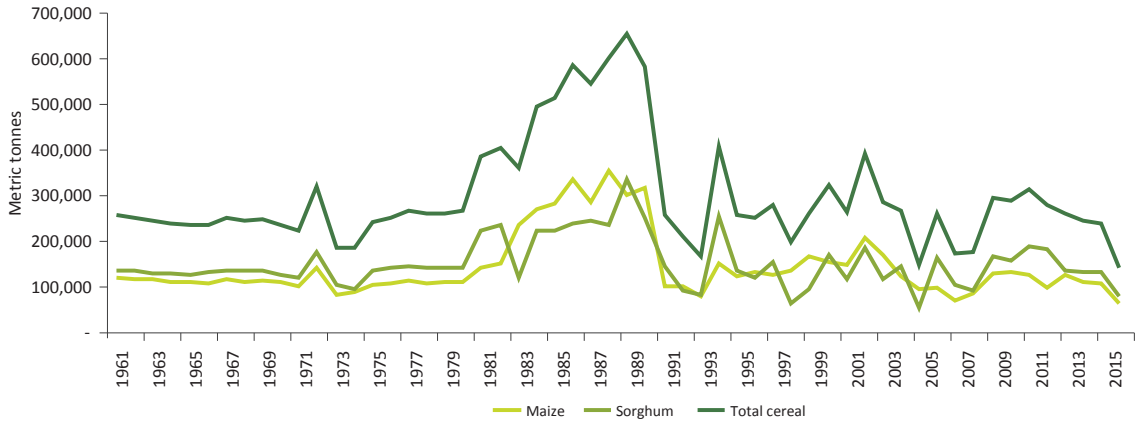
6.2.1 Cereal Crop Production

The decrease in cereal production has been so dramatic over the past three decades that recent (predrought) food aid and food imports now exceed domestic production of grains. Before the recent drought, production levels were 60 percent below their peak 1989 level. Before the civil war, annual average cereal production was about 500,000 tons (1980–90), peaking in 1989 at 654,000 tons. The long-term postwar (1995–2006) annual average amounted to about 265,000 tons; Over the past decade (2007–15), production remained roughly unchanged, with high intra-annual variations as a result of erratic rainfall, dry spells, recurrent floods, pests, and diseases (figure 6.6).

Maize production peaked at about 353,000 tons in 1988. It dropped 63 percent in 1995–2015, to an average of about 120,000 tons. In more recent predrought years (2010–15), average maize production decreased to about 110,000 tons, falling to 63,251 tons in 2016 as a result of below-average rains. In 1988–90, sorghum production averaged 275,000 tons, peaking at 330,000 tons in 1989. During 2010–15, annual production was only 110,000 tons, 60 percent less than in the late 1980s. It fell to 78,801 tons in 2016.

Crop subsector performance remains constrained by the volatile security situation and the absence of the rule of law, especially in the Southern regions; insufficient technical and support services; insufficient infrastructure and market integration and development; the absence of a credit system; and the absence of effective natural resource management and environmental protection. Consequently, food aid and imports of grain—including rice, maize, and wheat (which are used to make bread and

Figure 6.6: Production of Cereal in Somalia, 1961–2015



Source: FAOSTAT from 1961 to 1994, FSNAU from 1995 to 2016.
Note: Annual figures include mid-year Gu harvests and end-of-year Deyr harvests (of January of the following year).

pasta, which most urban Somalis consume in large quantities)—have increasingly replaced domestic production of cereals (figure 6.7). In 2010–15, food imports and food aid accounted for 48 percent and 13 percent of cereal supply, respectively; local cereal production accounted for only 39 percent of cereal supply. In 1988–90, when cereal production peaked, local production accounted for 70 percent of cereal supply, and food imports and food aid contributed only 23 percent and 7 percent, respectively.

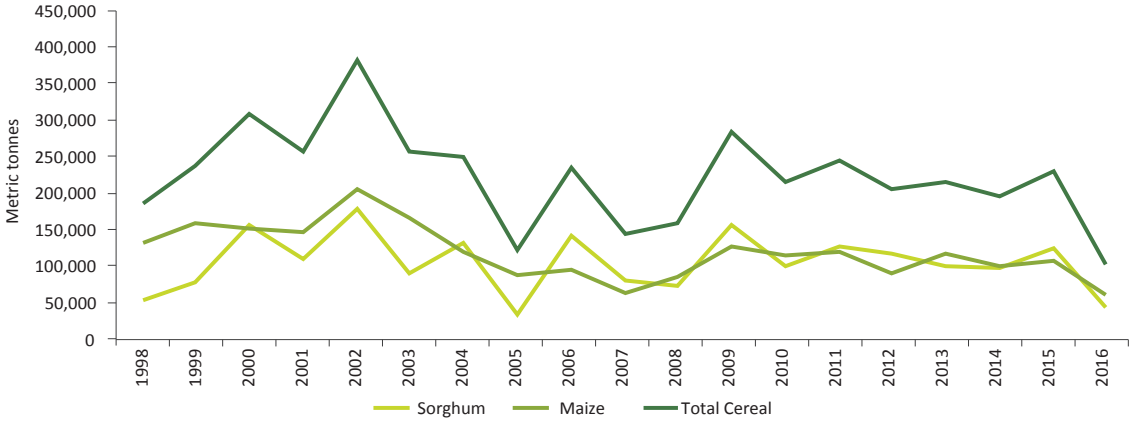
In southern Somalia, annual average cereal production fell by almost half between the late 1990s and 2009–15, declining from almost 442,000 tons to only 227,000 tons (figure 6.8).[72] Maize production fluctuated between 204,000 tons at its peak (in 2002) to 60,356 tons at its trough (in 2006), a year severely affected by drought. Average annual maize production during 2009–15 was 110,000 tons. During 1998–2015, sorghum production fluctuated widely, from a peak of 180,000 tons in 2002 to a trough of 33,000 tons in 2005. Annual production averaged 106,000 tons in 2013–15. It fell to 42,181 tons in 2016.

Annual maize yields are low, at 0.4–0.6 tons per hectare, with a long-term average of 0.5 tons per hectare (figure 6.9). There are large intrayear variations across farms, regions, and seasons, related to rainfall (quantity and distribution), the timing and quality of cultivation, the type and quality of seeds, weeding, pests and diseases, and other factors.

Figure 6.7: Domestic Cereal Production, Cereal Imports, and Food Aid in Somalia, 1988–2015

Source: FAOSTAT, World Food Programme, and FSNAU.

Figure 6.8: Production of Cereal in Southern Somalia, 1998–2016

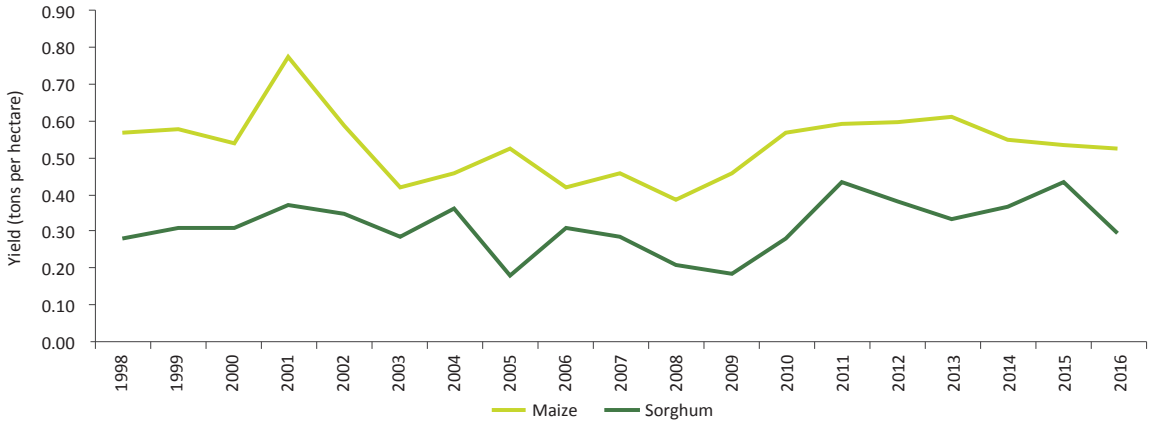


Source: FSNAU.
Note: Annual figures include midyear Gu harvests and end-of-year Deyr harvests (of January of following year).

Sorghum yields are also low, at about 0.3 tons per hectare, with interannual variations from just below 0.2 tons to 0.4 tons per hectare. These low yields reflect poor access to good-quality inputs and the widespread use of low-yielding varieties.

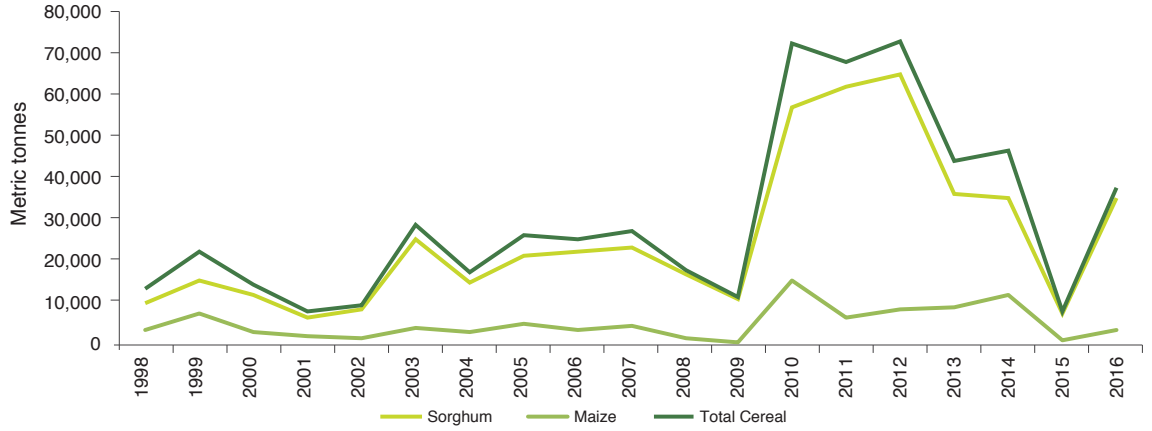
Even under rainfed cultivation in southern Somalia, when appropriate and quality inputs are used average yields can easily reach 2.5 tons per hectare for maize and 1 ton per hectare for sorghum, (as they have in various FAO-supported projects). The Somali Agriculture Technical Group recently conducted tests at its research station in the Afgoi area (Lower Shabelle) to compare a hybrid variety with locally grown maize under irrigated conditions. Yield increases of up to 30 percent for the hybrid variety were achieved, even in the most recent 2017 *Gu* season, despite the still below-normal rainfall. The hybrid produced 7.3 tons per hectare, 30 percent more than the local variety, which produced 5.6 tons per hectare. This result strongly suggests that using adequate irrigation techniques and other good agriculture practices can increase yields of even local varieties by a factor of five (while using better seeds could increase yields sevenfold). The experiment confirms studies the Somali Agriculture Technical Group (SATG) conducted in 2014/15 comparing the performance of CIMMYT maize hybrids with local varieties.

Figure 6.9: Cereal Yields in Southern Somalia, 1998–2016



Source: FSNAU.
Note: Annual figures include midyear Gu harvests and end-of-year Deyr harvests (of January of following year).

Figure 6.10: Production of Cereal in Somaliland, 1998–2016



Source: FSNAU.
Note: Annual figures include midyear Gu harvests and end-of-year Deyr harvests (of January of following year).

Sorghum is the largest cereal crop in Somaliland. Average annual production is less than 8,000 tons, with a peak of 11,523 tons in 2014 (figure 6.10).[73] In recent years, production levels have fluctuated with agro-climatic conditions, from a high of 64,652 tons in 2012 to a low of 7,045 tons in 2015, when the northwestern regions suffered from a very severe drought. In 2016, better rains allowed a recovery of output to 34,620 tons. Annual yields for sorghum fluctuated between 1.0 ton per hectare in 2012 and 0.4 tons per hectare in 2015 (figure 6.11).

6.2.2 Sesame Production and Exports

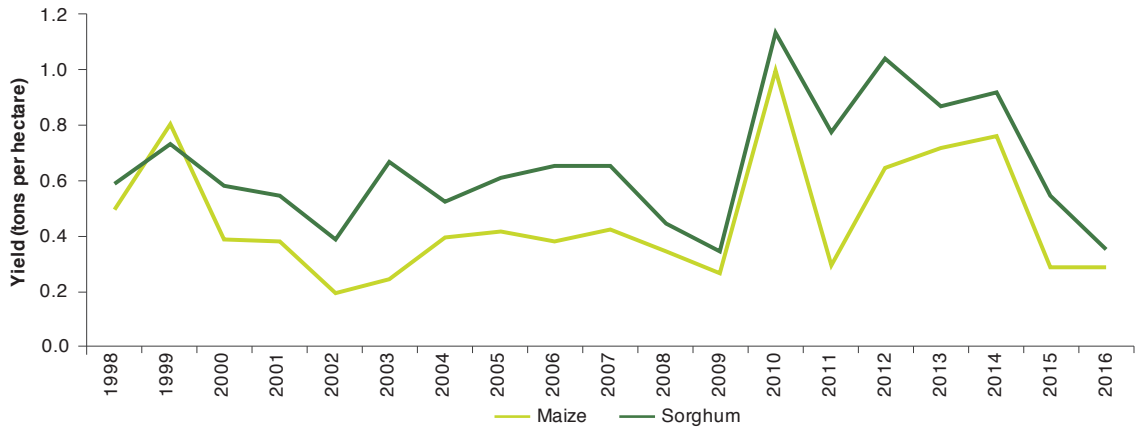
In sharp contrast to the drop in cereal production, sesame seed production and exports appear to be on the upswing and to have surpassed their peak prewar levels. About 80 percent of sesame production takes place in the Lower and Middle Shabelle and in the Middle Juba, with much smaller, localized production in the northwestern part of Somaliland. Sesame is well adapted to the geographic and climatic conditions of these regions.

Estimates of the number of sesame farmers range from 150,000 to 250,000. Most are smallholders, with an average of 1–2.5 hectares and yields of just 0.2 tons per hectare under rainfed conditions and 5–8 hectares and 0.4 tons per hectare in irrigated areas (UNDP and SATG 2016b).

Sesame production reached prewar peak production levels of about 57,000 tons in 1982 and 1985 before falling back to 45,000–50,000 tons in 1989–90, just before the start of the civil war (figure 6.12). Following a virtual collapse in the early 1990s, production volumes reached a peak of 38,133 tons in 2013, before falling back to 35,584 tons in 2014 and 28,640 in 2015, according to the FSNAU. SATG estimates that production reached 60,000 tons by 2014, surpassing peak production levels of the 1980s, with 15,000 tons (about a quarter of output) exported (SATG 2015). It estimates the value of such production at about $300 million.

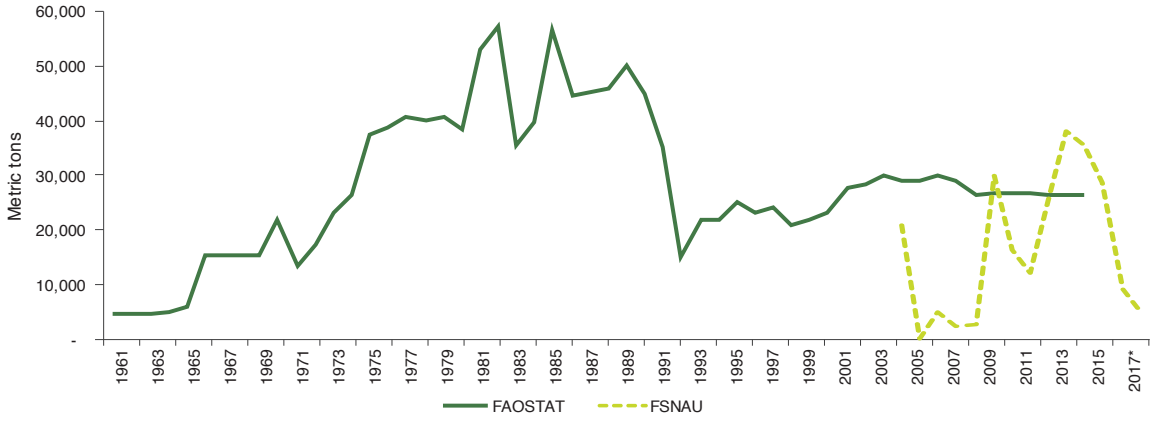
Yields range from a high of about 0.6 tons per hectare in Beer to about 0.35 tons per hectare in Afgoye; the average for irrigated sesame, including small and large farms, is about 0.4 tons per hectare, which is comparable to yields in Ethiopia. These low yields stem mainly from a lack of good-quality seeds (farmers using own local saved seeds), endemic pests and diseases (especially armyworm), and poor crop management practices. With only slight improvements in the irrigation system, seed quality, pest management, and related gaps, Somali farmers have demonstrated that they can increase sesame yields to 1.5 ton per hectare or almost four times (FAO 2016c).

Figure 6.11: Maize and Sorghum Yields in Somaliland, 1998–2016



Source: FSNAU.
Note: Data for Somaliland are available only since 1998.

Figure 6.12: Production of Sesame in Somalia, 1961–2017



Source: FAOSTAT data are based on national accounts through 1988. Figures for 2016 and 2017 were estimated for the Drought Impact Needs Assessment (FGS 2017a).

The export value of oil seeds from Somalia was $81.2 million in 2014, according to UN COMTRADE data based on partner country imports.[74] Annual exports averaged about $40 million in 2011–14, 10–20 times higher than the $1.8 million recorded in the late 1980s and the $4.2 million recorded in the early 1990s. Exports of $34.3 in 2015 appear to have fallen by almost 58 percent from the previous year and by about 14 percent compared with the previous four-year average.

There are several sesame exporters in Mogadishu. The main markets are India, Turkey, Jordan, and Saudi Arabia. The most important exporter, with about 11,000 tons exported in 2014, is Al-Mizan, which has also entered other markets, including the Netherlands, India, China, Israel, Iraq, Iran, Germany, and the United Kingdom. Other exporters include the Moumim Group, Horn of Africa Trading, and Danwadaag.

6.2.3 Banana Production and Exports

Somalia used to be the largest banana exporter in East Africa. Its main export markets were Italy (to which exports began in 1927) and Middle Eastern countries. Its bananas were highly prized for their taste; they also benefited from preferential access to the Italian market.

In 1990, on the eve of the overthrow of the Siad Barre regime, bananas were the largest export crop (with exports of $34.5 million a year). The subsector was the largest employer in Somalia, directly or indirectly supporting about 120,000 jobs. There were 141 farms in the Somalfruit supply network, ranging in size from 40 to 300 hectares. These farms also produced grapefruit, watermelon, citrus, and other food crops for local consumption, increasing the country's food security.

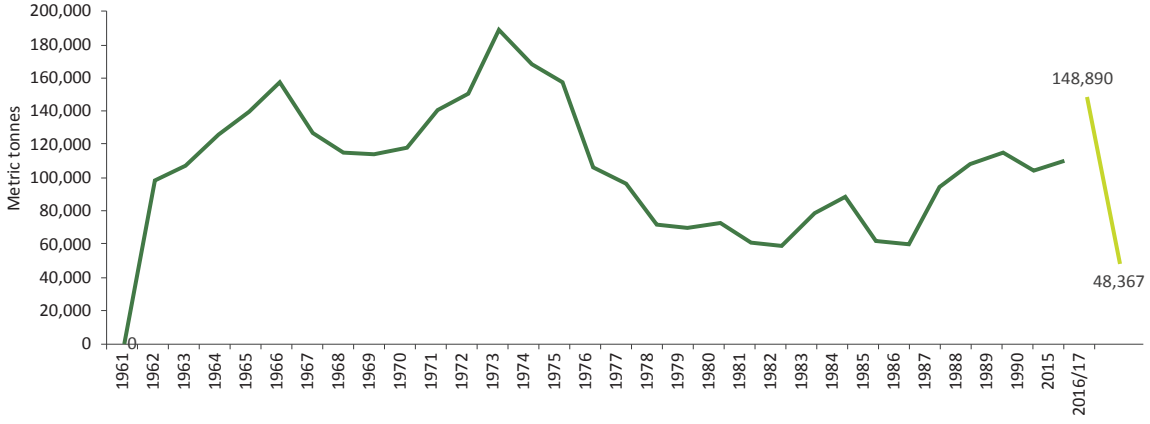
The size of the area cultivated with bananas (and associated fruits, such as grapefruit and watermelon) is believed to have remained about the same between the early 1970s and the late 1980s, at about 9,000 hectares. Sixty percent was located in the Lower Shabelle region and 10 percent was located in the Middle Shabelle regions, mostly under gravity irrigation; 20 percent was located in the Lower Juba, under pump irrigation. Both the Lower Juba and the Shabelle regions had good alluvial soils, reasonably developed irrigation, drainage and flood control systems, and road infrastructure that linked them to the ports of Kismayo and Mogadishu, respectively. The export competitiveness of these fruits was facilitated by these ports' location along major trade routes to the Gulf and beyond.

Production was vertically integrated and carried out by both medium-size and large private farms that supplied their output to (and were supported technically and financially by) Somalfruit, a joint marketing company co-owned by the government but controlled by Italian and Saudi investors; plantation owners and the government held minority shares in the company. Average yields were about 25–30 tons per hectare, significantly lower than the more than 40 tons per hectare achieved in other countries. Limited areas of ideal soils, strong winds, high evapotranspiration rates, and flooding were some of the factors responsible for these lower yields. Exports of Somali bananas and minor quantities of other fruits peaked in 1990 at about $34.5 million (the 1986–90 annual average was about $28.2 million).

Prewar statistical estimates of production from FAOSTAT and the Somalia National Accounts are inconsistent and implausible (figure 6.13). They show a major decline in production between the early 1970s (peaking at 188,500 tons in 1972) and the late 1980s (peaking at 115,200 tons in 1989), when banana exports were managed by Somalfruit, with an efficient and vertically integrated outgrowers' network, and total output is believed to peaked. The implicit annual yields (official production estimates divided by the known area under cultivation) of about 20 tons per hectare in the early 1970s and about 12 tons per hectare in the late 1980s are well below the range of 35–45 tons per hectare sector experts and banana farmers believe was the average before the war. Although the prewar official figures include banana exports, they most likely excluded much and possibly all of the crop marketed to domestic consumers in some years. The prewar time series thus suffer from both chronic underreporting of total crop production and from inconsistency in the extent of such underreporting. A more realistic, albeit very rough, point estimate of annual banana production in the late 1980s is about 360,000 tons, of which about a third was exported.[75] In earlier years, when banana exports were managed by state agencies, production was probably considerably lower.

The first and most destructive phase of the civil war, in the early 1990s, hit the banana subsector very hard. Between 1994 and 1998, there was a modest rebound in banana production and exports, with annual output reaching about 80,000 tons, with a value of about $14.5 million in 1997, of which 65 percent was exported to Gulf countries (SWALIM and FAO 2007d). Banana exports ceased completely in 1999, as a result of El-Niño floods and the loss of preferential access to European markets, among other factors. They resumed after 2008, with small test shipments through containers to some Gulf

Figure 6.13: Production of Bananas in Somalia, 1961–90 and 2015–16/17



Source: Data for 1977–88 are from Somalia National Accounts; data for 1961–76 and 1989–90 are from FAOSTAT data. FAOSTAT estimates for 1991–2014 are not shown, because they are inconsistent and unreliable. Data for 2015–17 are from the Drought Impact Needs Assessment (FGS 2017a).

countries. Customs-based statistics from partner countries show export values of $148,000 in 2014 and $571,000 in 2015, but virtually all such shipments were rejected by buyers because of unsatisfactory quality, and Somali exporters were almost never paid for them.[76]

Based on local expert knowledge and remote sensing, the area under banana cultivation in the regions along the two major rivers in the years just before the recent drought was estimated at about 2,135 hectares. Annual average yields are believed to be 74 tons per hectare in the Lower Shabelle and 50 tons per hectare in the Juba valley. These yields compare well with those of Indian states (in the 18-85 ton per hectare range), where bananas are also mainly for domestic consumption.[77] Based on these two data points, the recent predrought production level was estimated at 148,890 tons, almost 72 percent of which was grown in the Lower Shabelle region, on about 1,535 hectares (Somalia 2018) (see figure 6.13). The much lower level of 48,367 tons shown in figure 6.13 for 2016/17 reflects the negative impact of the drought during the *Deyr* 2016 and *Gu* 2017 seasons and the drying of the Shabelle River between the two seasons. Given the data challenges, however, and the uncertainty over the robustness of even the most recent estimates, further investigation and assessments (with both remote sensing and field surveys) are required to estimate banana production.

Some of the old commercial plantations have ceased production; others have switched to other fruits, such as lemon, or other crops. Production on these farms is inefficient, because they are occupied by people from different parts of the country who lack infrastructure, machinery, and knowledge of irrigation and plant management.

Despite many challenges, growing bananas for domestic consumption is very profitable in southern Somalia. New investment in banana cultivation has occurred on land that was previously forested or devoted to other crops. The smaller number of farmers on the much smaller area of land currently under banana cultivation have shown remarkable capacity to adapt and to address both the security challenges and the infrastructural challenges that have weighed on the entire agricultural sector for the last three decades. That they have been producing about 41 percent of the prewar output on only 24 percent of the prewar land cultivated with banana is indeed a powerful indication of their resilience (at least until the recent drought) and improved productive efficiency.

6.2.4 Expansion of Other Horticulture

Before 1990, producers in the Lower Jubba and Middle Shabelle refined sugarcane and processed cotton for the domestic market (box 6.1). Other enterprises included a tomato paste factory and a seed multiplication and processing industry in Afgoi in the Lower Shabelle, a grain flour mill factory in Mogadishu, and the frankincense and myrrh export monopoly in Somaliland and Puntland. All of these enterprises were majority state owned and, except for the banana export company (Somalfruit), state controlled or managed.

There are few studies and limited quantitative information on horticulture production, but anecdotal observations suggest rapidly growing production in southern Somalia, in the northwestern region of Somaliland, and on oasis farms even in Puntland. Most of these enterprises serve the domestic market, which is much larger than it was before the war. Nationwide estimates of the output of the main three vegetables (watermelon, tomato, and onion) just before the recent drought are much higher than at any time in the dozen years before the war.[78] Output of grapefruit and lemon/limes is 89 percent of that recorded at its peak in 1988 (table 6.2). No historical comparison is possible for other produce, because of lack disaggregated data before the war.

Box 6.1: Thriving Processing of Sugarcane and Cotton in Somalia before the War

Sugarcane

In 1920, Società Agricola Italo-Somala (SAIS) built a sugarcane plantation and annexed a processing factory in Jowhar, in the Middle Shabelle. In 1950, the sugar factory's output reached 4,000 tons, enough to meet about 80 percent of domestic demand. By 1957, production reached 11,000 tons. Following Somali independence, in 1960, the government took a controlling interest in the estate and formed a new company to operate the scheme, Società Nazionale Agricola Industriale (SNAI). In 1963, a major sugar production expansion program started in both the field and the factory with the object of making Somalia self-sufficient in sugar. Cropped area increased from 4,000 hectares in 1963 to more than 14,000 hectares in 1967. A new factory was built in 1965, with annual capacity of 40,000 tons, replacing the old factory, which had a capacity of 12,000 tons.

The sugar price increase in 1974 prompted mobilization of resources from various international donors and technical expertise from the United Kingdom to clear new land for sugarcane plantation and build a second sugar processing factory in the Lower Juba. When the project design was approved, in 1975, $188 million was allocated (Worrall 1980). State-of-the-art technologies, such as overhead and drip irrigation systems, were installed, and precision-guided equipment for land preparation was used. The plant was built by a British engineering firm (Wimpey and Mowlem) and managed by another British company (Booker Agriculture International Ltd., which has sugar projects all over the world. Intensive training on sugar production and processing was conducted for local staff. The project also paved new roads, constructed housing facilities, and created employment opportunities for large sections of the community.

All sugarcane production and processing infrastructure as well the farm machineries in Mareerey and Jowhar were looted during the civil war. No sugarcane production takes place in Somalia, and neither the private sector nor donor agencies have shown interest in reviving this sector. Unlike bananas, the sugarcane sector requires huge investment. Even if it could make such investment, Somalia would probably not be able to compete with Brazil.

Cotton

Cotton production and processing began in 1920. Investment in cotton bore fewer long-term results than investment in bananas or sugarcane.

Cotton showed some promise through the late 1920s, but its price fell following the collapse in the world market. The nearly 1,400 tons in exports by 1929 shrank to about 400 tons by 1937. During the Italian trusteeship period, there were years of modest success. In 1952, for example, about 1,000 tons of cotton were exported. Growth was consistent, however. In 1953, for example, exports dropped by two-thirds. An unstable world market and the scarcity of Somali wage laborers available for cotton harvesting doomed cotton as an export crop. To deal with labor scarcity, Italian traders worked out co-participation contracts with Somali farmers; the Italians received sole purchasing rights to the crop in return for providing seed, cash advances, and technical support.

Somalia's two cotton factories continued operations after independence, reaching production levels of about 15 million yards of cloth annually and employing 3,000 workers. In 1972, after the nationalization of all agro-processing industries, the Siad Barre regime introduced a mandatory system for all students in Somalia that boosted the outputs and profits of these two factories. Elementary and high school students as well as military personnel had to wear locally sewn uniforms from cloth materials produced by local cotton factories. Given the ideal climate for cotton plantations in Balad, after their upgrade and expansion in the early 1970s, the state-owned textile plants (Balad Textile Factory and Somalitex) were able to supply virtually the entire domestic market. Somalitex in the 1970s was considered among the best-equipped textile plants in Africa. Most shops stocked the traditional Somali sarong-like garments (futas).

After the start of the civil war, the plants were looted, and both cotton production and related cotton processing came to a stop. Today, there is no interest in reviving the sector. Small-scale farmers in Balad have reclaimed the land that was once used for growing cotton for the production of maize, sesame, and vegetable crops. The few machines that remain at the looted cotton factory in Balad are too old and damaged to operate.

Source: Hussein (2017).

Domestic demand for higher-value agricultural products, such as fruits and vegetables, is high and expected to grow substantially thanks to population growth, urbanization, and improvement in standards of living. Somaliland is estimated to import 61,000–95,000 tons of fruits and vegetables annually from Ethiopia alone, with about the same volumes sourced from southern Somalia (USAID 2014). Southern Somalia exports dry lemons to Gulf countries (the quantities are not known). In Somaliland, Borama and, to a lesser extent, Allaybade have favorable climate for vegetable and fruit production and are located close to Djibouti, which has high demand for fruit and vegetables. This export opportunity is not being seized, with only small quantities of watermelons sold to Djibouti traders (FAO 2016c). There are, nonetheless, various promising starts of new horticulture crops and processing ventures, as well as, strong growth prospects in this subsector (box 6.2).

6.3 Prices, Marketing, and the Impact of the Recent Drought

6.3.1 Sorghum and Maize Prices and Marketing

The Lower Shabelle and Bay regions account for 70 percent of maize and sorghum production in Southern Somalia. Baidoa (Bay region) is the main sorghum-trading hub in Somalia (ILO 2013). Maize markets are located in the Shabelle Valley, the Juba Valley, and along the coast (Jowhar, W. Wayne, Buale, Mogadishu, Qorioley, Merca, Kismayo, Jamaame, and Jilib). Price transmission across the country is high, paralleling the high degree of market integration.

Seasonal price variability is high for both sorghum and maize. The production of cereals remains acutely sensitive to seasonal fluctuations and weather patterns (more so for sorghum than for maize). Because there are few modern grain storage facilities in Somalia, between the two harvest seasons the supply of grains is not able to meet the demand and prices spike. After the harvests, the market is flooded with local grains and prices drop.

Table 6.2: Gross Production of Vegetables and Fruits by Somalia, 1977–2017

	1977-80	1981-84	1985	1986	1987	1988	2015 (Pre-Drought) \a	2016-17 (Drought) \a
Vegetables\b	26,600	30,100	40,800	48,300	52,500	54,600	97,025	15,632
Watermelon							30,000	7,904
Tomatoes							59,023	7,143
Onions							8,002	585
Other							-	-
Grapefruit and Lime	9,650	10,275	10,900	13,100	27,300	34,600	30,648	14,376
Banana\c	68,500	72,200	60,000	93,900	108,000	115,200	148,890	48,367
Other Fruits\d	88,250	96,750	100,000	113,000	125,400	135,000	14,767	3,425
Papaya							8,000	3,025
Dates							6,767	400
Other							-	-
Total Horticulture Production	**193,000**	**209,325**	**211,700**	**268,300**	**313,200**	**339,400**	**291,330**	**81,800**

Source: Central Statistical Department, Ministry of Planning, Somalia 1989 and Drought Impact Needs Assessment (FGS 2017a).
Notes:
\a The 2015 and 2016–17 figures are point estimates agreed upon by federal and state governments, the FAO, and the World Bank for the Drought Impact Needs Assessment (Somalia 2018). The 2016–17 figures refer only to the drought period of October 2016–September 2017.
\b The vegetable estimate in the 1977–88 national accounts is an aggregate that includes watermelon, tomatoes, onions, carrots, and other vegetables. The total for 2015–17 covers only watermelon, tomatoes, and onions.
\c The estimate for bananas for 1977–88 is the same in the national accounts and in FAOSTAT, but both figures are probably underreported.
\d The estimate for other fruits in the 1977–88 national accounts is an aggregate that includes mangoes, papaya, coconuts, dates, guava, oranges, and other fruits.

Box 6.2: Promising New Crops and Processing Ventures for Somalia

Since the reestablishment of peace and security in the northern regions in the 1990s and the abatement of the civil war in the Southern regions in the early 2000s, various new agro-processing industries have emerged. The major ones are the sesame and dry lemon industries in Mogadishu, which have seen thriving production, processing, and export in recent years. Others include two fruit juice processing and packaging plants in Somaliland, a locally owned plant in Hargeisa that extracts juice from guavas purchased from southern Somalia, and a foreign-owned company in Burao. A food grain processing company (Blue Flag) started operations in Mogadishu with an investment of more than $5 million and a processing capacity of 22,000 tons a year. Nearby, a new seed-processing facility (owned by Filsan Inc.) was established, with the aim of producing good-quality seeds. It has a capacity of 500 kilograms an hour (see table H.2 in appendix H).

Lemon production has increased to the point that (processed) dry lemons are now exported. Foreign demand well outpaces Somalia's still limited production, suggesting room for growth. No information is available on the total area under lemon production in Somalia, but the SATG estimates annual domestic and export revenues from lemons at $200 million in 2014. Most processors are in Mogadishu, because the city offers proximity to both growers in the Shabelle basin and port facilities.

There are about 300 sesame oil microprocessors in Mogadishu alone, but they operate with old machines that can produce just 100 liters of oil a day (UNDP and SATG 2016b), and the machines' filtering system does not produce high-quality oil. There appears to be a missed opportunity for the private sector to invest in high-quality sorting/cleaning machines with high processing capacity to satisfy market needs. Doing so would help increase oil production capacity for local consumption and exports while lowering maintenance costs.

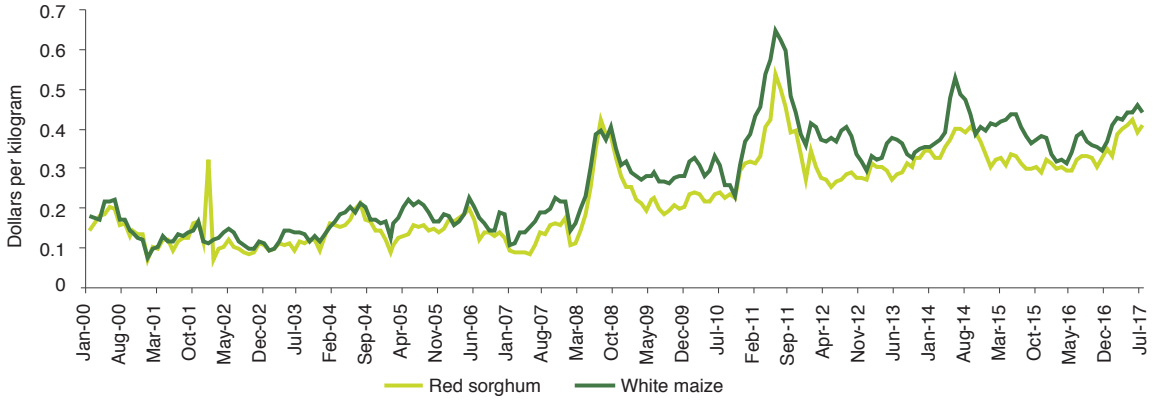
Most processed crop exports are shipped to Dubai for further processing, repackaging, and resale under different trade names (sesame exports are also shipped to India). As of mid-2016, all crop-processing companies were planning to increase production, most by more than 20 percent in the short term, according to a survey conducted for this report [see appendix H]). Some donors, including USAID and DFID, are supporting their expansion potential. USAID is helping 25 crop companies expand their production. The major constraints to operations and expansion, according to the companies, are lack of credit (mainly because of the lack of commercial banks), limited technical knowledge, poor storage and transport infrastructure, thin markets, and a very weak enabling environment with regard to both security and government policies and regulations. Addressing these constraints is crucial to unlocking the potential of both old and new crop-processing opportunities in Somalia.

Source: Hussein (2017).

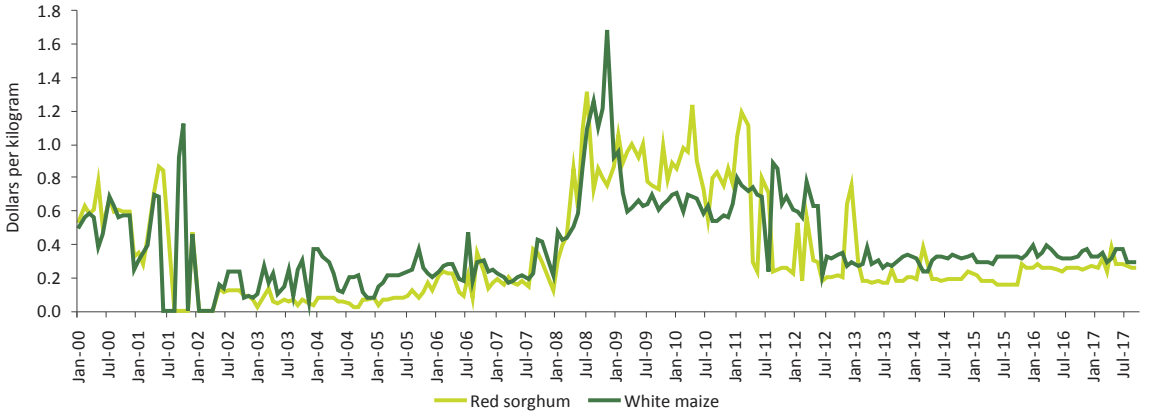
Prices fluctuate widely (figures 6.14). In 2008, for instance, cereal prices in U.S. dollars rose dramatically in both the Southern and the northern regions. They more than doubled in Southern Somalia and rose more than threefold in Somaliland. After a couple of years of relative price stability in Southern Somalia, prices increased again in 2011 (following the 2009–10 drought). Prices have fluctuated widely ever since. In anticipation of reduced crop production as a result of the drought, prices started rising again at the start of the *Gu* 2016 season, with a small dip at the *Gu* 2017 harvest time. In Somaliland, prices fluctuated until 2013.

Figure 6.14: Cereal Prices in Southern Somalia and Somaliland, 2000–17

a. Southern Somalia



b. Somaliland



Source: FSNAU.

6.3.2 Sesame Prices and Marketing

Sesame prices are highly dependent on the international market, and sesame production is highly responsive to market prices. International prices increased continuously between 2005 and 2013, reaching a peak of $1,700 per ton in 2013. In 2013, the estimated production cost was $0.60 per kilogram and the farm-gate price was $1.51 (UNDP and SATG 2016b).

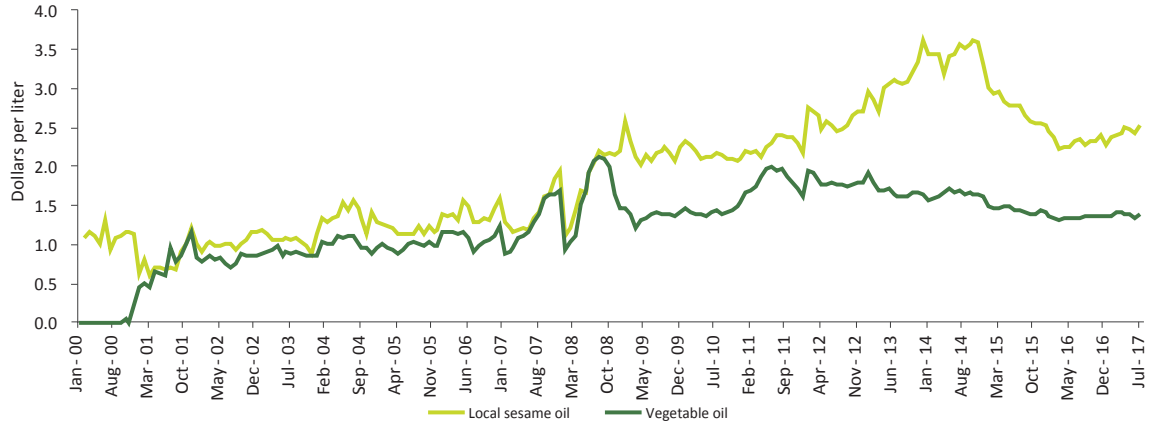
Between 2005 and 2013, sesame production in Somalia tripled, from 20,000 tons to 60,000 tons. Subsequent price declines resulted in a significant reduction of production. The average farm-gate price dropped to $0.70 in 2015.

Local buying and selling prices are highly correlated with market prices (table 6.3). Prices of sesame seeds in Somalia also vary according to their quality (the fullness of the grain), which is determined by the availability of water during the germination period.

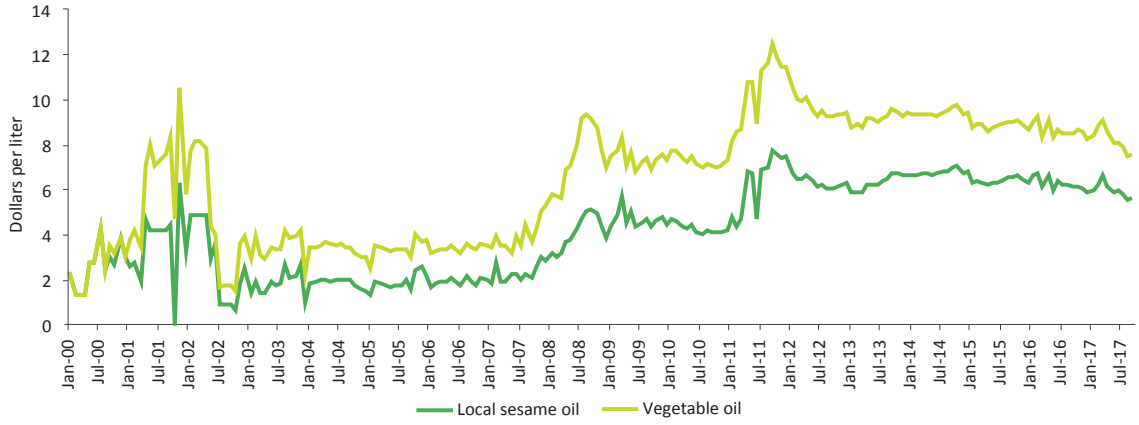
Three main factors determine the price of sesame oil in Somalia: market demand, the cost of the seed, and processing costs. Until 2008, prices for local sesame oil closely tracked those of imported vegetable oil (figure 6.15). In 2008 and again in 2011, the sharp increases in world prices for sesame seeds resulted in corresponding increases in the price and volumes exported of local sesame and reduced the availability of seed for local sesame

Figure 6.15: Prices of Sesame and Vegetable Oil in Southern Somalia and Somaliland, 2000–17

a. Southern Somalia



b. Somaliland



Source: FSNAU database.

Table 6.3: World Price and Wholesale Prices of Sesame in Middle Shabelle, 2011–15

Year	World price (dollars per ton)	Wholesale price in Middle Shabelle (dollars per kilogram)	
		Purchase price	Selling price
2011	1,000	1	2
2012	1,200	1	2
2013	1,700	1	2
2014	1,550	1	1
2015	-	1	1

Source: UNDP and SATG 2016b.
Note: — Not available.

oil production. As a result, the price of local sesame oil in Southern Somalia reached almost $3.63 a liter in 2014, $2 above the price of imported vegetable oil. Only after the 2014–15 world (and local) price declines did the price of sesame oil fall back. The new price of about $2.22 was still almost 71 percent higher than imported vegetable oil. The effect of the drought on local seeds supply caused sesame oil prices to rise again at the start of the *Gu* 2016 season. By the end of the *Gu* 2017 season, the price reached $2.53 a liter.

6.3.3 Impact of the 2016/17 Drought on Crops (Source: Somalia 2018)

Following a very severe drought spell in the northern regions during 2015 and three seasons of below-average rains in the Southern regions, the drought reached its peak during the *Deyr* (October–December) 2016 growing season and persisted through March 2017. On top of much reduced river flows, it caused major damage and losses to both rainfed and irrigated crops, especially shallow-rooted banana.[79] Even during the 2017 *Gu* (April–June) growing season, many parts of the country received below-average, sporadic, and scattered rainfall. In contrast, the northwestern regions of Somaliland received almost normal rains and thus experienced growth of both pasture and crop production following very poor performance in 2015.

The drought caused substantial damage. About $11 million in damages to the irrigation canals has been attributed to the drought in the Shabelle and Juba valleys, as thirsty and desperate livestock climbed over canal walls and nearby soil and sand was blown into the canal beds. The cumulative deterioration of the irrigation system since 1990 has meant that a large proportion of the previously irrigated land is now rainfed, with much lower yields and thus substantial production losses. Most banana trees along the drying Shabelle River could not survive the lack of water. Damage to these trees is estimated at $53 million. Total drought-related damage is thus estimated at $64 million.

The greatest economic impact of the drought has been production losses arising from both reduced land area under cultivation and greatly reduced yields at harvest. The drought had the greatest impact on rainfed staple food crops (mainly sorghum, cowpeas, and some rainfed sesame) in the inter-riverine regions of Bay and Bokool, which suffered from lack of rains in multiple seasons, starting in early 2016, and on irrigated crops in the Shabelle valley regions (mainly maize, most sesame, and rice, bananas, and tomatoes, among other crops), which suffered from the double whammy of lack of rains and a drying river.

Including the less affected northwestern regions, volume losses are estimated at 83 percent for sesame, 59 percent for cowpeas, 50 percent for sorghum, and 34 percent for maize. Physical losses of more than 90 percent for at least one of these four major staple food crops were experienced by the Middle Shabelle, Gedo, Mudug, Middle Juba, and Hiraan regions. In the rainfed inter-riverine regions of Bay and Bokool, losses were as high as 84 percent for sesame, 73 percent for sorghum, and 52 percent for maize. The regions along the Shabelle experienced losses for these three crops of 36–80 percent.

The monetary loss of output for the four main staple food crops has been estimated at $71 million: $35 million for maize and sorghum combined, $28 million for sesame, and $9 million for cowpeas (see table 1 of the Overview to this report). The Bay and Lower Shabelle regions experienced the largest absolute monetary losses, at $23 million each (a 74 percent decline from the baseline in the Bay region and a 54 percent decline in the Lower Shabelle). As a result of earlier drought conditions, farmers in the northwestern and Southern regions had already incurred substantial monetary losses.

Physical and monetary losses were also very large for other crops, including fruits, vegetables, and frankincense. For fruits, physical output losses range from 48 percent for lemons to 94 percent for dates;

banana production fell 68 percent. For vegetables, losses are 88–93 percent. Rice, which is grown only around Jowhar, in the Middle Shabelle region, recorded a loss of 60 percent through mid-2017. The loss for frankincense, grown in the Bari and Sanaag regions, is estimated at 17 percent.

These losses total $176.5 million, equivalent to 57 percent of the estimated baseline production value for these other crops (table 6.4). In percentage terms, the regions most affected are in the northeast and central zones, with Nugaal and Galguduud recording 93 percent losses, Mudug 78 percent, and Bay 75 percent. Losses in the Lower and Middle Shabelle regions were 74 percent and 68 percent, respectively. In the Juba valley, losses were smaller but still substantial, ranging from 30 percent in the Gedo region to 54 percent in the Middle Juba region. **In absolute terms, the region most affected was the Lower Shabelle, which recorded a $94.6 million loss, almost half of it from bananas and the rest from other fruits and vegetables.** The northeastern

Table 6.4: Estimated Damages and Losses to Crops from the 2016/17 Drought

Damages and Losses	Baseline Asset/ Production Values	Public Damages & Losses		Private Damages & Losses		Total Damages & Losses	
	US$, Million	US$, Million	Percent (of Baseline)	US$, Million	Percent (of Baseline)	US$, Million	Percent (of Baseline)
Damages to Irrigation Infrastracture	109.0	10.9	10%			10.9	10%
Damages to Banana Trees	85.4			52.9	62%	52.9	62%
Losses for Sorghum	47.6			22.1	46%	22.1	46%
Losses for Maize	35.4			12.4	35%	12.4	35%
Losses for Sesame	33.3			27.5	83%	27.5	83%
Losses for Cowpeas	15.4			9.2	59%	9.2	59%
Losses for Rice	3.0			1.8	60%	1.8	60%
Losses for Legumes	0.6			0.4	62%	0.4	62%
Losses for Banana	82.3			55.4	67%	55.4	67%
Losses for Lemon	6.0			2.9	49%	2.9	49%
Losses for Grapefruit	19.7			10.8	55%	10.8	55%
Losses for Papaya	23.1			14.5	63%	14.5	63%
Losses for Watermelon	31.5			23.7	75%	23.7	75%
Losses for Dates	12.2			11.4	94%	11.4	94%
Losses for Tomatoes	41.0			36.7	89%	36.7	89%
Losses for Onions	4.6			4.2	93%	4.2	93%
Losses for Frankincense (Boswellia)	87.6			14.6	17%	14.6	17%
Total Damages and Losses	**637.7**	**10.9**	**2%**	**300.5**	**47%**	**311.4**	**49%**
of which: Total Damages	194.4	10.9	6%	52.9	27%	63.8	33%
of which: Total losses	443.3	-		247.7	56%	247.7	56%
of which: Main staple Food Losses	131.7	-		71.2	54%	71.2	54%
of which: Other Crop Losses	311.6	-		176.5	57%	176.5	57%
of which: Fruits, except Bananas	92.5	-		63.4	69%	63.4	69%
of which: Vegetables	45.6	-		40.9	90%	40.9	90%

Source: Somalia 2018.

Bari region came a distant second, with a $23.8 million loss, which reflects heavy losses of dates and vegetables and small losses of frankincense. The Middle Shabelle and the Middle Juba also suffered large absolute losses, of $14.1 million and 11.8 million, respectively. The northcentral region of Sanaag lost $8.8 million, all of it in frankincense production. The inter-riverine southern region of Bay recorded a $7.6 million loss.

The severe economic impact of the drought on Somalia's crop subsector—its second-most important source of economic activity, employment, and exports—has been unprecedented. Aggregate production losses are estimated at $176.5, and total damages to assets are estimated at $63.8 million, representing almost 4 percent of the country's 2016 nominal GDP (estimated at $6.2 billion by the IMF and the World Bank).

As a result of the drought, by early 2017, more than 1.6 million people had exhausted their cereal stocks and become heavily dependent on markets (with cash purchases funded with remittances) and international aid for food. Many rural people left their homes in search of alternative sources of food and water; between November 2016 and mid-2017, about 444,000 people were internally displaced. The drying of the Shabelle River during December 2016–March 2017 also caused a major displacement of riverine farming communities. Female-headed small-scale farming households were hardest hit by the drought.

Intensification of conflict over agricultural land, pasture, and water resources among agro-pastoralists who remained on their lands, people returning after months of displacement, and others has been recorded. Most farmers fleeing irrigated areas are expected to return to their fields once river flows return to normal. In contrast, many farmers under rainfed conditions may seek new employment opportunities in urban areas, where it is easier to access both aid and remittances.

6.4 Growth Opportunities and Prospects for Crops

6.4.1 Opportunities and Prospects for Irrigated Crops

Despite the heavy losses from the recent drought and the many challenges the subsector faces, crops remains both viable and critical to economic recovery and long-term development. Somalia still has large and partly unexploited areas with fertile alluvial soils for staple cereals, oil seeds, legumes, and horticulture crops that can support both more efficient production and expanded cultivated area for both domestic and export markets. Widespread adoption of climate-smart agricultural practices would increase both resilience and growth for key rainfed crops, for which both yields and total area under cultivation could be doubled or even tripled, as discussed above.

The trend in staple food crop production, imports, and food aid as well as the collapse in banana production and exports should ring a loud alarm bell to governments and their international development partners that it is time to take urgent measures to revive both subsectors. Somalia has much room for expanded production of irrigated cereals, oilseeds, and fruits and vegetables, despite the institutional, human resource, environmental, and climate change challenges discussed in chapters 3 and 4. For farmers to place more land under cultivation and increase productivity, improvements to the country's flood control and irrigation infrastructure, seed quality, pest management, and related good agricultural practices are needed. All such improvements require stronger security in rural areas of southern Somalia, supportive and efficient public institutions, and engaged international development partners.

In Southern Somalia, the high-potential cultivable area under irrigation was estimated in 2012, through remote-sensing methods, at 591,325 hectares (figure 6.5). Most of this land is in the Shabelle River basin (475,620 hectares), but some

of it is in the Juba River basin (115,075 hectares) (SWALIM and FAO 2012c).[80] This estimate of the high-potential cultivable area under irrigation is 5.3 times the currently irrigated area in the Shabelle and Juba basins (110,800 hectares) and 2.6 times the prewar irrigated area (222,950 hectares).[81] Less than a fifth of this high-potential area is cultivated, because much of the flood control, irrigation, and transport infrastructure is either not functioning or in a very poor state, as a result of direct damage inflicted during the civil war or lack of security.[82]

Despite the postwar collapse of irrigation infrastructure, 70 percent of the country's national cereal production still takes place in the Shabelle and Juba River basins, mainly by small-scale farmers (Basnyat 2007). Recession flood agriculture is totally dependent upon flooding patterns and often leads to the destruction of crops by unexpected additional flooding arising from breakage and failure levels. It offers huge opportunities, however, because it is a low-cost, low-input system that is less sensitive than an irrigation system to security risks.

Maize production, mainly for human consumption but eventually also for livestock feed, could easily recover its prewar levels (of about 350,000 tons a year), if land under cultivation and its productivity were expanded through improvements in flood control and irrigation infrastructure, use of improved varieties, and good agricultural and water management practices. Experience from ongoing FAO projects has already demonstrated that maize crop yields can be improved by 50–100 percent with emergency interventions solely focused on inputs (improved seeds, more hours of irrigation, mechanized labor, and training on good agricultural practices). Maize quality would also benefit from better postharvest management practices, such as improved drying conditions, storage facilities, and pest control. The FAO pilot project "Support to Somali Farmers: Achieving Quality Farm Produce for Better Market Access" increased yields and quality so much that beneficiary small-scale farmers were able to sell 200 tons of their maize to the World Food Programme. It should be scaled up and replicated.

The sesame subsector also has a high potential for increased production (of seeds) and value addition. Somalia could increase production of sesame oil for domestic human consumption; produce more sesame cakes, which are added to poultry and animal feed mixes; and begin exporting both. Doing so requires investments in four main areas:

Table 6.5: Area under Irrigation in the Shabelle and Juba River Basins (Hectares)

River basin	Irrigated/flood-recession areas		Area irrigated over a four-year period, including half of fallow fields
	Prewar	Current	
Shabelle			
Lower Shabelle			321,495
Middle Shabelle			73,028
Upper Shabelle (Hiran)			81,097
Subtotal			475,620
Juba			
Lower Juba			41,897
Middle Juba			32,424
Upper Juba (Gedo, Bay, Bakool)			41,384
Subtotal			115,705
TOTAL	**135,855**	**135,855**	**591,325**

Source: SWALIM and FAO 2012c.

- public investment in quality control measures for certified seeds and other farming supplies
- public investment in the collection and dissemination of information on market prices
- public investment in extension services, especially in support of small-scale trading and oil-processing cooperatives traditionally dominated by women
- private investments in small and medium-size oil-processing units and in storage and packaging facilities.

As peace and security have slowly returned to more and more areas along the two main rivers in Southern Somalia, the revival of banana production has been picking up, albeit modestly, without any (or with minimal) direct or indirect government and external support. The potential for expanded banana production remains large, because the sector can rely on several strengths: technical know-how among local farmers, including returning internally displaced people; good soil and water quality; the need for only minimum supplementary fertilizer; and highly disease-resistant trees. Unlike before the civil war, when bananas were shipped from the riverine areas to towns all over the country, bananas have become a luxury item for most domestic consumers, because of poor roads and storage facilities, which result in much spoilage and high prices far from producing areas. The potential for expansion just to meet domestic demand therefore remains large. It could be realized by building reliable transport, storage, and logistical networks.

There is also a high potential for the expansion of banana sales to Middle Eastern markets (Baars and Riediger 2007a, 2007b). According to consumer surveys conducted in Iran and the United Arab Emirates, the quality of Somali bananas ranks even with (and their taste is actually preferred to) bananas imported from Central America under major brand names. Moreover, Somalia is much closer to Middle Eastern main ports and can thus provide fresher fruits at lower transport cost.

Expansion of banana production—albeit to levels that are lower than they were before the war—is a realistic and desirable goal. The federal and regional governments, local communities, and donors need to rehabilitate critical public infrastructure. The private sector needs to invest in improved input supplies, packaging cartons, food processing of dried bananas, more efficient shipping, and new boreholes to strengthen resilience to droughts and river drying. Further analysis of the sector's international competitiveness and profitability is required to assess whether further expansion beyond prewar levels and into export markets outside the Middle East is economically and environmentally sound and sustainable.

Other labor-intensive horticulture also has good potential for growth. The realization that it can generate higher revenues and income per unit of land than traditional crops has already drawn considerable interest from Somali investors, including from the diaspora. Recent initiatives include wind and solar installations for pumping water and providing drip irrigation for fruits and vegetables, the processing of tomato paste and ketchup for the domestic market, and the export of grapefruit to Turkey (USAID 2014). Public interventions in support of this subsector's growth and employment potential should focus on improving input supply with certified seeds, establishing a food safety certification system for export, and addressing policy constraints, in addition to improving transport infrastructure and security.

Even in the northern regions, which are much drier but also better connected and more secure than the southern regions, production of irrigated fruit orchards and vegetable farms could double if irrigation infrastructure improved and water management systems were more efficient. Even greater gains could be achieved by adopting improved production techniques, including the replacement of unproductive and old trees with improved cultivars from cloned material, better tree management practices, and intercropping with vegetables.

6.4.2 Opportunities and Prospects for Rainfed Crops

Improved farm management practices could double or even triple the yields of key rainfed crops (such as sorghum, legumes, and pulses), and the total area under cultivation could be substantially enlarged by a factor of at least 1.5, as up to half the land is usually left fallow in most cropping seasons. Even after such improvements, however, yields would be low, implying that rainfed crops will not be able to drive the country's agricultural growth. They still have important roles to play in providing a low-cost subsistence food security net that encourages economic activity rather than dependency on food aid and humanitarian assistance.

Given the high risk associated with rainfed agriculture in general and especially in the Horn of Africa, climate-smart agriculture is essential to increase output and strengthen food security. Widespread adoption of such practices is needed to improve soil fertility management, reduce pests and diseases risks, and adapt to stressed conditions and unpredictable rainfall patterns. Practices include the following:

- appropriate fertilizer application (micro-doses, lime, and so forth)
- use of compost, crop rotation, and diversification (for example, growing different crops and using multiple varieties of the same crop)
- intercropping with nitrogen-fixing legumes
- more efficient rainwater harvesting and runoff management
- selection, conservation, and improvement of local varieties and introduction of new drought- and pest-resistant varieties.

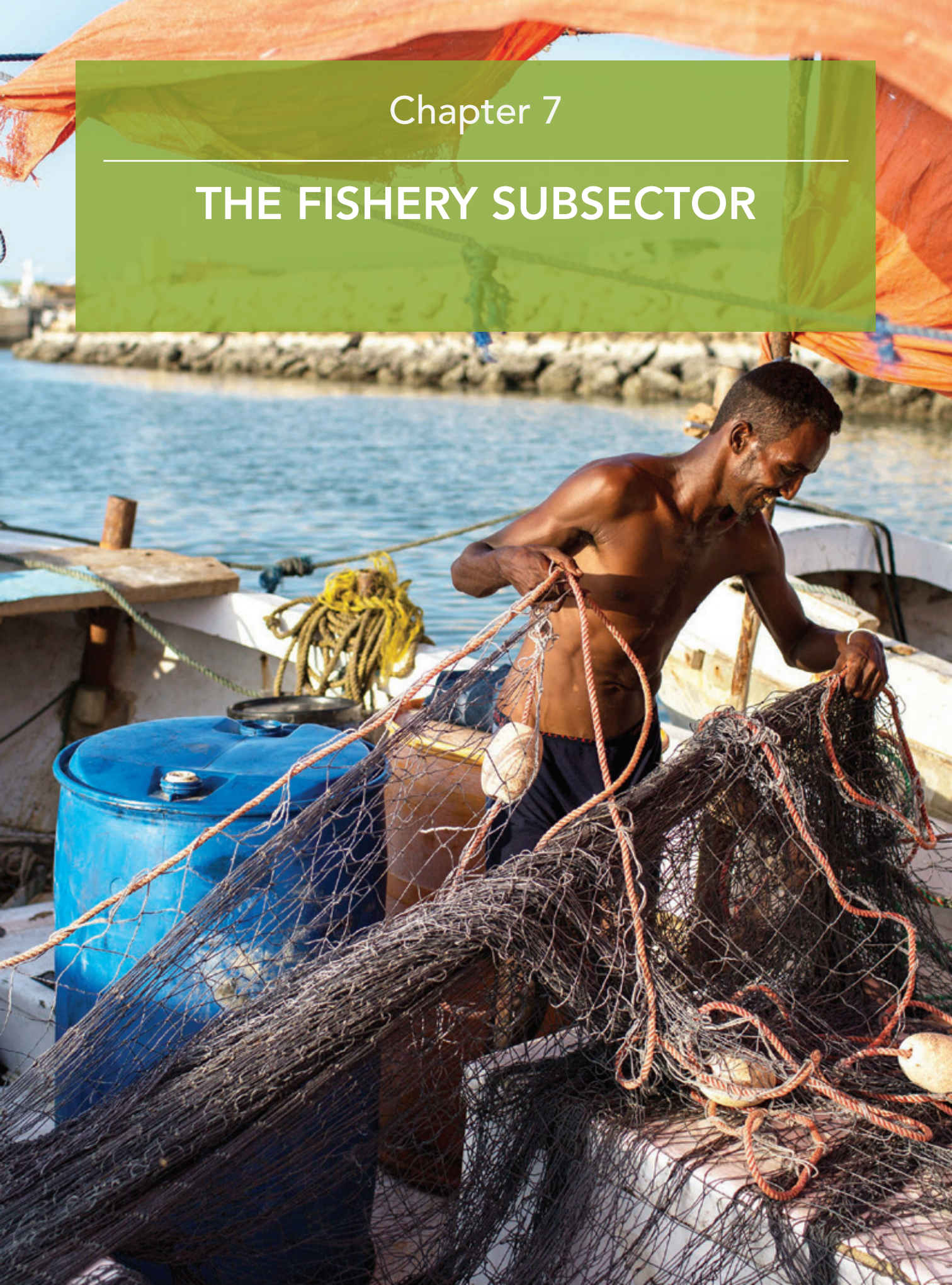
Fodder is a lucrative crop for farmers, under both irrigated and rainfed conditions; there is excess demand at seaports and along the main livestock export trade corridors. Smallholder farmers already switch cultivation of their land between crops and fodder, to reduce their risk and increase their income.

Commercial fodder production has expanded in recent years. Sorghum (and even irrigated maize) is increasingly harvested green as fodder; legumes, pulses, and root crops are also often used for feed. Some fodder production and marketing cooperatives have been established, but private companies have yet to venture into large-scale fodder commercialization, possibly because of poorly developed supply chains.

To boost fodder supply and its quality, public interventions are needed, especially for improving irrigation infrastructure, adopting high-yielding pasture grass varieties, and better managing (invasive plants. Introduction of improved grass varieties (for example, Cenchrus ciliaris) could more than double the productivity of the rangelands.[83]

Chapter 7

THE FISHERY SUBSECTOR



KEY FINDINGS ▶

- Somalia has the longest coastline in Africa (3,330 kilometers) and a large Economic Exclusive Zone (EEZ), but its coastal shelf is narrow, except off the Puntland coast, with limited habitat for demersal (bottom feeder) fish stocks.
- The Somali Large Marine Ecosystem nonetheless supports a wide variety of marine ecosystems and fish, from large pelagic (highly migratory) species (such as tuna) to smaller pelagic fish, crustaceans, and other reef species.
- Fish consumption in Somalia remains one of the lowest in Africa, but increased urbanization and the return of diaspora members with newly acquired preferences have fueled rapid growth in domestic demand for fresh fish. Coastal communities have traditionally relied on fishing for both their food security and their livelihood, exporting fish to Kenya, Tanzania, and the Arabian Peninsula.
- Weak or absent governments and the lack of active fishery management during the past three decades have allowed both artisanal fishing and (legal and illegal) fishing activity by foreign vessels to expand without controls. The result has been serious degradation of the marine and coastal environment.
- Projected increases in sea temperature and sea level will negatively affect coastal fish nesting and fishing grounds and increase the frequency and severity of flooding of low-lying coastal lands, estuaries, deltas, and salt marshes.
- The domestic marine fishery subsector is modest in size, with artisanal fishing carried out mostly by men (about 4,500 full-time and 5,000 part-time, with about 1,300 small vessels), and trading and support activities and (minimal) fish processing carried out by women.
- Knowledge of Somalia's fishery subsector is very limited, because its waters remain uncharted, unsupervised, and unmonitored. No reliable data on fishing activity, landings, stocks, or habitat status have been collected since before the civil war. Since 1980, guesstimates of catches by domestic and foreign vessels have fluctuated but generally increased, to about 194,000 tons by 2013—less than one-fourth the guesstimated annual fishery production potential of about 835,000 tons.
- Reliable assessments of 17 species found that 8 of them were fished unsustainably. They include swordfish, striped marlin, emperors, goatfish, snapper, sharks and rays (which represent as much as 40 percent of the catch of artisanal fisheries), grouper, and grunts.
- Maritime and fisheries' governances are still in their infancy, with provisions for licensing partly defined under the 2014 federal fisheries law and partly under some states' legislation or regulations. The new federal law still lacks important provisions and is of limited value for fisheries management. Revenue sharing between federal and state governments for the licenses recently granted remains to be implemented. Despite stated ambitions, neither the federal nor the state ministries have been transparent about the licenses they have issued, and they do not have the capacity to monitor or control fisheries, especially offshore.
- The main challenges for the subsector are (a) the lack or poor functioning of cold-chain facilities, (b) inadequate fish landing facilities at all major ports, (c) minimal processing ventures, and (d) the lack of or very poor transport links between major urban centers and isolated fishing communities along the coast, many of which remain reliant on trading with Yemeni vessels for their income.
- There is a strong consensus among scientists and fishers alike that considerable potential exists for sustainable expansion of many fisheries within Somali waters, especially of tuna and oceanic tuna-like species. Fish waste could be also utilized in a variety of ways, including for human consumption, livestock feed, and energy generation. Effective management, supervision and monitoring, and public investment and technical assistance plans, including for support to expansion plans by fishers' cooperatives and the private sector, are needed to ensure the sustainability of all fisheries. Two prerequisites for improvement are stock and catch assessments and ecosystem analysis and effective enforcement of existing regulations.

7.1 Overview of Somalia's Fisheries

Fish consumption in Somalia is one of the lowest in Africa, at about 3.1 kilograms per capita in 2009 (Kelleher 2016), although it is rising. Most Somalis are still rooted in their pastoralist tradition and have a strong preference for meat, although even pastoralists use a fish product known as *haneed*, usually mackerel or tuna species hot smoked in a fire pit to give it a shelf life of about three months. Coastal populations have also always eaten fresh fish, but traditional resistance to its consumption among the wider population reflects bad experiences with fish that spoiled quickly for lack of ice and proper handling. In recent decades, increased urbanization and returning diaspora members with newly acquired preferences have fueled rapid growth in domestic demand for fresh fish, albeit from a very low base.

Coastal communities are mostly dependent on fishing, carried out largely by men, and on fish processing, trading, and support activities, carried out by women. Since ancient times, Somali clans along the Indian Ocean coast have exported fish products to Kenya and Tanzania on sailing dhows, following the northeast monsoon. Returning during the southwest monsoon later in the year, these vessels used to bring back various other goods, supporting a valuable two-way trade and a second round of fish buying, this time to the Arabian Peninsula.

Many of these vessels were lost in the early 1980s, when their movement placed them in the Shatt-Al-Arab waterway at the outbreak of war between Iraq and Iran. Direct state control of fishing assets and activities and tight regulatory and foreign exchange restrictions on private investment and trading activities by the Siad Barre regime during its initial socialist phase deprived coastal communities of their livelihood and rendered them among the most food insecure.

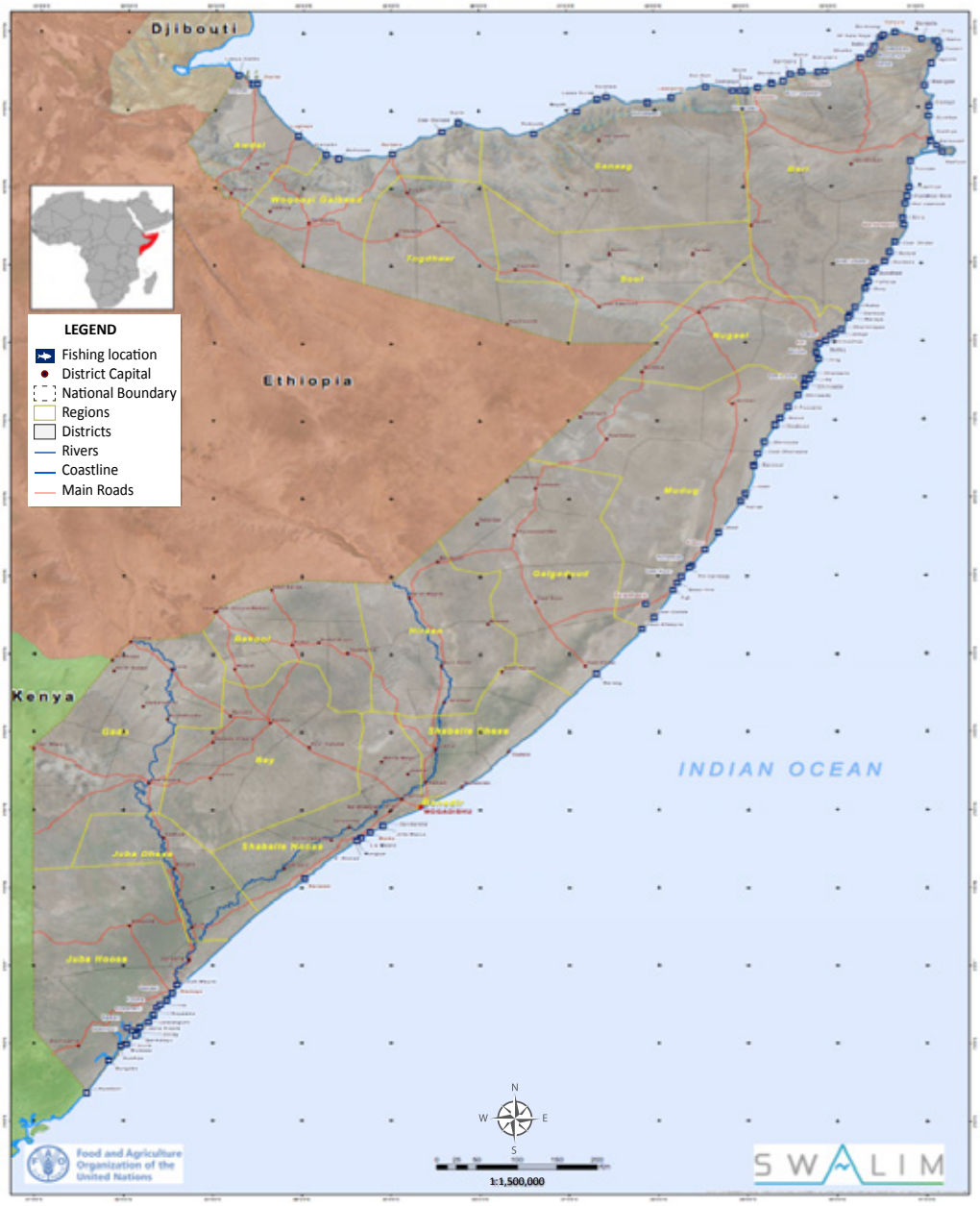
Since the start of the civil war, commercial fishing in Somali waters has been carried out mostly by foreigners, with little economic benefits for Somalia, mostly limited to revenues from nontransparent licenses. In the early 1990s, the industrial trawlers working before the civil war, under a joint venture company with Italy, were quickly looted and informally privatized by their Somali crews and sponsoring businesspeople, who operated them out of the ports of Bosaso and Berbera. Lack of maintenance and reinvestment turned them into short-lived ventures; none is still in operation.

Near-shore activity in Puntland and Somaliland was taken up by Yemeni fishers, who fish with their own vessels and buy fish from local fishers. As Yemen's own fisheries became overexploited, trade between Yemeni buyers and Somali fisheries grew. For many isolated Somali communities, this trade has been their main source of livelihood.

Weak or absent governments during the past three decades have allowed serious degradation of Somalia's marine and coastal environment. Pollution resulting from oil spillage and the dumping of toxic industrial waste, overexploitation by illegal foreign fishing vessels, sea level rise linked to climate change, and rapid urbanization and coastal population growth have contributed to marine and coastal habitat destruction. The expected rise in sea level will negatively affect fish nesting and fishing grounds and threaten the very existence of coastal communities through flooding of low-lying coastal lands, estuaries, deltas, and salt marshes (FSG 2015a).

Somalia has the longest coastline in Africa (3,330 kilometers) and an Exclusive Economic Zone (EEZ) estimated at 825,052–831,000 square kilometers (figures 7.1 and 7.4).[84] However, the Somali coastal shelf is narrow, with limited habitat for demersal (bottom feeder) fish stocks, and many coastal communities report reduction in stocks, the result of overfishing. Fisheries management—a precondition for unlocking and sustaining the sector's potential for increased incomes, employment, food security, nutrition, and fiscal revenues—is completely absent.

Figure 7.1: Map of Fishing Locations in Somalia



Little is known about the sector, because the waters are largely uncharted. For more than 30 years, there has been no scientific research about the status of fish stocks, and scientific data available in the 1980s were incomplete.

The Somali Large Marine Ecosystem has one of the strongest upwelling systems in the world (upwelling refers to wind-driven motion of dense, cooler, and usually nutrient-rich water toward the ocean surface, replacing the warmer, usually nutrient-depleted surface water). Seasonal variations related to the southwest and northeast monsoons (described below) support a wide variety of marine ecosystems and a high level of diversity of fish along Somalia's coast (Van Zalinge 1988). Between March and October, the warm southwest monsoon pushes surface waters northeast and forms the Somali current, the fastest open ocean current in the world, with an average speed of 3.5 meters per second.

This current causes an intense upwelling along the east coast of Somalia, stimulating an influx of cold (17°C–22°C), nutrient-rich (5–20 micrometers of nitrate) water moving to the surface to replace the layer of warmer water pushed toward Oman and resulting in increased primary production, known as plankton bloom. High monsoon wind speeds (about 15 meters per second) allow nutrients to be mixed deep into the water column; as a result, high biological productivity is not confined to surface waters (Prasanna Kumar and others 2000; Prasanna Kumar and Narvekar 2002). Between October and March, the northeast monsoon reverses the Somali current flow, moving the coastal waters southwest and suppressing the upwelling (McClanahan 1988).

The influences of the monsoonal wind systems on the Indian Ocean's oceanographic currents and the associated rich upwellings off the Somali basin make both the coastal and the offshore waters of Somalia highly productive, especially in the Indian Ocean (Mann and Lazier 2006). They provide optimal conditions for both demersal and pelagic (highly migratory) species, especially tuna, for which this area is among the most productive in the world. These upwellings support a variety of concentrations of small pelagic fish, potential preys of scombrids, which have been the basis for limited coastal fisheries for many hundreds of years and had already generated strong interest from industrial fishing before the civil war.

The 2,000-kilometer-long Indian Ocean coast of Somalia has very strong ocean currents and few natural harbors. Kismayo, in Jubaland, is the only natural port; Mogadishu has only a small naturally protected area at the old port, in addition to man-made cargo-oriented commercial facilities. Isolated headlands provide limited protection from monsoon conditions in some other locations and a natural deepwater harbor behind Ras Hafun Peninsula in the north. More than 1,000 kilometers of Indian Ocean coast has little protection for fishing vessels, most of which are beach launched.

The Gulf of Aden is less productive than the Indian Ocean. Pelagic fish concentrations vary in abundance seasonally and annually, and there are differences in species composition (more longtail tuna and sailfish, less skipjack tuna) The coastal shelf is generally narrow, with one extended area to Maydh Island, a rich fishing location, and Zeilac, close to the Djibouti border. The 1,300-kilometer-long northern coast of Somalia is protected from the strong southwest monsoon, but it has only two major deepwater harbors, at Berbera in Somaliland and Bosaso in Puntland, plus limited mooring facilities in Aluula and Laasqoray.

7.2 Fisheries Production Systems, Trends, and Institutions

7.2.1 Inshore Fisheries

The vast majority of Somalia's EEZ is oceanic, because the continental shelf along most of its coastline is relatively narrow, except off Puntland, where it extends some 300 kilometers to Socotra (in Yemen). Along the coast of the Gulf of Aden and from the Cape Guardafui (or Ras Asir) to Eyl, the coastline consists largely of outcrops and of beaches exposed to high-energy ocean waves. Some reef and seagrass habitats exist, but the main areas of barrier, fringing, and patch reef community stretch from Eyl south to Mogadishu, extending past the border with Kenya. Diversity is greatest in the coral reef region from Adale to the Kenyan border. All these reef systems are influenced by the tropical waters flowing north from the coasts of Kenya and Tanzania.

Fishing is a seasonal activity for many rural dwellers, including pastoralists, and often an important source of supplementary food and cash income. On much of Somali's Indian Ocean coastline, fishing ceases entirely during the months of the strongest southwest monsoon winds, when many coastal communities return to pastoralism.

On average, fishers are 38 years old and live in households of eight people. More than half own their fishing boats, half are members of fishing

cooperatives, more than a third fish within 10 kilometers of their communities, and half fish within 50 kilometers. Many part-time fishers move inland when fish concentrations are the highest (during the southwest monsoon), because their small fishing vessels are not suited for the rough weather during this period and because summer temperatures are very high. Lack of transport and cold-chain infrastructure serve as a further barrier to catching fish when they are most abundant.

There were an estimated 4,500 full-time and 5,000 part-time national fishers in 1990 along the entire Somali coast (Lovatelli 1996; ASCLME 2010) and some related jobs on land (box 7.1). Many experts estimate the current figure at about 10,000 full-time and part-time fishers.[85] Some sources report substantially higher numbers, including unregistered and seasonal fishers. Kelleher (2016), for instance, cites about 23,000: 730 in Somaliland, 12,000 in Puntland, and 5,000–10,000 in the rest of the country. Another expert indicates that the total could be as high as 30,000, plus another 20,000 people on land employed indirectly in the sector (Ahmed 2015). The high average age of 38 for registered fishers suggests that fishing is not an attractive occupation, because of low returns and high risks, the inability to finance expansion and new entries, and the reluctance of older fishers to allow or facilitate access (Kelleher 2016).[86]

Somalia's artisanal fleet is composed mostly of small boats, mainly built locally from old designs and generally beach launched. In the mid-2000s, the size of the fleet was estimated at about 650 motorized fiberglass 6- to 9-meter-long vessels, 380 traditional sail boats, and 800 5-meter-long houris or canoes (Kelleher 2016), suggesting that there may be today about 2,000 vessels of all types. A recent scoping mission by the FAO found the majority to be poorly built and unprofitable, offering poor catch handling.

Box 7.1: From Modest to Minimal Fish and Seafood Processing in Somalia

Realizing early the potential of Somali fisheries, private investors from Italy built tuna canneries in Alula (which closed after a short time), Candala, and Habo before World War II. Additional canneries were built in the 1950s in Bosaso and Laasqoray, though they operated only intermittently. A large cold-storage facility was built in Bolimog during the same period, but it never operated at commercial capacity because it was too far from markets.

Fish processing in Kismayo began in the late 1960s, with the construction of the port and a fish-processing facility complete with cold storage. Both the port and the facility remained operational until the civil war.

In the 1980s, the Siad Barre government oversaw the expansion of existing facilities and the construction of additional ones. Fishing cooperatives were formed and facilities were built for processing and storing fish in Bander Beyla, Eyl, Zeila, Heis, Mait, Bargal, Hobyo, Adale, Merca, Brava, Kamboni, Mareeg, Habai, and Ras Hafun. Some of these facilities were simple structures without refrigeration, in which filleting, salting, drying, and smoking of fish, primarily for export, took place. Others, especially facilities built with outside support in Berbera and Mogadishu, were more advanced and included cooling or freezing capacity. All were generally operated in partnership with investors from other countries, in particular Italy.

There is currently minimal fish processing in Somalia. The Laasqoray tuna cannery is closed and unlikely to return to production. The Habo tuna cannery remains on life support and is unprofitable, despite multiple grants and attempts to rehabilitate it. Eight domestic companies export and market fish and seafood (see appendix H).

Source: Hussein (2017).

The recent introduction by the FAO of new 6.3-, 8.3-, and 10.3-meter boat designs that meet international safety standards to boatyards in Mogadishu, Berbera, and Bosaso gives cause for optimism that successful fleet renewal through private sector investment may be possible.

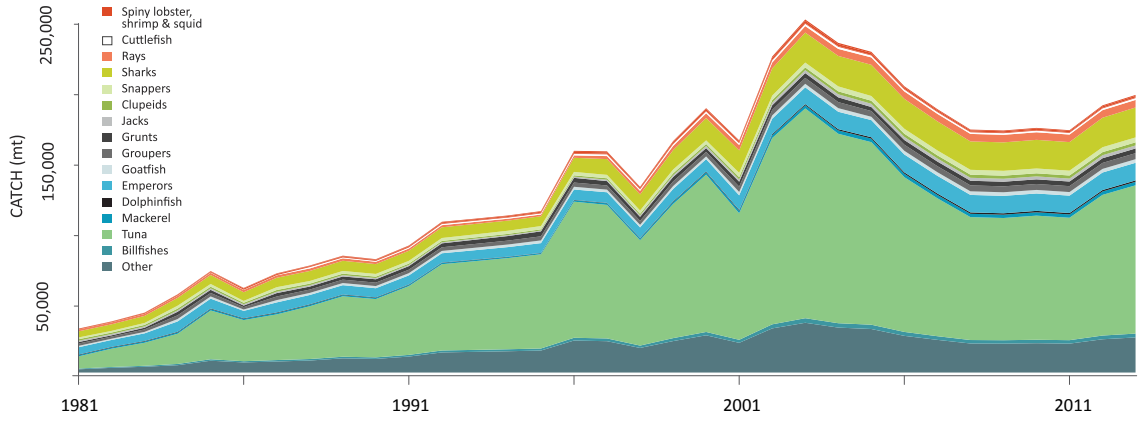
Somalia's domestic fishery subsector has remained modest in size since its development was stalled in the 1990s after the beginning of the civil war. As a result, the foreign fishery subsector was allowed to expand. As foreign vessels operating in Somali waters are either unregulated or poorly regulated but in all cases unsupervised and unmonitored, the true number of foreign fishers is largely unknown. Primary data have not been systematically collected since the early 1980s. Estimates on stock numbers and composition, effort, catches, prices, fishers, and domestic fishing vessels are therefore scattered and conflicting.[87]

A group of international researchers recently presented the results of a large study that included some catch estimates for these fleets. Their study is based on published reports, interviews with experts, analysis of Automatic Identification System (AIS) data, satellite data, and reported Indian Ocean Tuna Commission (IOTC) catch data (Glaser and others 2015). According to the report, since 1980, catches of foreign and domestic vessels in the Somali EEZ have fluctuated, but they have generally increased, reaching an estimated 194,000 tons in 2013 (figure 7.2).[88] Glaser and others (2015) estimate annual fishery production potential at 835,000 tons, more than four times their estimated catch.[89]

Glaser and others (2015) concludes that domestic and foreign catches in Somali waters increased from 16,500 tons in 1950 to 127,800 tons in 2015 and that actual catches were 80 percent higher than officially reported data (Cashion and others 2018). Foreign fishing dwarfed domestic fishing and likely contributed to the decline in the stocks of fisheries observed by Glaser and others. Both these latest estimates, as well as all others, need to be taken with extreme caution, however.

Although there is considerable potential for pelagic species, assessments conducted on domestic and foreign catches of 17 species groups find that 8—including swordfish, striped marlin, emperors, goatfish, snapper, sharks and rays (which represent as much as 40 percent of the catch of artisanal fisheries), grouper, and grunts—were fished unsustainably (Glaser and others 2015). Yellowfin tuna in the Indian Ocean have also been overfished (IOTC 2017). Reef and demersal species are exploited mainly by Somali artisanal fishing communities and visiting Yemenis. The overall level of exploitation may be below the potential sustainable capacity of the territorial waters, but local overfishing is reported for

Figure 7.2: Fisheries Catch in Somali Waters, by Species, 1981–2001



Source: Glaser and others (2015).
Note: Figures include both foreign and domestic catch estimates.

reef species, which are concentrated near population centers (Hassan and Tako 1999). Other sources concur that the state of fish resources in Somali waters is unclear; that many resources remain underexploited, because of weak domestic purchasing power, poor market links, and limited export facilities; and that many high-value inshore stocks, including lobster and sea cucumber, are overexploited (Kelleher 2016).

Domestic catches in coastal waters are made mainly by gillnets. Other gear types are also used, including handlines, longlines, traps, and seine nets from small motorized fishing crafts. Artisanal fisheries also use trolling and handlining for tuna and kingfish and cast netting for sardines, which are used as bait (FAO 1999; Rosenberg and others 2014). Data collected during the FAO fishers' registration project indicate that in some areas, beach collection for crabs and diving for spiny lobster and sea cucumber are important sources of seasonal income, particularly for people with few assets or cash reserves. Anecdotal evidence suggests that these fisheries are now heavily overexploited, particularly in communities where traders have introduced scuba gear.

A fleet of four freezer trawlers has operated off the coast of Puntland for several years, transshipping at sea or landing in Oman, in contravention of Somalia's laws. Few data are available on their landings, although indications from the Environmental Justice Foundation, based on limited landing data obtained from Salalah, indicate that these vessels may be taking several thousand tons a year (FAO 2016b).

The activities of foreign-owned industrial trawlers in coastal waters have also depleted reef and demersal coastal fisheries and damaged habitats. Iran and Yemen have the largest fishing presence in Somalia's waters, with Iranian tuna gillnetters often entering into conflicts with artisanal fisheries. Tuna vessels from Europe and Asia had a large presence in Somali waters in the past (see Johnsen 1985 for the prewar period); this activity has declined since the onset of large-scale Somali piracy. In 2015, the federal or regional Somali governments granted some of these trawlers fishing licenses, but many longliners still crowd just outside the EEZ border and some still venture illegally into the EEZ.[90]

Commercial bottom trawling has occurred for several decades along Somalia's narrow continental shelf (0–75 meters but also much deeper, to 400 meters). It is particularly intense on the northeastern coast of Puntland, where the continental shelf is widest, and to a lesser extent off the coast of Jubaland. Trawls generally target demersal species (eight are considered of economic importance), mostly over reefs but also in deep water. Although bottom trawling has been illegal since 2016 under the new Somali fisheries law, trawls continue to operate, mostly under license from the state of Puntland. These vessels catch about 5,500 tons a year of cephalopods and demersal fish, according to estimates based on four years of Automatic Identification System (AIS) data (Van Zalinge 1988). Although old and limited, these data suggest very high rates of discarding and environmental damage; many more fish are probably discarded than landed.

The spiny lobster (both deepwater and shallow species) is the most commercially important invertebrate caught in Somalia's waters and one of Somalia's oldest fisheries. They used to be exploited industrially by trawls at depths of 150–400 meters. Almost nothing is known about current trawl effort on deepwater stocks, although trawlers are known to have landed these species in Mombasa and Salalah in 2014 and 2015.

Artisanal fishers target coastal species using traps, spear, and nets, as well as by free and scuba divers (UNEP 2005). Most current catches are by Italian vessels in a submarine canyon along the Puntland coast and a little farther south and in the south of Jubaland, including around the Bajuuni Islands and near the border with Kenya. Lack of government and local community management measures and regulations and the high market prices lobsters command has led to overfishing.

Sharks and rays are another very valuable catch, for both local and export markets; Asian countries prize their liver, fins, and meat. They are targeted by artisanal fishers along the northern, northeastern, and central coasts and are highly vulnerable to overexploitation (Glaser and others 2015). A very small group of Mombasa-based traders controls the shark fin trade. As with sea cucumber and lobster, limited competition among traders results in most of the price received in export markets remaining with middlemen. A fishery targeting Gulper shark in Puntland developed rapidly for the production of fish oil. Signs of overfishing are already evident, with anecdotal reports of decrease in the size of the sharks.

Other important nonreef species inhabiting sand, silt, and mud bottoms that are already targeted in the near-shore coastal and neritic zones of Somalia include (a) small pelagic fish, such as sardines, herrings, anchovies, and mackerel (caught by seine nets, cast nets, stake nets, and lines), the stocks of all of which remain underexploited in the wider Indian Ocean (see appendix G); (b) cuttlefish (caught by trawls, jigs, and traps); and (c) shrimp and prawns (caught by trawls, seine nets, and gillnets). A seasonal artisanal fishery targeting prawns was operating at the mouth of the Juba River near Kismayo in southern Somalia (Johnsen 1985), but no reports are available on its postwar and current status. Egyptian trawlers working out of Eritrea fish for prawns in the waters off Zeila, in Somaliland, landing them in Djibouti or occasionally Berbera.

Other valuable resources in the EEZ are not targeted, because of lack of domestic demand, transport, and processing infrastructure. They include Indian oil sardines (*Sardinella longiceps*), which also attract large pelagic predators, such as tuna. Although part of these stocks make seasonal migrations into the coastal areas between Ras Mabber and Ras Asir, their fishery's main distribution areas are off the northeastern coast, which are not within easy reach of Puntland (Pilcher and Krupp 2000). If markets were available for this species, vessels of the type recently built by the FAO in Bosaso, with a combined ice/fish capacity of 6 tons, could probably reach them.

7.2.2 Offshore Fisheries

Economically important species of large pelagic species, including tuna and tuna-like species, billfish, and sharks, are targeted offshore (more than 24 nautical miles from the coast) only by foreign, industrial, and oceanic fisheries when they migrate through Somali waters.[91] Purse seiners catch tropical tuna species (bigeye, skipjack, yellowfin) when they group in surface schools or around fish aggregating devices—large rafts left to float in the current that aggregate schools of tuna beneath them—which came into use in the early 1990s. Their impact has been controversial, because they increased catches of juvenile yellowfin and bige. (Other kinds of coastal-anchored fish aggregating devices, which are not used by the fleet but were recently installed in a pilot project by the FAO for small-scale fishers in southern Somalia and Puntland, result in a different form of aggregation. They are used for handline fishing only and have very limited impact on fish stocks.) Longline vessels also catch some yellowfin and bigeye tuna. Longliners come from China; Taiwan, Province of China; and Japan. Purse seiners come from the European Union, Iran, Mauritius, Oman, Pakistan, Seychelles, Yemen, and other countries.

Estimates of landings for highly migratory species based on data from the regional tuna fisheries management organization, the Indian Ocean Tuna Commission (IOTC), indicate a total catch of about 50,000 tons in 2013 (Glaser and others 2015). The real figure of total offshore catch is uncertain. For the methodological reasons discussed above, the estimate is probably high—but it could also be low, if large landings offshore go unreported.

In 2016, the IOTC classified some highly migratory species (including yellowfin tuna, black and striped marlin, longtail tuna, and narrow-barred Spanish

mackerel) overfished throughout the Indian Ocean. Stocks of other species under the management mandate of the IOTC (including other tuna, swordfish, and kawakawa) seem to be healthy (or their status could not be assessed; see appendix G).[92]

Highly migratory species were fished largely by the European purse seine fleet, which traditionally fished in Somali waters during the southwest monsoon. After the outbreak of piracy in 2007, the fleet moved away from the EEZ, after the European Union and the governments of France, Spain, and Seychelles imposed strict conditions.

There is potential for generating revenue by licensing the purse seine and longline fleet to target tuna and tuna-like species in Somalia. In 2014, discussions between federal and state administrations, supported by the FAO and the government of Italy, were held to reach an agreement on the creation of federal fisheries authorities, modalities for tuna licenses, and revenue sharing. The objective was to develop a clear and transparent licensing system for foreign tuna vessels to operate under license in Somali waters, generating revenue for the country. A few interim agreements were reached, under which tuna licenses would be issued by the federal Ministry of Fisheries and Marine Resources, in consultation with Federal Member States. In 2016, other partners, including the World Bank, USAID, the European Union, and Norway, supported this imitative. In May 2016, a proposal suggested that management responsibility be given to Federal Member States within 12 nautical miles of the coast and to the Federal Government for the EEZ (12–200 nautical miles from the cost), a management option commonly used in other federal countries, such as Australia, India, and the United States (although in the latter, federal waters extend 3– 200 nautical miles in most states).

None of these agreements has yet been incorporated into the Somali legal framework. Somaliland, which is still seeking international recognition for its self-proclaimed independence, has used its lack of tuna resources and interest by the international tuna fleet in fishing in the Gulf of Aden as an argument to distance itself from the revenue-sharing negotiations among the Federal Government and the other Federal Member States.

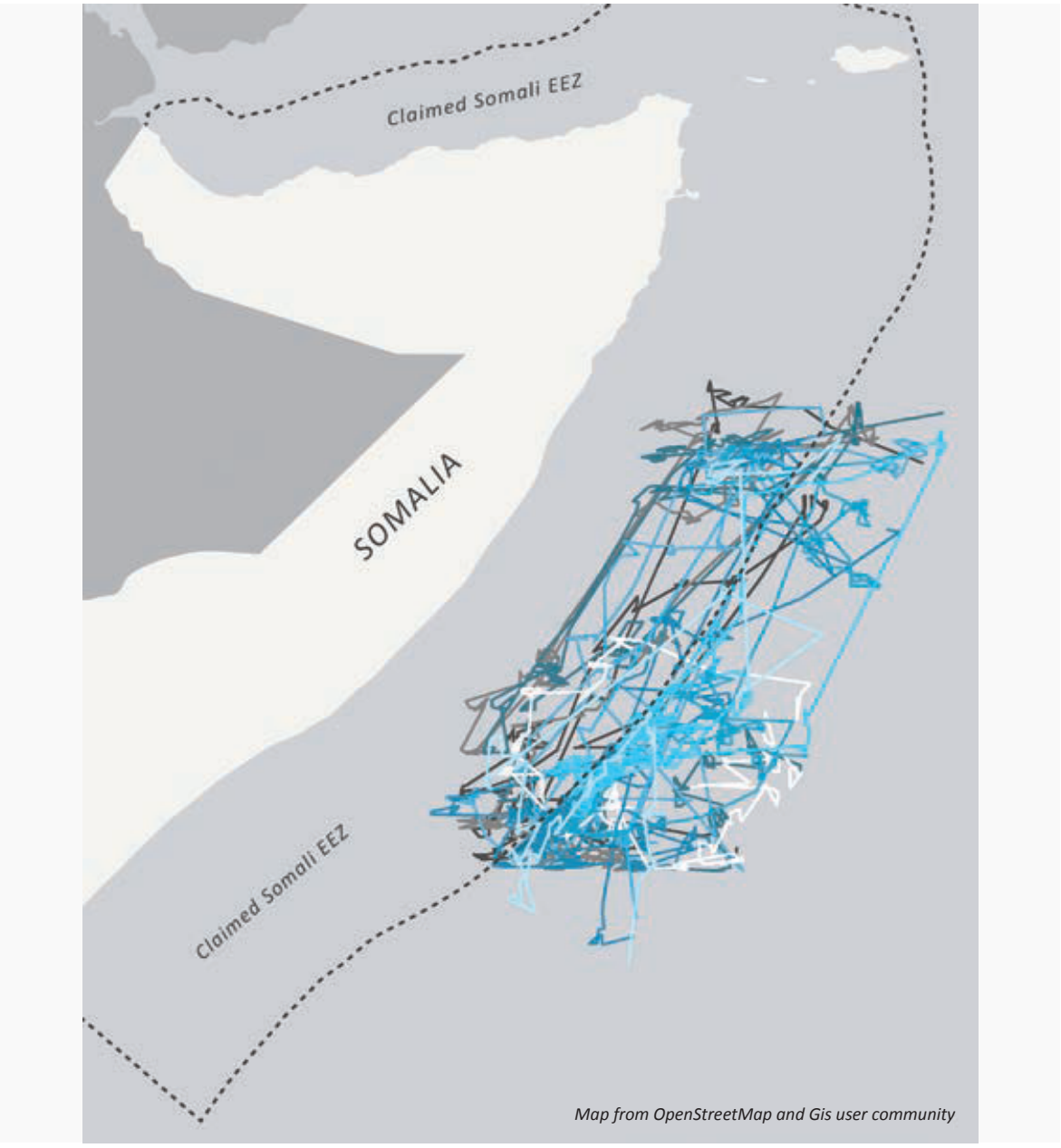
In 2015, the Automatic Identification System (AIS) identified some Chinese longliners operating in the Somalia EEZ without license (figure 7.3).[93] The Federal Government responded by issuing licenses to a small number of Chinese tuna longliners, without consulting the Federal Member States. The licensing fees were not shared with them but were instead used to build a new federal ministry building in Mogadishu (it remains unfinished and unoccupied).[94]

7.2.3 Inland Fisheries

For generations, share-cropping communities in Somalia have fished the lower reaches of southern Somalia's two permanent rivers. These fish are highly valued locally as a good source of food, particularly in watersheds in which tsetse flies are common, where little or no livestock is available for consumption. Fishing and consumption of fish farther upstream are less established.

FAO site visits around Jowhar in 2016 confirmed that fishing skills and equipment are rudimentary, with fishers using traps and handlines in the southern reaches of the river. The FAO funded row boats, fishing kits, and training in fishing techniques, handling, and processing. These efforts resulted in more than 85 percent of beneficiaries eating fish daily.[95] Interventions in Dollow, in the Gedo region, where the FAO supported the formation of fishing cooperatives, and more recently in Jowhar also saw bycatches of freshwater turtles and crocodiles in gillnets, however. The ecosystem impact of further expansion of gear and resulting catches could thus be significant.

Figure 7.3: Automatic Identification System (AIS) Tracking of 11 Chinese Longline Vessels, March–May 2015

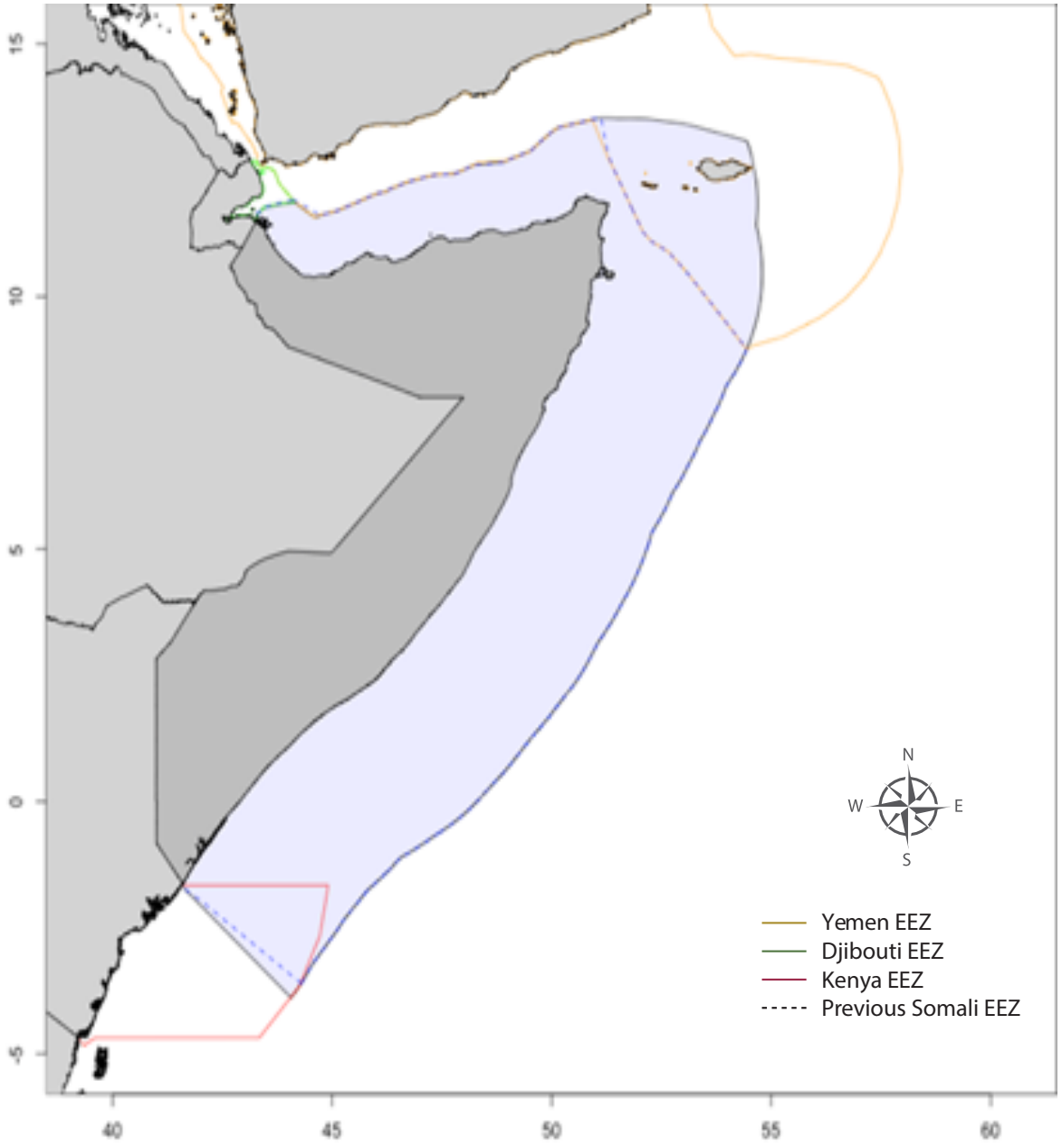


Source: Glaser and others (2015).

7.2.4 Institutional Framework for Managing Fisheries

Maritime and fishery governance in Somalia is still in its infancy. For many years, a major constraint was the lack of a legitimate EEZ. Somalia declared a 200-mile-wide territorial sea in 1972 (Law No. 37), with boundaries to the south with Kenya, to the north in the Gulf of Aden with Yemen, and to the west with Djibouti; within these water, fishing operations by any vessel were prohibited unless flagged or licensed by Somalia. In 1989, Somalia ratified the UN Convention on the Law of the Sea (UNCLOS), but it retained its declaration of a 200-mile territorial sea, which was incompatible with UNCLOS. In June 2014, Somalia officially proclaimed an EEZ (figure 7.4).[96] It claims waters around the island of Socotra (in Yemen) and near the Djibouti border, setting up or renewing disputes with neighboring countries.

Figure 7.4: Map of Somalia's Economic Exclusive Zone (EEZ)



In 1979, Kenya proclaimed an EEZ with a northern boundary of latitude 1°38'S. It revised it in 2005 to 1°39'34'S. In the 2014 EEZ proclamation by Somalia, the southern boundary with Kenya was set perpendicular to the coastline, creating a large disputed area between the two countries. Somalia instituted proceedings against Kenya in August 2014, before the International Court of Justice regarding the maritime boundary between their territorial seas, EEZs, and continental shelves. The case is ongoing.[97] **The EEZ proclamation was a vital step toward enabling Somalia to issue licenses to foreign fishing vessels, generate much needed revenue, and sustainably manage its marine resources.** Before its proclamation, the ambiguous legal situation meant that visiting vessels could—and did—claim that licenses were not a legal requirement. Somaliland also claims its own EEZ and exclusive fishing areas.

In December 2014, the federal Parliament passed a new fisheries law, which sets new fishing limits (the 2014 EEZ proclamation did not define the 12-mile territorial sea or the 24-mile contiguous zone) (box 7.2).[98] It prohibits fishing without a license and partly defines provisions for licensing. It lacks missing important provisions, however, and is of limited value for fisheries management.

Somaliland and Puntland adopted fisheries laws in 1995 and 2011, respectively, as well as fisheries regulations. Their status is unclear, given the repeal provision of the federal fisheries law (Article 43).

Neither the Provisional Constitution of Somalia (2012) nor the Fisheries Law (2014) contain specific provisions on the responsibility or jurisdiction of the Federal Member States of Somalia over the maritime domain. Article 44 of the Provisional Constitution states that "the allocation of the natural resources of the Federal Republic of Somalia shall be negotiated by, and agreed upon, by the Federal Government and the Federal Member States in accordance with this Constitution." Article 54 states that "the allocation of powers and resources shall be negotiated and agreed upon by the Federal Government and the Federal Member States (pending the formation of Federal Member States), except in matters concerning: (A) Foreign Affairs; (B) National Defense; (C) Citizenship and Immigration; (D) Monetary Policy, which shall be within the powers and responsibilities of the Federal Government."

The fisheries law does not give any powers to issue licenses to the Federal Member States. Some states that have issued licenses to foreign fishing vessels, in particular Puntland, claim that the law was drafted and passed without any consultation of the states. In the context of fisheries for tuna and tuna-like species in Somali waters, the FGS and the Federal Member States agreed that licenses to foreign tuna vessels would be issued by the Federal Ministry and the revenue generated shared between the FGS and the Federal Member States. This agreement was never translated into a legal instrument, however, and no revenue from licensing was shared. Moreover, despite stated ambitions, neither the federal nor the regional state ministries have the capacity to monitor or control fisheries, especially offshore.[99]

The federal Ministry of Fisheries and Marine Resources is based in Mogadishu. According to the 2014 Fisheries Law, it has jurisdiction over all fisheries in Somalia. All five Federal Member States as well as the self-proclaimed independent Somaliland also have ministries responsible for fisheries. Their jurisdiction and relationship with the Federal Ministry is unclear and not defined, and contacts for collaboration and exchange of information among them are limited. For instance, the FGS has yet to gain access to the fishers' registration data collected by the state ministries with support from the FAO. All states except Somaliland and Puntland operate without their own legislation or regulations. Galmudug has at times asserted that it has a coast

Box 7.2: Excerpts from Somalia's 2016 Fisheries Law

Article 3 of the federal fisheries law approved by the Federal Parliament in December 2014 (and which became effective in 2016) sets the fishing boundaries of Somalia's EEZ as follows:

The length of Somalia coastline is 3,333 kilometers with the width of 200 nautical miles.... The restricted zone reserved for Somali fishers living on the coast, and prohibited for any other fishers is 12 nautical miles....The protection zone that protects coastal fishers and in which fishing vessels are not permitted to enter is up to 24 nautical miles. Only coastal fishers are allowed to fish within 24 nautical miles.... Beyond 24 nautical miles, licensed vessels are allowed to access up to a length of 200 nautical miles of the Indian Ocean & Red Sea.

Source: Official translation of the fisheries law.

guard capable of protecting its fisheries resources, but no law establishes such an effort, and there is no evidence of such capability. A common maritime and fishery development strategy was agreed to in September 2013 among the FGS, Galmudug, Puntland, and Somaliland (box 7.3).

Somaliland, which does not recognize federal authority, has passed its own fisheries laws and regulations, and its ministry does not deal or coordinate with the federal ministry for any operational matter. In 2000, it approved a coastal and marine resource policy. The Somaliland Food and Water Security Strategy of 2012 bases its approach on the understanding that cultivating productive sectors (agriculture, livestock, and fisheries); water; and natural resources has the potential to reduce poverty, broaden the economic base, and create employment. The Somaliland Navy reportedly operates 29-meter vessels that can be fitted with machine guns and includes about 600 coast guards and a community reporting system. Somaliland has favored developing coastal fisheries while authorizing some foreign fishing, including private arrangements with Yemeni vessels and Djibouti to facilitate fish trade and factor supplies. Its regulations also require fishing vessels,

Box 7.3: Creating Sustainable Fisheries: Key Goals of Somalia's Maritime Resource and Security Strategy

In September 2013, delegates and technical experts from the FGS, Galmudug, Puntland, and Somaliland came together to agree on a single strategy that identified problems, challenges, and common objectives. While recognizing the different stages of development among the regions, the strategy (summarized below) presented a common vision and goals to guide domestic development plans and assistance by the international community.

Overall

- *Short term:* Stocks to be assessed and local experts to be appointed to lead development of fishing policy. Training and equipment to be made available to local fishers. Somalia to join the IOTC for the benefit of the Somali people alongside the rest of East Africa.
- *Medium term:* Fleet, port, processing, and export infrastructure to be developed. Fishing sector personnel to be trained. Local fish markets with some regional and global export potential to be developed. Fisheries institution to be established for the management of industrial fisheries and revenue from licensing.
- *Long term:* Full value chain in the fishery subsector to be developed, with ability to trade domestically and export. Capacity [to be] developed for the management of the subsector, including adequate monitoring, control, and surveillance, as well as enforcement, effective prevention of illegal, unreported, and unregulated fishing, and adequate response to fishing-related crime.

Resource Security

- *Short term:* Legal ambiguity over Somali owned maritime resources to be resolved; effective licensing and registration monitoring, control, surveillance and enforcement to be adopted and immplemented.
- *Medium term:* …community fisheries management to be adopted, leading to territorial use rights in fisheries (TURFS); small-scale and localized patrol bases to be established along the coast.

Maritime Economy

- *Short term:* Somali ports to become safe and financially viable for seafarers and industry… [with] sufficient capability to support port state control functions in relation to safety, security, customs, fishing....
- *Medium term:* Developing a training and certification need for Somali fishers and seafarers.

Source: Official translation of the fisheries law.

including vessels operating under joint ventures, to be registered, maintain fishing logbooks, and pay fees (Kelleher 2016). Links between the ministry and the Navy's coast guard unit are strained, undermining their cooperation and effectiveness.

Among Federal Member States, Puntland has the longest-established regional fishery administration, fisheries law, and regulations. In 2004, it prepared a Marine Fisheries Policy and Strategy. It outlines its principles and objectives for fisheries management as follows: "Marine and coastal resources belong to the entire people of Puntland. . . are shared equally, fairly and transparently. . . [to ensure] a marine environment that is healthy; free of pollution, waste and degradation; rich in quality, forms of life, and production; accessible; and [capable] of creating equitable opportunity for sustainable development." Its Fisheries Regulations (last updated in April 2004) established a Fisheries Advisory Council, with representation from 9 associations covering some 50 fishing settlements (some of which are very isolated, with no road access). Although a new fisheries law was adopted in 2011, these regulations were not revised and remain based on the 1985 Somali Fisheries Law.

Puntland claims (or at least asserts) full jurisdiction over its waters and requires all fishers and fishing vessels to be registered and licensed. But it lacks the institutional capacity to implement its law and regulations (Hassan 2011). It often ignores federal law. Recently, for instance, it issued licenses permitting foreign vessels to fish within 24 nautical miles of its coast with trawl gear, in contravention of the 2014 federal fisheries law (and the Puntland fisheries law). A private service provider (Triple S) that has a contract for patrols (under which it retains 30 percent of license fees and fines imposed) has been permitted to apprehend only a few unlicensed Iranian dhows, but no illegal, unreported, or unregulated trawlers—in disregard of both federal legislation and Puntland's own laws.

Although fishery statistics are essential for sustainable fisheries management, Somalia still does not have a fishery data collection system in place. All but one effort by development agencies to support the collection of primary catch and effort data by federal or state government agencies have failed. The sole exception is the FAO-supported registration project, under which almost 7,000 fishers and 1,300 vessels have been registered in Somaliland, Puntland, Galmudug, and Jubaland.[100]

In 2016, the FAO provided the FGS and all Federal Member States with an Internet-based vessel monitoring system (vTrack from VISMA), initial training, and computer terminals, and it facilitated access and integration of Automatic Identification System (AIS) data from SeaVision to the system. Use of this system is very limited, however, as none of the foreign or domestic vessels operating under license in Somalia is transmitting data, which the Somali authorities do not require. The FAO and IOTC trained observers and inspectors, but observers are rarely deployed onboard fishing vessels, and as no vessel is calling in Somali ports, no inspections have been carried out.

7.3 Conditions of and Challenges Facing Regional Fisheries

7.3.1 Jubaland and South West

Coral reefs form an uninterrupted barrier from Caldale to the Kenyan border, giving some protection to inshore fishing grounds. Inshore shrimp grounds were historically fished by the Somali national fleet and subsequently by Kenyan trawlers under various forms of licenses. Historically, significant quantities of lobster were caught in the Kisimayo area and exported (by air) through Djibouti in the 1980s (Kelleher 2016).

Activity of the once-thriving artisanal fishery out of the natural port of Kismayo and its surroundings is at a low level, after two and a half decades of instability and alternating rule by different clan militias, the

Kenya Defense Forces, and Al-Shabab.[101] Many of its fishers are now living and working in Bosaso or other towns in Puntland (having rejoined their extended clan families there or moved to camps for internally displaced people) and are unlikely to return (FAO 2016b).

Fishing facilities in the region are nonexistent. Some foreign industrial trawling was observed in 2015 and 2016, for deep sea crustaceans, fish, and cephalopods (for example, cuttlefish) landing in Mombasa. Two vessels have fished this area, but their licenses (believed to be forged), fishing method, and areas fished (inside 24 nautical miles) are in contravention of the provision of the federal fisheries law. This activity has now ceased, after intervention by the FGS and Kenyan authorities. The potentially rich Bajuni island chain, between Kismayo and the Kenya border at Ras Kamboni, is also reported as experiencing a low level of fishing.

There are strong opportunities to generate local employment and enhance incomes to supply the growing local market demand and especially export markets, according to a scoping report by the Horn Economic and Social Policy Institute (HESPI) for a possible fishery-related aid project in Jubaland (Yahie 2016). The absence of basic fisheries' gear and infrastructure and the weak institutional capacity in both the public and private sectors—as a result of the prolonged civil unrest—presents two major challenges that need to be addressed urgently (box 7.4).

NGOs and the private sector have made some efforts to revitalize the fish industry in the area, with only mixed results. Some ice production is available in Kismayo, but cold-chain infrastructure is in ruins. Some institutional memory on fish drying and processing remains, but the large labor pool of internally displaced people who originate from agricultural and pastoral hinterlands possesses few fishing skills. Most efforts to introduce them to fishing have failed. Security difficulties, in an area prone to the smuggling of weapons, people, and charcoal, and access difficulties to fish markets in Kenya keep the level of activity in Jubaland low.

The still unsettled political situation in the South West region has precluded significant interventions to help its fisheries. Plans to introduce fish aggregation devices at the traditional fishing ports of Barawe and Merca in 2015 were prevented by fishers, who feared execution by Al-Shabaab if suspected of cooperating with foreign development and aid agencies. Both ports were successful fishing sites before the war and continue to host limited landings. Fish are sold at very low prices (as low as $0.70 per kilogram), however, because few buyers are willing to take the logistical and security risk of shipping fish overland to Mogadishu.

Landing infrastructure at these two ports is no longer usable; piers have collapsed and largely disappeared. Jazeera, 40 kilometers south of Mogadishu and the northernmost coastal location of the South West state, has a sheltered landing site and a permanent fleet of 20 vessels, joined seasonally by vessels from Mogadishu and Merca, the latter using Jazeera to sell catch to buyers who drive down from Mogadishu. Ice facilities are not available at either port, although a facility is currently under construction in Jazeera. The fisheries at Barawe and Merca are expected to benefit from the high political priority accorded the two ports by the Federal Government, which is very keen to rebuild them and create new employment after the recent expulsion of Al-Shabaab.

7.3.2 Banaadir (Mogadishu) and Hirshabelle

The artisanal fishery of Mogadishu is very active, though there is no data collection, registry of boats, or market data, only anecdotal evidence of production, marketing, and processing. Increased landings have been reported, thanks to high demand for fish and a thriving market system. Some ice production is intermittently available in Mogadishu, allowing distribution of fresh fish to

wider markets, but the relatively large population of Mogadishu means that all fish landed there are sold locally. A fleet of more than 200 locally built outboard-powered and fiberglass-reinforced plastic skiffs supplies fish daily to the Hamarweyne and Lido markets. Fish sold in these markets also originate from Jazeera, Merca, and Barawe to the south and Warsheikh to the north.

Box 7.4: Fishery Development Needs in Jubaland

The scoping report by the Horn Economic and Social Policy Institute (HESPI) for a possible fishery-related aid project in Jubaland recommends that any support provided to address the lack of gear, infrastructure, and institutional capacity be holistic. Establishing boat-building facilities and improving skills, building new markets or rehabilitating others, importing and establishing modern cold rooms and ice-making machines, and providing large vessels are all critical needs. Fishers also need access to capital. For fish markets to operate adequately and hygienically, electricity and running water are needed. Qualified local technicians and trained entrepreneurs are also needed to operate and maintain equipment and markets.

The report makes three broad recommendations: (a) avoid reinventing the wheel by heeding lessons learned from other studies, (b) build on existing institutions and remain selective about areas of intervention, and (c) offer finance but avoid giving grants and donations, in order to ensure the sustainability of the resultant outcomes. It also offers actionable recommendations (not listed in order of priority):

- Establish at least two cold-storage and ice production units each in Kismayo and on Madhowa Island.
- Implement the United Nations High Commissioner for Refugees (UNHCR)/American Refugee Committee (ARC) boat rehabilitation workshop project, and arrange for suitable management to operate and sustain the facility based on a viable business model.
- Identify entrepreneurs who are both familiar with both markets (Jubaland and Mombasa, Kenya) and willing to take advantage of opportunities despite the high risk of doing business in Jubaland. Consider establishing links with Somali/Kenyan local fishing communities and businessmen who have presence on both sides of the border.
- Provide adequate support (hardware and software) to fishing cooperatives, and transform them into viable enterprises built on sound business practices.
- Establish a business incubator for existing apprenticeship workshops and provide it with the necessary tools and capital to perform repair and maintenance services of refrigeration and cooling system and to train youth.
- Build and equip a fish-drying and salting workshop, to be managed by the Juba Fish Cooperative at Kiboro beach and used as an apprentice center for unemployed youth.
- Provide support in building institutional capacity and training a cadre of professionals and skilled apprentices to support industry rebuilding.
- Establish a Small Entrepreneurs Loan Facility (SELF) for the fishery industry, to be managed by an existing finance institution in Kismayo.
- Assist the government in establishing a fishery subsector donor coordination unit, to be established under the Office of the Jubaland State President.
- Establish a unit with qualified staff in the ARC Kismayo office to oversee and implement the proposed project and study recommendations.

Source: Yahie 2016.

Box 7.5: Fishery Development Needs in South West State

Before the civil war began, fishing was the main occupation and fish the main source of food security for people living in coastal towns and villages in the Lower Shabelle region. The state's fishers used gillnets, hooks for large fish and sharks, and to a lesser extent traps and seine nets.

The civil war resulted in the collapse of most fishing activities in the South West state. Coastal communities lost almost all their fishing gear, including wooden boats, nets and net anchors, diving kits, anchors, and fishing lines. Today, artisanal fishers in the coastal settlements of Brava, Merka, and Jazira use small vessels, mostly canoes, which limit their ability to reach offshore resources and to fish during months of the year when seas are rough. Virtually all the few motorized boats in the state are out of order.

A state assessment team identified the following development needs for the sector:

- replacement of fishery gear (15-horsepower outboard engines, small oars for wooden boats, fishing hooks and nets, shark nets, fishing ropes, anchors)
- development of fishery infrastructure, including freezers
- formation of fishing cooperatives
- vocational training and empowerment of fishers
- creation of employment for youth
- distribution and marketing of fish products in noncoastal regions of the state.

Source: Ministry of Fishery and Marine Resources, South West State (email communication to World Bank).

Surface longlining for shark, mainly the lucrative shark fin export trade, is widespread. Where habitat is suitable, fisheries for lobster and sea cucumber are also thriving, though both species are reported as overfished. Market interviews undertaken by the FAO in 2014 suggested catches for Volvo-type vessels of up to 200 kilograms a day in high season; average catches are about 100 kilograms. Vessels fish at night and return catches to land in the morning. They fish only sporadically off the Banaadir and southern coast in low season, when the southwest monsoon makes sea conditions very difficult.

The municipal government has carried out some refurbishment of the Hamarweyne market, but it is still in deplorable conditions, with fresh fish either hand carried to the market from the small nearby beach or transported in open pick-up trucks from other sites. A Danish NGO recently provided the beach landing site at Lido with a small ice facility. Some other cold-chain investment (by NGOs and private Somali investors) has been made in Jazeera and Warsheikh, but these facilities remain unfinished. Plans by local businesspeople to create a 90-kilometer tarmac road between Mogadishu and Warsheikh have yet to be realized.

Hirshabelle, the most recently formed Federal Member State, is largely occupied by Al-Shabab, but its two main fish landing centers north of Mogadishu, Warsheikh and Cadale, and a smaller one at Habai, are under government control. All three sites have artisanal fleets that longline for shark, lobster, and other fish species. Sales are predominantly to buyers from Mogadishu, who control prices and the supply of ice from the city. Infrastructure for holding live lobsters remains intact in Habai, with communal memory there of successful export of live lobsters to Gulf countries, through road links to Mogadishu airport.

7.3.3 Galmudugs

The town of Hobyo, which enjoys some natural protection from the southwest monsoon, is the main fish landing site in Galmudug. In addition to hosting a long-time active fishery, in recent years it has been a major base for piracy (box 7.7). With the success of international navies' patrols in stamping out piracy here and elsewhere along the Somali coast, fishing activity has been reported as redeveloping, though very limited information is available. During 2014–15, a trawler and a Yemeni-registered longliner (fitted with traps) were actively operating in Galmudug and Puntland waters, transshipping and unloading their catches in Oman, Yemen, and Kenya.

Neither Hobyo, which has some small natural protection from the southwest monsoon and is the key landing site in the state, nor any other fishing community in the state has a landing jetty or similar facilities or working ice facilities. In 2015, the FAO deployed two fish aggregation devices in Labad and Xinwarbargo, north and south of Hobyo, respectively; Hobyo itself remains too insecure for any boat-building assistance. Box 7.6 summarizes the development needs identified by the state itself.

7.3.4 Puntland

Puntland has a 1,600-kilometer-long coastline dotted with fishing communities, from Laasqoray through Bosaso to Habo on its Gulf of Aden coast and from Toxin through Ras Hafun to Eyl on its Indian Ocean coast. With its wider (30-kilometer) continental shelf, it has access to the best fishing areas in Somalia. But until recently, southern Puntland was also a major base of piracy activities (box 7.7).

Artisanal fishing is very active and reportedly on the rise throughout Puntland, most evidently so in Bosaso. The Puntland Ministry of Fisheries and Marine Resources has registered more than 5,000

Box 7.6: Fishery Development Needs in Galmudug State

Small-scale fishing activities are a major source of employment, livelihood, and food security, directly and indirectly, for thousands of Galmudug residents. Its fisheries were hit hard by the civil war, however, and its revival may require millions of dollars, as the entire fisheries infrastructure and facilities put in place by previous governments were either looted or destroyed beyond repair or left to degrade in the course of the civil strife. Other problems affecting the sector and coastal fishing communities include lack of cold chains, easy-to-access markets for its products, financial resources, regular data collection, analysis, skill training, and a regulatory framework for the sector.

The state's priorities for the redevelopment of its fishery subsector are as follows:

- Develop the state's legal framework for local and foreign fisheries management, maritime controls/security, and the financial management of fisheries revenues.
- Invest in sustainable livelihoods for coastal communities affected by piracy; illegal, unreported, and unregulated fishing; and droughts.
- Develop an effective maritime security strategy to protect biodiversity within territorial waters based on scientific and marine research, to be conducted in collaboration with the FGS and other states.
- Develop coastal infrastructure, including appropriate landing sites, deep freezers, flake ice-making machines, and processing rooms.
- Support the building of adequate fishing vessels and fishing gear.
- Set up training facilities for fisheries-related professions, fisheries management, research, and fisheries-related skills, such as marketing and fisheries commerce, hygiene and sanitation, and so on.

Source: Ministry of Fishery and Marine Resources, Galmudug State (email communication from Ministry to World Bank).

Box 7.7: Dwindling Piracy But Increasing Illegal, Unreported, and Unregulated Fishing Activities in Somalia

The business model for piracy that supported the high level of attacks—based largely in the Indian Ocean coastal communities of Galmudug and Puntland between 2007 and 2011—has been disrupted, principally because naval patrols by the international community have made the activity unprofitable and unviable (UNSC 2015). Analysis of the Fishermen's ID and Registration Project in the two states reveals that the average age of fishers was highest in known piracy bases, as youth in these remote districts preferred piracy and eschewed fishing activities that were only marginally profitable for established operators.

Although a few pirate attacks have been attempted since 2015, there have been no successful hijackings of merchant ships (one in early 2017 was speedily resolved by the intervention of Puntland authorities and local clan elders). There have, however, been small-scale incidents involving foreign fishing trawlers (in 2015, for example, two Iranian gillnetters were attacked. One , escaped, the other was seized and impounded.

Hostages from earlier attacks are still being held for ransom. Eight Iranian seafarers were recently released by Somali pirates after having been held in captivity since May 2016. Up to a dozen Iranian sailors taken from a different vessel are still being held hostage (Tehran Times, February 16, 2017).

Table 7.8.1: Pirate activities in Somalia, 2008–16

Pirate Activities	2008	2009	2010	2011	2012	2013	2014	2015	2016
Suspicious events	8	59	99	166	74	20	5	1	2
Total attacks	24	163	174	176	34	7	2	0	1
Of which pirated	14	46	47	25	4	0	0	0	0

Source: EU Navfor (http://eunavfor.eu/).

The spread of piracy did reduce illegal, unreported, and unregulated fishing activities in Somali waters and in the western Indian Ocean in general, probably resulting in some stock recovery. With the decline in piracy, illegal, unreported, and unregulated activities are reportedly on the increase. According to the UN Monitoring Group on Somalia and Eritrea, private security guards from Somalia are sometimes involved in these activities. Many of them may previously have been engaged in piracy.

The UN Security Council renewed its call to international navies to continue their antipiracy efforts in the area through 2017 and to renew the mandate of the European Union Naval Force ATALANTA (EU NAVFOR) through 2018. Without significant improvements in local employment and restoration of the rule of law, piracy will remain a latent threat on this coast.

fishers, most of them using drift gillnets targeting large pelagic species. According to Kelleher (2016), in 2010 there were 12,650 fishers in Puntland, operating 3,136 artisanal vessels, including motorized watercraft, sailboats, and canoes.

Fish landed in Bosaso are traded by road through Qardho to the regional capital of Garowe and as far as Galkayo, along the only paved north-south road. Other fishing towns on the Indian Ocean coast, such as Hurdiyo, Banderbeyla, and Eyl, have only rough roads, making fish transport difficult. They are more reliant on Yemeni buyers from the sea, although officials report fish exports by land from various coastal communities all the way to Ethiopia. The reopening of an improved airport in Bosaso in early 2017 and the start of regular commercial air cargo flights has opened up the possibility of air exports of high-value species to the Gulf countries, if catch handling and quality control issues can be resolved (box 7.8).

Box 7.8: Lessons from the World Bank's Failed NECFISH Project

The World Bank Northeast Coast Fisheries Enterprise (NECFISH) project, based at Bosaso in the late 1980s, explored the feasibility of large-scale harvesting of pelagic species and the collection and marketing of demersal species caught by artisanal fishers. A series of financial, structural, and technical problems beset the $9 million project. They included failure of the initial co-financing, technical difficulties with ice production, and difficulties with market access. The failed project highlighted the need for pilot projects to resolve technical, economic, and institutional issues and indicated that although large-scale pelagic fishing in the area was unlikely to be profitable, inshore fisheries had potential if fish transport and marketing of high-value species could be developed.

Source: Kelleher (2016).

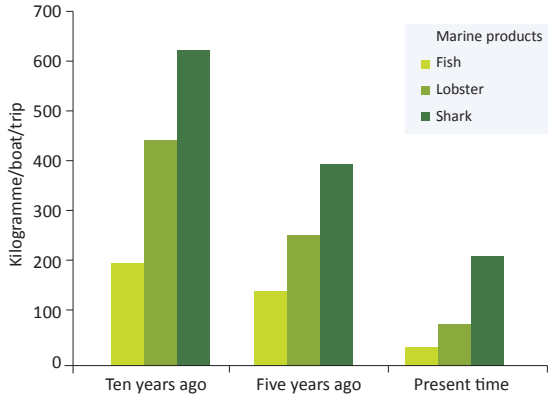
Puntland's annual sustainable catch has been estimated at more than of 100,000 tons, mostly finfish but also lobster; the actual reported catch in 2004 included 8,990 tons of shark and 2,144 tons of other finfish (UNDP 2005; Kelleher 2016). In 2010, three licensed trawlers operating in Puntland waters provided a total of $270,000 in government revenue. Traders are reported to account for about 40 percent of fish sales, Yemeni collector boats account for another 40 percent, and about 15 percent of the catch is sold directly by fishers through local markets. In 2010, an estimated 120 Yemeni-flagged boats operated in Puntland during the fishing season, exporting 3,600 tons of fresh fish a month (Spanish mackerel, demersals, and some tuna).[102] Some Somali traders have filled the vacuum left by departing Yemenis affected by their country's civil war, buying fish from fishers at sea for sale in Oman. Billfish from Puntland are also exported by air through Nairobi to Turkey.

An estimated 200–300 tons a year of lobster tails are exported annually, contributing $5.0–$7.5 million a year to the regional economy (Fielding and Mann 1999).[103] The major lobster catches (in the Eyl/Foar area) are processed into tails at the beach, mostly by fishers themselves, and then sold to local traders. Traders use reefer trucks to freeze and store the tails, which they later transport by road to Garowe or Galkayo. From there, the product is airfreighted to the United Arab Emirates.

For many years, possibly as far back as 2007, a fleet of six trawlers from the Republic of Korea, four of which are now reregistered in Somalia, has trawled the Puntland coast. Initially, they had no licenses; they now hold licenses from the Puntland Ministry of Fisheries and Marine Resources. They export most of their catch to world markets, mainly through Salalah, in Oman. Four Somali-flagged trawlers are still operating, mostly in Puntland waters. In addition to these trawlers, surface gillnetters from Iran are known to fish both inshore and offshore.[104] In February 2017, seven Thai-owned trawlers, recently flagged to Djibouti, were licensed by Puntland to operate in its waters, contrary to the federal fisheries law and causing considerable local controversy. The Thai vessels appear to be trawling in the same inshore grounds as the Korean-owned vessels. These vessels do not report any of their catch and effort and are not effectively supervised, regulated, of monitored by the Ministry of Fisheries and Marine Resources, which only licenses them.

Licensing and other tax revenues paid to the Puntland government are not transparent. Lack of transparency and the unregulated activities of these vessels, which often operate very close to the coast and on the same fishing grounds as artisanal fishers from Somalia, are undermining faith in the authorities and negatively affecting the livelihood of local fishers, directly through loss of gear and indirectly through the destruction of stocks and habitat. As figure 7.5

Figure 7.5: Fishery Productivity in Puntland, 1995, 2000, and 2005



Source: FAO 2005a.
Note: These figures are based on anecdotal reports and extrapolations. They should be viewed as an indicator of trends rather than trusted as actual hard figures.

shows, catch rates in Puntland's three most significant artisanal fisheries was lower in 2005 than in the preceding decade, likely because of unregulated fishing offshore and local overexploitation of spiny lobster and shark resources by artisanal fishers (FAO 2005a), though these findings should be interpreted with caution, because they are based on anecdotal reports, limited local data, and extrapolations.

A lucrative gillnet fishery in the Gulf of Aden for gulper shark grew rapidly in 2016. The sharks are caught in deep waters and processed to extract oil from their livers, mostly for use abroad in health foods and cosmetics. The value chain is much simpler than for fish for human consumption. Many fishers have switched their efforts to this fishery. The current effort of this species is already unsustainable. No adequate private investment has been made in modern and safe processing and the storing of the fish oil. At least for the short term, the move into this fishery is undermining attempts to increase and maintain domestic markets for fish for human consumption, to the great concern of small-scale fish traders, most of whom are women.

Over the last decade, donors built cold-store and ice facilities in Puntland, with very mixed success. Public-private partnership (PPP) agreements to operate such facilities have regularly failed, although ice continues to be produced in factories in Tohin and Bargal, giving these isolated communities access to markets inland, and in Bosaso. Most other PPP cold-chain facilities are mothballed, and most Bosaso fishers report that they do not use ice, because of its high cost. There is a pressing need to invest in the right human capital to run such facilities but to leave their rehabilitation, construction, and operation entirely to the private sector.[105]

7.3.5 Somaliland

Fish resources and habitats in Somaliland are as poorly understood as in the rest of the country. Its coastal areas remain uncharted, and no reliable data collection is taking place. The only habitat survey data are from almost two decades ago (Fielding and Mann 1999). Fishing activity by local fishers has been at a very low level for many years, with most fish landings in the artisanal sector made by visiting Yemeni boats and Egyptian trawlers, which target shrimp in the far northwest of the state.

Somaliland has a coastline of 850 kilometers, an estimated annual catch of about 4,000 tons, about 730 fishers, and about 200 vessels. Most fishing activity is concentrated at Berbera, which is home to about 27 registered fishing companies, about 15 of which are functional (Kelleher 2016).

Political instability in Yemen has resulted in an influx of fishing vessels from that country. As many as 60 Yemeni motherships (large dhows or converted fishing vessels) operate along the Gulf coast of Somaliland and Puntland. Most of their catch is marketed in the Gulf States; some is also supplied to the region's inland urban centers. Sales of fish in Hargeisa, for instance, almost quadrupled, from 524 tons in 2012 to 2,048 tons in 2014 (Kelleher 2016), and the number of fish retailers rose from less than 10 in 2010 to 34 by the end of 2014 (Haibe and Miller 2014). Some limited fishery activity also remains in Zeila, primarily for the Djibouti market, and in Maydh, which lacks any road connections.[106]

In 2014, a Danish NGO set up a cold-store gear supply business and ice factory in Berbera, to promote development of the sector. The operation failed. Some local investors built cold stores and small ice facilities that are still in operation. They also purchased some larger vessels, which are generally crewed or skippered by Yemenis. A company has started shipping fish from Maydh to Berbera for onward sale. At least three smaller companies purchase fish from artisanal fishers in Berbera for transport to Hargeisa market; one of them owns and operates its own ice plant in Berbera.

The main constraints to expansion, including for export to markets in Ethiopia along the Berbera corridor, are lack of fish and the poor quality of the fish landed. Already more than a decade ago, anecdotal field observations in prime fishing markets such as Maydh showed only a few adult demersal species (Zajonz and Akester 2005), suggesting some frailty in fish stocks after many years of Yemeni exploitation.

7.4 Opportunities and Prospects for Growth

7.4.1 Overall Prospects for Fisheriess

In coastal and inland urban centers, demand for and the availability of fish have been increasing. There is still little understanding among consumers about its quality, however, with iced fish not generally receiving a premium price. This lack of appreciation for fish quality and safety is widespread in Somalia, providing little financial incentive for fishers to treat their catch safely. Moreover, many species, especially small pelagic fish and crustaceans, remain unpalatable and unsalable to domestic consumers. Tastes are expected to change only slowly, as economic recovery and sustainable economic growth take hold and more Somalis return from the diaspora, as investors, visitors, or returnees. In the short to medium term, market growth for these species will remain largely dependent on export sales to the Gulf States, Ethiopia, Kenya, and the Indian subcontinent. **There is a widespread perception within the Somali business community that the fish subsector has a bright financial future.** The 2015–16 drought disrupted livestock production and greatly increased food insecurity, reinforcing this perception and highlighting the relative affordability of fish, which costs about 30 percent as much as meat ($3 versus $10 per kilogram). Instead of developing long-term sustainable and flexible fisheries with the capacity to supply high-quality products and react to changing availability, however, most investment by the Somali business community, including investors from the diaspora, seeks quick profits from export markets that are perceived as lucrative.[107]

Confidence in such markets is misplaced. High-valued species such as spiny lobster and grouper are easily overfished, especially when no management measures are in place. Public bodies such as the Somaliland Business Fund and the Somali Stability Fund have supported a longer-term outlook, but they have had only mixed success, because of the lack of fisheries management and governance.

International hygiene experts embedded in the Somaliland and Puntland ministries for the last two years produced manuals and training on the fish hygiene chain, certification, and inspection procedures. They have not been applied in local markets and appear to be completely ignored by ministry staff. A complete lack of quality control or monitoring at the ministry level will restrict access to more lucrative export markets and place a burden on the more progressive fishing companies in Somalia to have their own hazard analysis and critical control point (HACCP) processes independently certified and monitored. It will also mean that many foreign ventures will continue to prefer to land catches outside Somalia.

Notwithstanding these challenges, considerable potential for increased employment, export revenue, and increased food security exists in the sector. Puntland in particular has considerable potential to build on its inshore fishing industry by harnessing skills and experience already available within many local communities, its relatively strong cooperative tradition, and the country's best boat-building facility, based in Bosaso.

Across the country, the greatest obstacle to higher fishery production and consumption is the lack or poor quality of transport links between major urban centers and isolated fishing communities along the coast, which remain reliant on trading with Yemeni vessels for their income. The unsettled security situation around the Galgala Mountains makes accessing remote communities along the Gulf of Aden coast difficult. Smuggling presents a constraint for many Indian Ocean communities.

Somalia's 2017–19 National Development Plan targets a 44 percent increase in the value of fish caught annually in Somali waters, to $65 million, and a 10 percent increase in export volume and the value of marine products. Despite some concerns about the overfishing of some specific species, there is strong consensus among both scientists and fishers that considerable potential exists for sustainable expansion within Somali waters of many fisheries, especially of oceanic species like tuna and tuna-like species, in areas where upwelling is a regular seasonal phenomenon.

With strong interest in Somalia's offshore fisheries from the European Union, Seychelles, and Asian tuna vessels, estimates of annual potential revenues from licensing fees are about $1–$2 million, potentially increasing to $5–$8 million in the medium term. Efforts supported by the FAO are underway to develop a transparent licensing system for offshore fisheries and to broker a revenue-sharing agreement between federal and state administrations that would ensure public confidence in the system and in the monitoring of foreign vessels and allow the federal ministry and all regional administrations to profit from this subsector.

7.4.2 Prospects for Various Types of Fisheries

Small pelagics. Small pelagics, such as oil sardine, have good potential for expansion. Estimates of potential sustainable catch vary widely, but all exceed 50,000 tons a year without negative impact on larger tuna species (World Bank 1992; FAO 2006; Glaser and others 2015). These small pelagic fisheries are relatively labor intensive and could therefore create good opportunities for employment expansion. The introduction of new semi-industrial designs of locally built vessels in 2016, able to land up to 4 tons of fish per trip, gives some cause for optimism for the increased size and efficiency of catches.

As these species are unsalable in Somalia as a result of domestic aversion to them, future market opportunities depend largely on export sales of frozen products to Ethiopia and Kenya and in dried/salted form to the Indian subcontinent, Tanzania, and the Democratic Republic of Congo. The FAO is undertaking an initial market assessment in India and Sri Lanka to gauge the product type and quality needed to allow Somali small pelagics to enter those markets. Potential for canning some of these species for domestic consumption in Somalia also exists. Initial promotional efforts should concentrate on smaller-scale investments at the local level, as the status of stocks, their seasonality, and their role in the wider ecosystem needs to be better understood before large-scale investment is encouraged.

Coastal spiny lobster. Despite widely reported overfishing, spiny lobsters remain an important source of income for Somali fishers, including coastal gatherers without their own vessels. They are also an important source of export revenue. Coastal fishers appear to be price takers for spiny lobsters, landing to merchants who chill whole lobsters or

tails (usually slowly in freezer trucks) before flying them to Gulf countries or transporting them from Jubaland overland to Kenya. Community regulation and management have largely broken down since the civil war, with soft, berried, and undersized spiny lobsters all being landed. Recovery of this fishery takes time, because spiny lobsters of all species concerned take four years in the plankton phase and another four years to reach market size. Well-designed interventions working through carefully selected local cooperatives would improve and possibly establish effective control of production areas. Such efforts should be combined with a wider stock analysis of the spiny lobster fishery.

The potential for expansion beyond the 200 tons a year (highly variable from year to year) of lobster exports from Somalia reported by the International Trade Centre is limited. Under adequate management measures and with adequate support to fishers' cooperatives, however, the provision of suitable holding, cold-storage, and shipping facilities could result in up to a fivefold increase in the price paid to fishers (from about $5 to $25 per kilogram).

Larger pelagics. Tuna and other highly migratory species are abundant within the Somalia EEZ during its four- to five-month southwest monsoon season. Established foreign industrial ventures also operate successfully in international waters outside the Somali EEZ and under public-private ventures in the EEZs of some countries of the western Indian Ocean, following annual fish migration cycles. The overcapitalized canneries in the region are working far below their producing capacity, however. Foreign fishing companies might therefore be interested in joint ventures with Somali investors for supplying fish to the many larger regional canneries (in Seychelles, Mauritius, Thailand, and elsewhere) that are in need of fish to maintain production at full capacity and to new Somalia-based processing plants to meet growing domestic demand by Somali consumers for such species.

Somalia imports about $17.5 million a year of canned and processed fish, virtually all of which is canned tuna, according to the International Trade Centre. Given the ubiquitous availability of canned tuna in Somali retail shops, this figure, which represents a consumption of less than $1.50 per capita a year, is a reliable medium-term upper limit to potential domestic sales for a Somali canning industry. In the long term, this subsector could grow very rapidly from virtually nil, by exporting to neighboring Ethiopia.

Necessary preconditions for such developments include a functioning Somali government operating under the rule of law, an appropriate policy framework and incentives to investors, and cooperation with neighboring states through the IOTC and possibly regional economic organizations for ensuring a fair share of the fishery's value chain. Existing canneries in Somalia would probably need to modernize to ensure processing of tuna, tuna-like species, and small pelagics during the season. Agreements for the supply of raw material would have to be developed with local fishers or foreign vessels operating in Somalia. License fees by Somali authorities could be higher for vessels with no economic links to the domestic economy.

Demersal species. Illegal, unreported, and unregulated foreign demersal trawling jeopardizes coastal habitats, artisanal livelihoods, demersal fish stocks, and the investments made by Somali businesses in their small vessels. It must be stopped. Even if it ceased, however, the coastal habitat for demersal stocks would be limited, because of the relatively narrow continental shelf (except off the Puntland coast) and the depletion of demersal stocks. This resource should therefore not be the basis for a large industrial fishery. If, however, local communities adopted management measures that provide for stock conservation, coastal demersal artisanal fisheries might contribute more than they currently do to livelihoods and improved nutrition, and limited expansion into export markets might be possible.

Some demersal species, such as deep sea fish and crustaceans, could be sustainably exploited by a small number of well-managed semi-industrial and industrial vessels, with reliable stock assessment and strong fisheries management plans. Interest from foreign and Somali investors in deepwater trap fisheries for red crab, golden crab, and various spiny lobster species in the Somali EEZ is growing. Similar interest and potential in longlining and gillnetting for deepwater finfish also exists, with recent approaches received from a number of investors. Although these deepwater fisheries cannot support heavy exploitation, the scale of the Somali EEZ is such that a small fleet of vessels could be sustainable. A well-managed deepwater demersal fishery has the potential for limited employment onboard vessels and in processing, if the government imposed license conditions. Licensing would also provide an additional source of revenue for the government.

Fish waste. No quantitative information is available on fish waste in Somalia, but postharvest losses are reported to be high, because of the absence of cold-chain infrastructure. According to informed FAO experts, losses are likely at least as high as in Comoros and in Kenya, which report losses of 30 percent.

Three landings centers, at Berbera, Bosaso, and Mogadishu, generate large volumes of fish waste; many smaller communities also have problems disposing of fish waste. The expanding (but unsustainable) gulper shark fishery has created significant environmental problems in communities between Laasqoray and Aluula along the Gulf of Aden coast. The tuna cannery at Habo and the fisheries in Kismayo will soon become other large sources of fish waste.

Box 7.9: Promoting Fish Consumption among Internally Displaced People

In 2014, the FAO undertook a pilot project in a camp for internally displaced people outside Bosaso, identified as the most food insecure community in Puntland. It initially trained people to make dried tuna jerky from locally caught fish, purchased at times when oversupply saw prices drop and the fish would otherwise have spoiled. Trainees were taught how to use fish skeletons and head for soup. Initially, there was resistance, but women and children in particular welcomed this additional source of food, and it very soon became a staple in this community. The success of this project was such that it was rolled out to an additional 400 trainees.

To mark World Food Day in 2013, the FAO undertook a publicity event at a camp outside Dollow, on the banks of the Juba River, close to the Ethiopian border, that housed mainly pastoralists with no previous knowledge or experience harvesting or eating fish. The event coupled provision of handline fishing gear for volunteers interested in catching fish in the nearby river, cooking demonstrations, free food sampling, basic training, and a fishing competition.

Follow-up surveys in 2015 indicated that more than half of respondents were eating fish three times a week or more. The project has now been replicated with another 50 beneficiaries in Dollow and 600 in Jowhar district along the Shabelle River. Although river fisheries do not have the potential to generate as many exports or employment opportunities as the marine sector, they can help improve food security and nutrition for local communities along the rivers.

Fish waste can and should be used in a variety of ways, including for human consumption (box 7.9), livestock feed (silage), and energy generation. Most of it is discarded in Somalia, even where there is excess demand for animal feed, such as at Berbera and Bosaso ports. Small-scale fish meal plants working with quantities of 500 kilograms to 5 tons a day in the three main landing centers for gulper shark, as well as in some smaller communities, could solve the growing waste-disposal environmental problems, create new sources of employment and incomes, and replace some imports of animal feeds.

7.4.3 Opportunities for Improved Nutrition

Somalia's draft 2017–19 National Development Plan seeks to increase per capita fish consumption from 3.1 kilograms a year to 4 kilograms, still the lowest among any coastal African state. This increase is feasible. It will require increased landings and improved handling of tuna and tuna-like species, which are most acceptable to local consumers. Both fresh and canned tuna are widely accepted and available in Somalia, but local canners struggle to compete with imports.

With wider consumer education about quality, safety, and preparation of fish, there are also other opportunities to expand domestic fish consumption, including of small pelagic fish, fish byproducts, and meal. Small-scale investments in solar refrigerators, insulated boxes, and fish-handling training could help reduce high postharvest losses and expand the availability of fish for consumption. Alternatives, such as fish drying, would require major changes in food consumption habits in Somalia, where consumer resistance to eating smaller pelagic species is strong.

7.4.4 Prospects for Fishery Governance and Information

The sustainable management of fisheries is not yet a reality in any part of Somalia, partly because it was never part of formal government programs before the civil war and because traditional community management practices that helped fish conservation broke down in recent decades. Reliable information on fishing activity, stocks, and ecosystems is essential to ensure that targeted fisheries are within sustainable yields and subject to management plans and effective supervision and monitoring, even if they are precautionary and run at the community level.

Somalia's recently adopted fisheries law requires changes. Regulations and practices at the state administration level also need modernization.

Central to future fisheries management will be both enforcement and an effective working relationship among the Federal Government, the states, and local fishing communities that would provide the stability needed to encourage investment and enable community management of coastal fisheries. Cooperatives should be key partners in strengthening community-level fisheries management, in partnership with the regional ministries. Such efforts are only in their infancy, but they are key to expansion of the sector.

Chapter 8

REFORM AND INVESTMENT OPTIONS FOR AGRICULTURAL RECOVERY AND GROWTH

KEY FINDINGS ▶

In the short to medium term, recovery of agricultural production, especially of the crop subsector, to prewar levels depends on better security; stronger public and community institutions; and at least a start toward rehabilitating dilapidated flood control, irrigation, and transport infrastructure. In the longer term, the country's agricultural growth potential can be realized only by developing and implementing a comprehensive development strategy, supported by effective government institutions and interventions that would harness the dynamism of its private sector in both primary production and domestic and foreign trade of inputs and produce. This strategy—ensuring country ownership and enhanced coordination, providing economic opportunities and jobs for youth, and leveraging remittances from the diaspora for investment rather than consumption—ought to aim at achieving the following objectives:

- Increase crop production beyond prewar levels, through full rehabilitation of prewar public infrastructure and adoption of improved technologies and climate-smart agriculture practices.
- Protect and improve the natural environment, in light of the vulnerability all agricultural subsectors to the negative impact of climate change.
- Transform private sector–led production systems in all subsectors into modern, commercial, and competitive ones that add value through agro-processing.
- Strengthen household resilience and reduce hunger and malnutrition, including by introducing more modern postharvest long-term storage technologies and drought risk mitigation.

The broad sectoral components of such a comprehensive development strategy include the following.

- **Climate change.** Full implementation of Somalia's well thought-out National Adaptation Programme of Action to Climate Change (NAPA) and Intended Nationally Determined Contributions (INDC) action plan would foster the adaptation of its agricultural systems for improved climate resilience.
- **Management of natural resources and rangeland.** There is a pressing need to clarify land tenure arrangements; reach consensus over policies and their implementation with local communities; improve communities' capacity to manage their natural resources in a sustainable manner; and support rangeland rehabilitation (with technical assistance and public investments for intensified soil and water conservation, reforestation and afforestation, reseeding of pastures, planting drought-resistant and fast-growing grasses and legumes, use of micro catchments to enhance water filtration, and various other flood control mechanisms).
- **Charcoal production.** An expanded program of action to reduce charcoal production, especially from acacia trees, and conserve trees, by fostering and enforcing sustainable tapping methods and frequency for frankincense, myrrh, and gum Arabic, should be the top priority for the Puntland and Somaliland governments and donors supporting them. A second priority should be to increase value addition by supporting new private investments in quality processing.
- **Livestock.** A top priority of public policy and assistance should be building capacity along the entire value chain to cope with animal disease threats. Open and regular dialogue with importing countries to review and update sanitary standards and other import requirements is needed. Other priorities include promoting innovative breeding and good husbandry practices and strengthening rangeland use policies, planning, and enforcement, with community participation. More emphasis should be given to supporting integrated production systems, leveraging the complex interlinkages between crop agriculture and peri-urban livestock rearing systems for an expanded and more efficient feed supply chain, and providing more value addition and diversification opportunities. Rangeland use policies, planning, and enforcement at both the government and community levels, especially regarding private enclosures, also need strengthening. For livestock products, production volumes and values that exceed those of both trend lines and the relatively modest National Development Plan targets are feasible, if effort is made to promote private sector–led value addition and the processing of animal products.

- **Crops.** A holistic approach that addresses technical, social, and environmental challenges in the context of climate variability and population growth is required to deliver quick, large, and sustainable production and productivity gains for staple commodities and more diversification into horticulture and other high-value crops. The main components of this comprehensive medium-term program should include (a) institutional and human capacity building, (b) rehabilitation of prewar flood control and irrigation infrastructure along the two major rivers in southern Somalia, (c) expansion of rain water catchment and moisture conservation and introduction of control measures for soil erosion and gully formation in the central and northern regions, (d) rehabilitation of prewar trunk and rural roads to improve transportation of inputs to farms and of produce to markets, and (e) improved access to and adoption of productivity-enhancing and resilient technologies (climate-smart agriculture practices). The first four components should be pursued in parallel, rather than sequentially, as institution building without investment in infrastructure will not yield gains, and initial gains in production and productivity from investment in infrastructure will likely prove unsustainable without complementary institution and capacity building.
- **Fisheries.** The strongest growth prospects for fisheries are from Somalia's highly productive oceanic waters, both for small pelagic and for tuna and tuna-like species that migrate through the country's waters during the southwest monsoon. Realization of this potential will depend largely on private investment in underexploited offshore fisheries; the development of coastal and inland fisheries, including cold chains for domestic markets and improved nutrition; and processing. All levels of governments, in partnership with international fishery organizations, academic institutions, and donors, have crucial roles to play in promoting sustainable growth of the fishery subsector. They can help provide (a) basic field data collection, research, and indicators estimation, as well as capacity building in teaching, research, and professional skills; (b) a clear and effective system of fishery management, at both the federal and regional levels, based on a sound legal framework and the rule of law for private investors, including for licensing; (c) design and cost estimates, adoption, and implementation of master plans for rehabilitating and developing fish landing sites at all five major ports and redevelopment of related transport infrastructure, including rural roads connecting small fishing communities to main roads and urban markets.

8.1 Main Challenges and Priorities

Given its domination of the economy and the large share of the population still living in rural areas, the recovery and long-term sustainable growth of Somalia's agriculture sector is the key to addressing the country's high poverty, food insecurity, and unemployment. The main cross-sectoral and subsector-specific challenges affecting food security and livestock, crop, and fishery production include the following:

- poverty, rapid population growth, and high youth unemployment
- protracted insecurity, political instability, and conflicts over land, pasture, and water
- destroyed or badly deteriorated infrastructure
- absent or weak regulatory framework and institutional and human capacity
- land erosion and degradation, from drought, overgrazing, deforestation, and soil erosion
- high exposure to climatic and other shocks and stresses
- settlement of pastoralists on marginal and fragile areas, especially in central and northern Somalia
- low productivity of and investment in most crops and fisheries
- minimal agro-processing
- very limited access to agricultural finance.

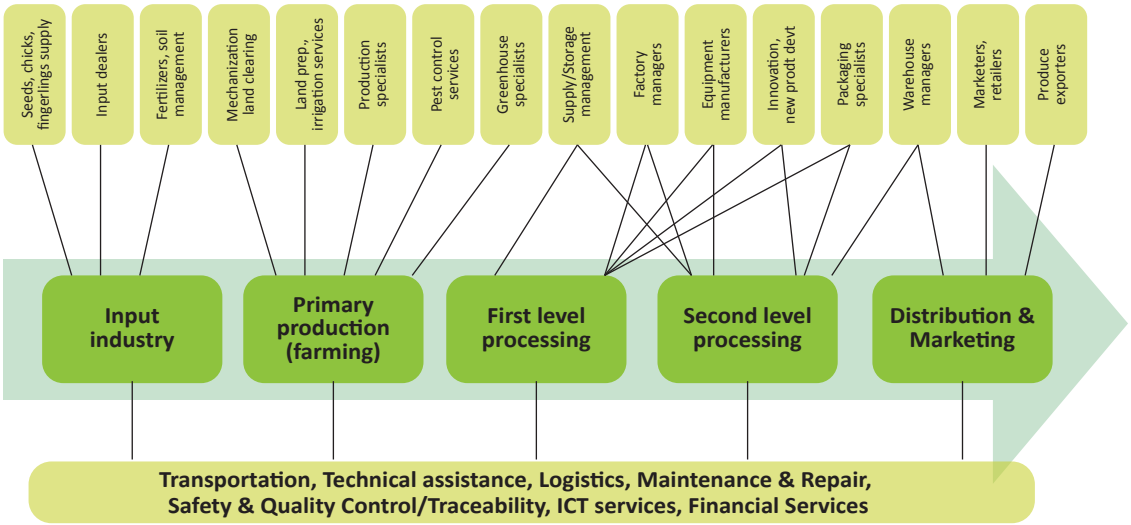
Somalia's agriculture also has natural and geographical strengths that provide cause for optimism about the sector's revival and sustainable growth. Chapters 5–7 document both the strong historical performance and remarkable growth potential of the livestock, crops and forestry, and fishery subsectors. The emerging commitment to agriculture by governments at all levels, by private Somali investors (including in the diaspora), and by development partners is another strength.

Somalia has a variety of land types, large areas with soils of relatively good fertility, and agro-ecological conditions (see the map of agro-ecological zones in appendix C), which can support the economic production of many livestock, crops, and fish species for both domestic and export markets. The southern part of the country has two major rivers and relatively heavy rainfall; 35 percent of its land is suitable for expanded crop production. Its forests can recover and, with better management, provide higher-quality and unexploited products. Its vast rangelands provide a solid basis for higher offtake of livestock. The long-term trend away from pure pastoralism toward mixed agro-pastoral systems offers a good opportunity for much improved quality of live animals and more processing of animal products. The rich fisheries within Somalia's EEZ along both its long northern and eastern coastlines can support a much higher volume of catches and even higher income growth if better managed.

Demand-side constraints do not appear binding to the sector's recovery or growth. Supported by rapid population growth and still large remittance inflows, domestic demand has been high and is expected to continue to grow for both domestically produced and imported food. There is also strong preference in Somalia's traditional export markets (especially in the Gulf and Middle Eastern countries) for its agricultural products. Therefore, the focus of all public and private interventions should be on addressing the many supply-side constraints—namely, policy, institutional, security, sanitary and phytosanitary, and infrastructural deficiencies.

Reviving the crop subsector through infrastructure rehabilitation; expanding all subsectors' primary production and marketed value through better and more modern input supplies, production methods, transport, and storage links; and adding value through processing would create many new income-generating opportunities, including for women and youth (figure 8.1). Most future employment will

Figure 8.1: Employment and Income Opportunities in Somalia along Agricultural Value Chains



Source: AfDB 2016a.

come from the revival of the crop subsector and the processing of its products. As the livestock subsector has likely reached the limits of its export potential of live animals, new employment opportunities will have to come from increasing commercial fodder production and value addition. Environmental stewardship and sustainable exploitation of forestry and fishery resources will imply constrained employment opportunities in these sectors, which nonetheless can generate higher incomes from better quality and more processing.

8.2 Main Goals and Design Principles

In the next one to five years, recovery of agricultural production, especially of the crop subsector, to prewar levels will depend mostly on improving security; strengthening public and community institutions; and starting to rehabilitate dilapidated flood control, irrigation, and transport infrastructure. In the long term (5–10 years), improving food security and realizing the growth potential of agriculture will require developing and implementing a comprehensive development strategy that invests in water capture and storage and harnesses and promotes the dynamism of the country's private sector in primary production and the processing of primary products.

Agricultural development strategies and interventions should seek to achieve four main objectives:

- Recover crop production to—and in the long-term increase it beyond—prewar levels, through full rehabilitation of the prewar public infrastructure and adoption of improved technologies and climate-smart agriculture practices.
- Protect and improve the natural environment, in light of all agricultural subsectors' vulnerability to the negative impact of climate change.
- Transform private sector–led production systems in all subsectors into modern, commercial, and competitive ones that add value through agro-processing.
- Strengthen household resilience and reduce hunger and malnutrition, including by introducing more modern postharvest long-term storage technologies and drought risk mitigation.[108]

Three cross-sectoral principles should guide the design and assessment of reform programs and public investments in agriculture:

- strengthening country ownership and enhancing coordination
- expanding economic opportunities and creating jobs for youth
- leveraging remittances from the diaspora for investment rather than consumption.

Strengthening country ownership. Application of the first principle calls for empowering national, regional, and local institutions to drive and own reform and investment strategies and plans. The National Development Plan 2017–19 was developed by the Federal Government, in close consultation with state governments, private sector stakeholders, and the international aid community, to ensure continuity with the objectives and priorities of the 2014–16 New Deal Compact. It is based on five strategies:

- strengthening institutional capacity at all levels
- improving and rehabilitating productive infrastructure
- improving sustainable production intensification and diversification and animal health
- developing and supporting efficient marketing systems and trade in local, regional, and international markets
- improving national food security, nutrition, and safety of food systems (table 8.1).

Table 8.1: Somalia's Development Priorities for the Agricultural Sector

Subsector	Priorities
Livestock	• Strengthen institutional capacity and infrastructure. • Improve livestock health services and increase productivity of both smallholders and large producers. • Increase the trade of livestock and livestock products in local, regional, and international markets. • Improve national food security and food safety systems within the livestock subsector. • Establish systems for range, forest, and wildlife management.
Crops and forestry	• Strengthen institutional capacity. • Improve and rehabilitate agricultural infrastructure. • Increase production. • Develop and support agricultural output commodity/marketing systems.
Fishery	• Harvest aquatic resources within sustainable limits. • Expand the supply of fishery products to keep pace with demand, in order to safeguard the nutritional standards and the social and economic well-being of communities depending on fisheries for their livelihood. • Help the private sector develop and expand fisheries. • Safeguard critical habitats used for both marine and inland fisheries

Source: National Development Plan 2017–19.

Subsector policy frameworks have been developed, but they need operational strategies reform and investment plans to be better aligned with the National Development Plan's strategic objectives and priorities, as well as stronger results frameworks for accountability. Both the National Development Plan and subsectoral plans need greater realism, to avoid the risk of setting policy objectives, investment options, and expected results beyond the financial and human capacity of governments, the donor community, and private investors.

Implementing policies and investment plans is much more challenging than formulating them, especially in a country like Somalia, where institutions are weak and human capital low. While strengthening institutions, and building capacities at all levels, interventions should promote community-driven development initiatives, building on high levels of social capital at the local level and being mindful of traditional clan-based institutions. Partnerships with civil society organizations are also important. Academic and professional associations, think tanks that include members from the diaspora, farmer organizations, and production and trading cooperatives can provide or be the conduit for technical support, mentoring, and access to professional networks abroad. New development programs and projects need to include effective coordination mechanisms within and across agricultural subsectors and adequate capacity-building components for planning, governance, implementation, monitoring, and evaluation systems.

Aid coordination needs to be improved and simplified. Several overlapping donor coordination mechanisms exist in Somalia, including the Somalia Donor Group, the UN country team, the NGO Consortium, and others. No study has evaluated their effectiveness. Donor and government agricultural projects are small, fragmented, and isolated; many are pilots that are never scaled up, even after decades of "piloting."

Much aid is still short-term emergency and humanitarian aid, especially in Southern Somalia. The food security situation is often fragile, with frequent and severe droughts and other crises. This kind of assistance is therefore still necessary, but it should foster sustainability, economic viability, and resilience. The National Development Plan can bring partners and government institutions closer together in an effort to move aid beyond meeting emergency humanitarian needs toward medium- and long-term interventions that address some of the root causes

of underperformance of the agriculture sector and establish the necessary building blocks for sustainable agricultural growth.

Expanding economic opportunities and creating jobs for youth. Increasing youth employment and involvement is among Somalia's top strategic priorities, in light of their very large share of the population, the high security risk they pose, and their role as potential drivers of modernization in agriculture. High unemployment and lack of economic and livelihood opportunities among Somali youth fuel their recruitment into terrorist groups and their migration, both within and out of Africa.

The benefits of increasing youth employment have been well documented for Africa (Filmer and Fox 2014; AfDB 2016a and for Somalia (FSG 2015). Promotion of youth employment and entrepreneurship must be part of all agricultural development capacity and investment plans. With the right skills; improved access to seeds, capital, and credit; technical assistance; and an enabling environment, young Somali men and women can become agents of agricultural transformation and modernization in Somalia.

Several ongoing initiatives and projects focus on youth employment in all major regions of Somalia. One is a joint program by the FGS and the United Nations that has identified various sectors, including in agriculture, with strong potential for creating sustainable jobs and business opportunities for the youth. To address lack of or weak education and skills, identified as the main constraint youth face (as distinct from infrastructural constraints, which apply to all producers), this program aimed to:

- rehabilitate or build vocational training youth centers
- develop training curricula for promising occupations identified by value chain analyses
- implement vocational, business, and life skills training programs
- support the development of a youth unit and youth advisory board in Mogadishu, as a model to be used in other regions
- support youth engagement in priority rehabilitation projects (FGS 2015).

Public work projects to rehabilitate or expand roads, ports, and irrigation systems can increase employment and income opportunities for urban and rural youth. Cash income generated from such projects can provide starting capital for enterprising youth to start or develop microenterprises and small businesses in livestock, horticulture, and high-value forestry products for niche export markets (FAO 2016a).

Somali vocational schools and universities are producing too few graduates in agricultural sciences and too many business graduates. The agriculture sector is starved of "agripreneurs" capable of harnessing new approaches and technologies, such as information and communication technology, mechanization, and a value chain approach. There is need to create an agro-business flagship program for youth that draws on existing diagnostics and new analyses of youth employment opportunities, to enhance both technical and agro-business training curricula and teaching capacities, and to offer technical and financial support to emerging agripreneurs for incubating new agri-businesses and supporting them in accessing commercial financing.

Leveraging remittances from the diaspora for investment rather than consumption. Given its meager human and financial resources, the public sector in Somalia cannot and should not invest in commercial ventures, even in the few instances where it managed to do so successfully before the war. In the high-risk business environment of Somalia, only a few foreign companies can be expected to invest in banana revival, livestock exports, livestock product processing, and fisheries—and they can do so only in the most secure regions and under strong government protection commitments.

In the short to medium term, the largest source of capital for large-scale private investments in Somali agriculture is its diaspora, in partnership with local businesspeople who understand the production and marketing challenges on the ground. Somalia's economy is already fueled largely by its diaspora, which injects up to $2 billion a year in the economy. Annual remittances are greater than government revenues and international aid combined; in the late 2000s they accounted for about 80 percent of all foreign direct investment in Somalia (Hammond, Dagan Ali, and Hendrick 2012). Many medium-size and large business ventures in Somalia already have shareholders or investors from the diaspora, though they often play only a passive role.

Now is a critical and propitious time for diaspora members to increase their active involvement in Somalia, by providing capital, technical know-how, and links to international and regional markets for agri-businesses and sharing their skills and human capacity with youth and small businesspeople. Governments and the international development community should promote both the continuing smooth flow of remittances and their use by beneficiaries on investments in skills and physical assets. They should also look for more effective ways to draw on the business acumen and foreign experience of the diaspora, including by relying directly on diaspora-partnered private business ventures to provide donor-funded basic social services and improve donor-funded public infrastructure.

8.3 Addressing Environmental Challenges

8.3.1 The Climate Change Challenge

Recognizing the impact of climate risks on the country's future, in December 2009 Somalia became a signatory to the UN Framework Convention on Climate Change (UNFCCC). In 2013, it formulated its National Adaptation Programme of Action to Climate Change; in 2015, it became one of 165 countries that submitted its Intended Nationally Determined Contribution (INDC) action plan ahead of the Paris Summit, outlining proposed programs and interventions that would contribute to emissions reductions and the adaptation of its agricultural systems for improved climate resilience (table 8.2). Together, the National Adaptation Programme of Action to Climate Change and the INDC provide a road map to inform and guide technical and financial contributions from all stakeholders.

Table 8.2: Somalia's Priority Actions for Adapting to Climate Change

Program area	Activity
Sustainable land management	• Develop national regional policies for the protection of forests, ecosystems, and biodiversity. • Protect forests by hiring community-based rangers. • Raise awareness about the environment, focusing on ecosystems and their services and promotion of alternative energy sources. • Develop and enforce land use plans for each district. • Improve rangeland management, by developing and enforcing a system for rotational grazing. • Launch a large-scale afforestation campaign, including the distribution of seedlings to vulnerable communities. • Curb charcoal production, by banning exports, developing alternative energy plans, supporting the manufacture and use of fuel-efficient stoves, and supporting alternative livelihood options for charcoal producers.
Watershed management and development	• Build medium- to large-scale infrastructure, including dams, diversions for irrigation, livestock watering points, and boreholes. Subject all new projects to environmental impact assessments. • Build or rehabilitate community-level infrastructure, including berkeds, shallow wells, ponds, and other technologies, ensuring that a mechanism for maintenance is in place. • Build embankments/gabions and check-dams to protect flood-prone areas.
Disaster management	• Strengthen the national disaster management agency responsible for coordination during emergencies, develop early warning systems, and craft management and emergency preparedness plans. • Establish an emergency relief fund. • Build storage facilities for food and fodder, including stockpiles of emergency relief items.

Source: FGS (2013a, 2015).

8.3.2 The Natural Resource and Rangeland Management Challenge

The combination of rising temperatures, more frequent drought spells, more frequent extreme rainfall events that result in less spatial infiltration and increased runoff and erosion, and increased variability in water availability will have a large negative impact on rangeland productivity, related mostly to poorer growth of desirable grasses, an increase in invasive species that out-compete native grasses, and reduced diversity of plant species (Thornton and others 2007). Water infrastructure is of crucial importance to pastoralists, who depend largely on shallow groundwater sources and surface water ponds, as well as to agro-pastoralists.

A bold set of interventions is needed to preserve the livelihoods of Somali pastoralists and agro-pastoralists and increase the value added of the livestock subsector. Such interventions must start from the realization of the limited planning and enforcement capacity of policies and management by national and regional authorities and the pressing need to reach consensus over policies and their implementation with local communities and to improve their capacity to manage their natural resources in a sustainable manner.

There is a need to clarify rangeland use and tenure arrangements and to take advantage of opportunities for licensing the use of natural resources, including water, pasture, and forest resources. Doing so might entail instituting and supporting a process of rangeland use and tenure formalization, which could include the issuance of new titles for demarcating grazing commons and verifying old individual titles for cultivated farmland by agro-pastoralists. Key to all natural resource management interventions and investments is the need to ensure equitable access and avoid creating or fueling conflicts, following the "do no harm" principle.

The following priority interventions are recommended to increase the adoption of improved rangeland management practices while supporting the Federal Government's action plan to combat deforestation and desertification (box 8.1):

- Encourage sustainable rangeland management methods, such as grass banks, drought refuges, conservation easements, and reciprocal grazing arrangements.
- Support the formation of and dialogue with pastoral associations, to negotiate productive and resilient herding strategies.
- Support rangeland rehabilitation, by intensifying soil and water conservation; supporting afforestation and reforestation by planting indigenous trees, reseeding pastures, bunding soil, and planting drought-resistant and fast-growing grasses and legumes; using micro-catchments to enhance water filtration; and instituting flood control mechanisms.
- Establish a monitoring system that includes seasonal forecasts of potential drought conditions, spatial monitoring of pasture availability, and promotion of migration and/or offtake, to allow early migration or reduction of herd sizes.
- Implement technical investment options for mitigation of groundwater scarcity, such as the options identified in Somaliland and Puntland (SWALIM 2012b).

The proposed actions should be integrated into a comprehensive soil and watershed management and landscape restoration plan, and existing productive activities should be strengthened. In the Golis Mountains, for instance, better management of the harvesting of resins and medicinal and aromatic plants is needed. In coastal systems, where land degradation has been advancing at about 1 percent a year, expansion of date palm trees and horticultural crops would offer alternative livelihoods and reduce the current unsustainable rate of mangrove destruction.

Box 8.1: Somalia's Action Plan to Combat Deforestation and Desertification

The remedial action plan described in this box was developed by Somalia's Federal Government, with the support of its main development partners. It is a comprehensive, appropriately ambitious plan that encompasses the recommendations made above and deserves technical and financial support from the donor community.

- Complete the ongoing postconflict environmental assessment, to document the degree of environmental damage.
- Appoint an interministerial taskforce to finalize the National Action Plan to Combat Desertification.
- Establish and support nurseries in key regions to grow and distribute seedlings of economically and environmentally important indigenous forest species and fast-growing nonindigenous forest species.
- Establish pilot wood lots in deforested areas of, in cooperation with local communities.
- Provide alternative sources of income for workers engaged in charcoal production.
- Integrate water management, through expanded water harvesting, improved conservation, and more efficient use for both rural and urban needs, in order to increase the availability of water for crops and livestock.
- Use soil and water conservation technologies such as contour terracing in sloping, dry areas to retain rain water and minimize soil erosion, in order to foster the regeneration of grasses, shrubs, and trees; reduce gulley formations; and improve rangelands for livestock grazing.
- Use the media to enhance public awareness of the importance of protecting trees, in collaboration with rural community elders, educational institutions, religious scholars, and civil society.
- Develop alternative energy sources and encourage the adoption of efficient gas stoves.
- Adopt more efficient and mobile kilns and processes to make charcoal briquettes from currently discarded wood dust, to improve the efficiency of charcoal making.
- Strictly enforce the ban on charcoal exports to the Gulf States, through local policing and legal actions against traders exporting from small ports, as well as through stricter enforcement of the ban by importing countries, as recommended by UN Security Council Resolution 2036 (2012).
- More sustainably manage land and food security through enhanced productivity, using modern technology that can increase yields while reducing areas under rainfed cultivation.
- Reduce the risk of natural disasters to vulnerable populations, and improve the sustainability and resilience of the agricultural sector.
- Establish government rangeland reserves, in consultation with nomadic communities, and gradually remove private rangeland enclosures.
- Use *Prosopis juliflora* for charcoal production, as India has done.

Source: Somalia 2015a (Federal Ministry of the Environment).

8.3.3 The Charcoal Challenge

An expanded program of action to reduce charcoal production, especially from acacia trees, should strengthen, complement, and scale up the best practices used in recent and ongoing projects (see, for instance, FGS and UN 2016). It should build on the following pillars:

- development of a legal framework and the capacity of relevant institutions to enforce national and international promulgations on charcoal from Somalia, including policies on energy, forestry, and natural resource management; awareness-raising campaigns; capacity building for enforcement by communities and local governments; and a national charcoal reduction fund.
- promotion of "green cooking" and production practices and technologies, such as improved, mobile charcoal kilns, which reduce the amount of wood needed.
- promotion of safe, reliable, and sustainable energy alternatives (efficient cookstoves, green charcoal, energy plantations, liquefied petroleum gas, solar energy, and biogas).

- promotion of community-based programs to strengthen the management, reforestation, and rehabilitation of degraded ecosystems.

More effective management and greatly expanded use of the garaanwa tree (*Prosopis juliflora*, otherwise known as mesquite), including for charcoal and commercial livestock feed, should be promoted beyond current small-scale, innovative projects by NGOs, such as the one sponsored by the Pastoral and Environmental Network in the Horn of Africa (for a summary of its work program, see PENHA 2016). This extremely invasive species has already taken over wide agricultural and agro-pastoral areas of the country, but it is both poorly managed and underexploited. Exploitation of the tree—for firewood, charcoal, timber, livestock feed, and flour and syrup for human consumption—could provide substantial direct economic benefits while helping keep its uncontrolled spread in check.

Somali consumers complain that charcoal from *garaanwa* is less efficient for cooking than charcoal made from acacia trees. This misperception stems from the fact that the trees are harvested too early, when they yield only small nuggets. Traditional harvesting of the much larger, long-established acacia trees yields larger nuggets. If allowed to mature, *garaanwa* is an excellent source for charcoal, highly prized in India and the Americas, that is far superior to comparably mature acacia trees. Although the tree is not as good a source of fresh food for livestock as the acacia tree and its thorns are poisonous to humans, practices of various communities around the world show how savvy management, harvesting, and processing of this tree can provide many benefits to Somalis.[109]

8.3.4 The Resins Challenge

The internationally recognized high quality of resins produced in Somalia represents a significant opportunity for livelihood diversification if current inefficiencies and sustainability concerns are addressed. Fostering and enforcing sustainable tapping (methods and frequency) of frankincense, myrrh, and gum arabic should be the top priority for the Puntland and Somaliland governments and the donors supporting them. A second priority should be increasing value addition, by supporting new private investments in processing.

There is good potential in the northern and Southern regions for the domestication of various other wild forest species (such as *aloe vera*), as proposed by the Federal Ministry of Agriculture in a recent project proposal to donors. The key initiatives recommended to improve the quality, sustainability, and processing of gums and resins and to promote new forestry products include the following:

- establishing a public-private network and agency for documenting and disseminating information on production, domestic and international prices, market opportunities and links, and best practices and lessons learned inside and outside Somalia on the harvesting, postharvest handling, commercialization, and processing of gum and resins.
- supporting land use planning and adequate supervision by regional governments and local communities of appropriate tapping methods, frequency, and overexploitation.
- supporting the formation of harvester cooperatives for more effective protection of trees and possibly the elevation and stabilization of wholesale prices of resins.
- ensuring uniform grading of resins, for better marketing domestically and abroad.
- establishing public nurseries where species traditionally grow and are harvested.
- distributing and selling seedlings to small farmers by these nurseries, to expand the areas under domesticated cultivation.
- providing technical and financial assistance for the provision and/or expansion of shallow wells along *wadis* to small farmers beginning to grow these species.

- establishing a clearer and more secure policy and regulatory business framework to promote more private sector investment in processing ventures.
- encouraging the private sector to establish more steam distillation plants in towns near key production areas, by facilitating its access to finance, know-how, and markets.

8.4 Increasing Agricultural Production

8.4.1 Overall Reform and Investment Options

The main trends of agriculture growth in Somalia are mixed—and in the fishery case very uncertain picture. Prospects are clouded by a high degree of uncertainty regarding future security and climate developments. Policy and institutional reforms can reduce uncertainty, but governments, donors, and private businesses need to adopt a flexible approach that considers multiple decision pathways in choosing optimal public and private investments, especially in the short and medium terms (Koppl-Turyna and Koppl 2013). Four main decision pathways should be considered:

- Growth options allow investors to secure economic or financial profits if market conditions turn out to be as good as or better than expected.
- Innovation options offer the flexibility to alter the focus and direction of investments, including in research and extension services, in various ways and at different times, and to expand or reduce production or change entry plans into new markets.
- Learning options emphasize a "wait-and-see" approach, small-scale and pilot interventions, and the deferral of large-scale investments, in order to benefit from lessons learned from early interventions.
- Risk-reducing options allow the scaling down or abandonment of investments to reduce potential losses.

Growth options. A number of trade- and market-oriented interventions can lead to substantial increases in productivity, production, employment, and profits even under the current high-risk environment. These opportunities are found in all subsectors and in all primary and processed products that already have solid domestic and export markets. Table 8.3 summarizes the growth potential of 12 subsectors in Somalia's main geopolitical regions.

Interventions should scale up successful programs and projects that increase access to inputs, technologies, credit, and product markets. They should leverage linkages and synergies among subsectoral and specific products' value chains. With good design, implementation, and risk-mitigation strategies, bold interventions—including policy and institutional reforms, capacity-building initiatives, and large physical investment projects in established, more productive as well as emerging growth zones or corridors, such as the Somali Coastal Shabelle Green Belt Special Economic Zone and the Bosaso Corridor—can yield large benefits.

Innovation options. Growth in the agricultural sector will depend largely on investments in revitalizing and improving the research and extension systems that existed before the war. Adoption of climate-smart agriculture innovations would be extremely beneficial for production systems in the dry, harsh environment of Somalia outside riverine and inter-riverine areas.

Highly recommended is a new technical assistance program to promote good agricultural practices and climate-smart innovations for sustainable intensification in irrigated and rainfed farms, animal husbandry, and dry-land resource management, especially at the adoption and diffusion of the technological cycle. It is important that such programs leverage, rather than try to replace, the current extension systems of civil society organizations, such as professional associations, which already

Table 8.3: Growth Potential of Selected Agricultural Subsectors in Somalia, by Region

Subsector	Somaliland	Puntland	Southern
Live animals	High	High	High, but limited scope
Dairy	High, but limited scope	High, but limited scope	High, but limited scope
Hides and skins	High, but limited scope	High, but limited scope	Limited (niche market)
Fruit	High, but limited scope	High, but limited scope	High
Vegetables	High, but limited scope	Low	High
Fodder	High, but limited scope	High, but limited scope	High, but limited scope
Sesame	Limited (niche market)	Low	High
Fisheries	Limited (niche market)	Limited (niche market)	Limited (niche market)
Cereals and pulses	Limited (niche market)	Low	Limited (niche market)
Frankincense, myrrh, and resins	Limited (niche market)	Limited (niche market)	Low
Bananas	Low	Low	High, but limited scope
Roots and tubers	Low	Low	Limited (niche market)

provide technical support and professional advice to individual producers and producer cooperatives and associations. Diaspora members should be encouraged to apply their skills and devote some of their time and funds on the ground when travelling to Somalia and to expand the linkages between local professional associations and professional networks abroad.

There is also a need to develop and implement a longer-term program for building a critical mass of research and extension personnel and infrastructure in all regions of Somalia. Doing so requires strengthening and expanding the agricultural programs of private institutions of higher education and integrating them into East African agricultural research networks. There is strong evidence from around the world that investing in agricultural research, extension, and development services has high returns (World Bank 2011c). In Somalia, the lack of information on crop yields, animal husbandry, fodder productivity, animal health, and fisheries management and the rapidly changing climate lend urgency to the need to reassess traditional technologies and adapt newer ones to local conditions. A program to develop and support pluralistic extension services (specialist knowledge and participatory extension approaches) should do the following:

- Support applied research in selected areas of irrigation agriculture.
- Establish and facilitate field schools that provide applied training on both basic business competencies and good agricultural practices, including on the use of good-quality seeds of improved varieties, timely planting and weeding, integrated soil fertility management, integrated pest management, and efficient use of water and nutrients.
- Establish community-based as well as commercial production systems for seed and fodder.
- Promote climate-smart agriculture on dry lands.
- Further develop and equip community-based animal health workers in pastoral and agro-pastoral areas.

Learning and risk-reducing options. Somalia is hobbled by a severe lack of basic economic and social statistics; the few statistics available are outdated, inconsistent, and/or unreliable. Studies of agriculture are often localized, isolated, and fragmented. They lack conceptual and methodological rigor and

produce few robust findings that can inform large and/or long-term investment decisions. For some commodities, products, and parts of the value chains and/or in some regions, it may therefore be best to "wait and see"—that is, to defer decisions about specific interventions while waiting for reliable information and the resolution of uncertainties and insecurities before committing scarce resources.

A wait-and-see attitude may make sense with respect to large-scale investments in commercial fodder, poultry and chilled meat exports, sugarcane and rice, and various parts of the fishery subsector. Virtually all attempts to build and operate large cold-chain and processing facilities for fish (by governments and donors) and meat (by Somali businesspeople) have failed, and no one has yet documented or evaluated them. It would thus be unwise to try to throw new money at this major constraint to the expansion and quality improvement of fish and meat marketing without first studying and understanding the reasons for previous failures.

Another example is the loss of experience and skills during the past three decades and the lack of updated knowledge on the global and domestic production and marketing conditions and prospects for rice and especially sugar. Before the government rehabilitates the dilapidated rice farms and sugarcane plantations and factories in the Middle Shabelle and Lower Juba, it should conduct in-depth studies of the competitiveness of domestic production relative to imports as well as detailed feasibility studies on the specific farms and facilities that private investors would be expected to rehabilitate under a public-private partnership (PPP).

8.4.2 Policy and Investment Recommendations for the Livestock Subsector

Live Animals

Somalia's livestock production system is geared primarily toward mitigating risk. There is ample room and opportunity for the system to shift toward meeting domestic and export demand for livestock and livestock products. Any proposed interventions along the livestock value chain, however, should carefully consider the limitations of the pastoral production system, including the carrying capacity of its rangelands, which has been maxed out. Minimal emphasis should be placed on animal population growth, including restocking, and maximum emphasis on expanding processing, where value addition and high growth potential lie.

Integrated production systems. Farms practicing settled mixed farming and urban stall feeding have sprouted up in Somalia to meet growing domestic demand from an increasingly sedentary and urban population. These demographic changes suggest that more emphasis should be given to supporting integrated production systems, leveraging the complex interlinkages between crop agriculture and peri-urban livestock rearing systems. Many opportunities in processing, value addition, and diversification, including but not limited to microenterprises, can be best pursued in peri-urban settings, where the need for employment is greatest.

Policies and projects to address pastoral issues must help build the resilience of communities to livestock emergencies, by mainstreaming disaster risk management and climate change adaptation. In addition to support related to livestock production systems, marketing, and trade, pastoralists need healthcare, education, and better conditions for women, especially related to land ownership.

Livestock trade. Trade networks and logistics for live animals and their products have been and should continue to be fully managed by the private sector. Investments aimed at increasing assets and trade and reducing costs along their value chains fall within the domain of the private sector. To ease the procurement and transport of livestock from primary markets to ports of exit or main centers of domestic consumption, private sector investment is needed to

develop and upgrade watering and holding facilities; fodder collection, transport, and feeding facilities; separation pens; transport; and (regional) livestock markets. Investments by both the public and private sectors are also needed to enhance animal welfare, by improving loading and unloading ramps, watering points, livestock shades, and vaccination pens in district and regional markets along the main transporting routes. Selling shoats at an earlier age would increase annual offtake rates while curbing animal population growth and related pressure on grazing resources. While these are desirable results, such a step should be carefully promoted so that a more rapid turnover of male animals does not lead to poorer selection of breeders for the next year, limiting the genetic pool.

Public functions should focus on creating a favorable policy environment for livestock trade and facilitating open and regular dialogue with importing countries to continuously review and update import requirements. These negotiations can be undertaken within a regional context (for example, with support from the Intergovernmental Authority on Development) or bilaterally. The public sector could also complement private sector investment by training relevant groups of people, such as marketing associations and user groups, to manage and maintain their infrastructure and facilities. The key priority areas for public investment in support of live animal trade are related to animal health, promotion of feed systems for expanded and higher-quality fodder supply, and genetic improvement. There is also a need for public promotion of more processing of animal products and value addition.

Animal health. Building the capacity along the entire value chain to cope with animal disease threats and to limit the occurrence of transboundary animal diseases, zoonotic diseases, and vector-borne diseases (such as Rift Valley Fever) should be a top priority of all livestock and animal health policies and programs. Animal diseases and outbreaks remain a continuous threat, a point underscored in December 2016 by the latest ban by Saudi Arabia on Somali livestock exports (only temporarily lifted in July–September 2017).

Continued efforts and investment are required to improve animal health. Many animal health interventions are still financed on a project or ad hoc basis. Disease surveillance is still undertaken in a haphazard and passive manner, and coordination with neighboring countries on disease control and coordination is still inadequate. The lack of institutionalization of the animal health system; the weakness of public institutions, particularly in the regions; and the unclear division of the roles and responsibilities of different health care service providers, both public and private, need to be addressed.

Extensive and sustained efforts are needed to build the capacity of public institutions for ensuring and certifying animal health. Capacity development is also needed for private sector service providers. Support should focus on the following areas:

- strengthening both public and private training institutions to deliver the next generation of experts in rangeland management; animal production, nutrition, and health; meat, dairy, and food processing technologies; and genetics
- staffing public institutions with qualified personnel to deliver effective services, at the federal and regional levels
- helping livestock professional associations increase their outreach and coverage and improve their service delivery while providing their members with continuing training opportunities and better links with agro-vet stores at the community level.

PPPs and professional associations need to institutionalize the delivery of veterinary and animal health services across the production chain. The public sector should invest in disease surveillance and control, by establishing and upgrading animal health facilities, such as quarantine stations, border

posts, and laboratories, and improving early testing and certification systems, whether publicly managed or operated by professional veterinary associations. Enhanced domestic diagnostic capacity and collaboration with reference laboratories for often reported diseases would ensure early disease confirmation and allow more rapid and effective control and response mechanisms. Early testing and a better disease prescreening, testing, and certification system would greatly reduce the number of rejections at ports. It should start at the main livestock markets and along major trade routes, after which cleared animals would obtain a permit for transit onward. Preliminary findings of such a system—implemented so far only in Galkayo, Puntland—are promising, according to FAO internal assessments. Complementary investments in human capacities and organizational structures should be supported.

A national disease surveillance and control system should be coordinated with the Intergovernmental Authority on Development, which bears responsibility for regional coordination of disease control, harmonization, and coordination of policies and interventions, as well as information sharing and reporting. Information management and dissemination should be improved using information and communications technology to increase outreach. Considering the high risk of emerging and reemerging diseases and the major economic threat they can unleash—and the most recent Saudi export ban—the level of emergency preparedness and response at federal and regional levels also needs to be improved. Establishment of an early warning system that would integrate animal disease risk assessment and risk communication and the preparation of contingency plans are important and urgent steps.

Fodder production and feed systems. Fodder has the greatest impact on the body conditions of livestock and on milk yields. Given the booming live animal trade and the growing domestic urban demand for milk, demand for fodder is also high. Its production is increasingly important in all regions, because many livestock producers and traders already rely on animal feed to mitigate the seasonal lack of grass pasture and tender shoots of shrubs and trees and to improve animal quality.

This subsector presents good opportunities for smallholder farmers, who can switch cultivation of their land between crops and fodder to reduce risk and maximize income. There is also evidence of increasing commercialization of fodder production, with animal traders and exporters paying producers in advance to ensure timely delivery of fodder. Experience, technical knowledge, and large-scale private investment are still very limited, however.

A value chain analysis of the fodder/feed subsector should be undertaken, with a focus on existing "feed corridors" connecting fodder production areas to regional markets and terminal ports. It should consider the risk that feed development could constrain pastoral mobility and fuel clan conflicts over scarce irrigated land resources. As animal feed production is at the nexus of crop and livestock agriculture and has significant environmental implications, there is also a need to assess, align, and harmonize the policies and institutional arrangements of various line ministries. Large-scale public interventions to promote the production of fodder should wait for the findings of such a feed value chain analysis.

Several recommendations can already be advanced about short-term interventions to promote fodder production:

- Strengthen capacities to deliver extension services to farmers. Agro-pastoral farmer field schools can be used to train trainers, farmers, and small seed producers, including through field demonstrations, to promote the adoption of good agronomic practices, including smart irrigation and the use of high-yielding, nutrient-rich drought-tolerant plant varieties.

- Support fodder seed production and marketing. Support should be provided to research and extension on the introduction, testing, multiplication, and distribution of suitable seeds and planting materials, both local and introduced varieties, coupled with sound management practices for open range fodder production (for example, deferred grazing during flowering and seed setting). Support should also be provided to agro-vet stores in all regions, in both distributing fodder seeds and marketing feed and fodder.
- Improve the processing, storage, and transport of fodder, either as hay or silage, to minimize wastage and quality losses and ensure year-round availability. Efficiency gains can be realized in optimizing the collection and transportation of fodder by promoting boxing rather than bulking of fodder.
- Explore alternative animal feed options, including harvesting and processing Proposis julifora pods for animal feed, and enhanced conservation of browse tree forage.
- Consult and involve pastoral communities in the design and management of feed production schemes, building on their traditional governance mechanisms.

Restocking. Severe droughts that kill large numbers of animals are a catastrophic event for poor households that is closely related to their destitution, marginalization from community life, and migration to urban and peri-urban areas. As traditional means of restocking have proved inadequate, large-scale emergency restocking programs by NGOs and other development partners have been undertaken across the country, often by giving female shoats to poor pastoralist households. Restocking to critical livestock threshold levels with the right livestock composition, which ought to include also larger animals, is important. Such programs, however, should not aim to restore the predrought livestock population, given concerns about its sustainability. People who move to (peri-) urban areas also need support in integrating livestock-keeping activities in their new livelihood.

Improving animal genetics. As natural resources become ever-more scarce and climatic change becomes the new reality across Somalia, investments in animal genetic research and breeding programs are required to enhance the productivity and adaptability of native livestock breeds. Community participation should be sought in promoting innovative breeding practices. Initiatives involving community participation are expected to be welcomed by Somali pastoralists struggling to cope with the unprecedented degradation of their natural environment and climate change.

The challenge will be to improve productivity traits while maintaining adaptive traits. Toward that end, the focus should be on selective breeding within the existing stock to take advantage of its time-tested capacity for adaptation, resistance, and rebound to local conditions, which include a harsh climate, severe droughts, poor feed quality, and endemic diseases. Only in special cases (for example, peri-urban dairying), should introduction of new breeds be considered. Breed improvement interventions should include the following:

- participatory genotype characterization (taxonomy of genetic differences) through phenotypic (physical appearance) features
- training of communities on simple breeding concepts and intensive feeding of selected breeding animals with improved fodder
- development of community-based schemes for stock upgrading, including participatory selection of superior animals, leveraging pastoral knowledge
- promotion of management systems that not only increase production and productivity of indigenous breeds but protect the improved genetic pool.

Livestock Products

Ample opportunities exist to expand and modernize the value chains for all livestock products, from raw milk and hides and skins to hygienic slaughterhouses for chilled meat exports, small- and medium-scale dairy production, and poultry keeping. Gradually moving up the value chain in the livestock subsector would have the greatest impact on improving nutrition, increasing incomes and employment (including of youth and women), and diversifying products.

Somalia's National Development Plan foresees a cumulative increase of production and consumption between 2016 and 2019 of 20 percent for milk, 15 percent for hide and skins, and 12 percent for meat. Processed milk and meat volumes are expected to increase only modestly, by 10 percent and 4 percent, respectively. The National Development Plan seeks to increase the export value of both processed meat and hide and skins by 10 percent. With a concerted effort to promote the value addition and processing of animal products, much higher production volumes and values are feasible in the medium term, contributing to strong job creation.

Dairy production and processing. Rapid population growth and urbanization have increased and will further increase demand for milk and other dairy products. Domestic production is still well below demand. Despite increased production, Somalia remains a net importer of both raw and processed milk and other dairy products.

Most investment in dairy sector infrastructure (such as milk collection centers and cold storage) and processing facilities (such as low-cost artisanal plants to pasteurize milk and process yoghurt and cheese products for the domestic market) should be undertaken by the private sector; larger ventures could be promoted through PPPs. Public investments are needed to address key bottlenecks along the milk value chain, including animal health issues and the transporting, processing, and marketing of dairy products. As women dominate the dairy value chain, such investments would contribute greatly to women's economic empowerment.

To ensure consumer safety and to upgrade the value chain for milk, the government should focus on five sets of priority actions:

- Provide extension support to dairy producers, to expand productivity and reduce seasonal fluctuations.
- Organize and train people across the dairy chain, in order to allow them to make bulk purchases of inputs.
- Provide capacity development and basic equipment to women's cooperatives.
- Develop and implement a policy and regulatory framework development, including the Dairy Act and Code on milk hygiene, to govern operations in the dairy sector. Strengthen the Quality Control Commission, to provide inspection and testing to ensure compliance with milk quality standards.
- Improve coordination and marketing, by facilitating the establishment of a multistakeholder platform that brings together dairy sector actors to identify problems, promote solutions, and share information about opportunities in the sector.

Meat production and processing. Although consumers in Somalia's traditional export markets in the Gulf prefer fresh meat, Somalia could still export chilled and frozen meat. Attempts by the private sector to do so have ended mostly in failure, however, for reasons that are not fully understood. Further analysis is recommended to understand past failures before recommending large-scale private investment in new meat-processing ventures for export.

Local processing for the rapidly expanding domestic urban market is still feasible and profitable. The bulk of investment in slaughterhouses and other facilities for meat processing and value addition needs to come from the private sector. The public sector still has a major role to play, as illustrated by the sustainable meat value chain Namibia put in place through a PPP (box 8.2).

Hides and skins. With world and regional demand for leather on the rise, professionalizing the Somali hides and skins sector could attract private sector investment from abroad. Growth of this subsector would expand income-generation and employment opportunities for local traders, entrepreneurs, and youth.

Box 8.2: Lessons from Sustainable Development of the Meat Value Chain in Namibia

With an exported volume of about 12,000 tons in 2010, Namibia is a relatively small player in the global beef market. It cannot therefore compete purely on price. Its unique production landscape, in which cattle production takes place in a delicate natural environment, made a differentiation strategy based on environmental sustainability a logical choice for increasing competitiveness.

Namibia's dynamic and market-driven stakeholders in the beef value chain collaborate through the Meat Board of Namibia, a PPP. Through meetings, market research, and technical support, the board facilitates synergies at the value chain level. It is in part through this board that the Farm Assured Namibian (FAN) Meat scheme was established.

FAN Meat markets free-range, hormone-free beef with guaranteed animal welfare standards. It combines good agricultural, transport, veterinary, and manufacturing practices. FAN Meat guarantees customers that at least 70 percent of the animals' diet is based on grazing.

To ensure that this grazing does not destroy Namibia's fragile ecological environment (through bush encroachment, for example) or reduce alternate economic opportunities (through loss of wildlife, for example), the board promoted new community-based pasture management practices and individual ranch management practices through training and changes in the legal framework. A key element was that the reduced pressure on natural resources was based not on reducing herds but rather on better managing them (through a holistic management approach that focuses on restricted movement of the entire herd as opposed to the traditional approach of allowing animals to roam freely). This approach both increased the amount of meat produced per hectare and reduced the environmental footprint of beef production.

The national strategy is embodied in the marketing strategy of Meatco, Namibia's largest beef processor. In September 2008, it launched its Nature's Reserve brand and shifted from selling wholesale to selling directly to high-end retailers or food-service providers. The brand allows quality-conscious consumers to distinguish Namibian beef from other supplies.

The success of this strategy is revealed by the fact that Namibia's exports have grown faster than Botswana's, especially in volume. Namibia also exports more higher-value fresh-chilled boneless cuts, sells more into high-end markets, and commands prices that are 20–40 percent higher than those received for Botswana beef. With a larger share of the total kill sold as "quality-differentiated" cuts, exporters have been able to pay their farmers premiums of $28 million a year above the prices received by comparable South African farmers.

Source: Neven (2014).

Private investment from domestic and diaspora sources is needed to strengthen the local supply chain. Public support should focus on training actors along the value chain, including butchers and flayers on proper slaughter and flaying techniques and use of appropriate flaying knives to enhance the quality of hides and skin; pastoralists and farmers, hide and skin collectors, and traders on proper handling, curing, drying, and preservation of hides and skins; and local entrepreneurs and professionals to improve technical knowledge and skills in leather tanning and manufacture of leather goods. Business development support should be provided to local tanneries. The public sector should also enforce environmental regulations for tanneries, to prevent environmental damage and subsequent popular backlash.

Poultry. Demand for poultry and poultry products, such as eggs, is increasing in urban areas. Promoting improved indigenous chicken breeds for expanded household poultry production in peri-urban areas and the associated downstream marketing of eggs and poultry meat can provide opportunities for employment and income generation, particularly for women and youth, while meeting at least part of the large and growing urban demand for an alternative source of animal protein, which is currently met by imports. Development of the poultry subsector would also contribute to income, employment, food and nutrition security, and women's economic employment in rural areas. For household- and village-based poultry production, support and facilitation should be provided for access to inputs (started pullets [hens 15–22 weeks old], poultry vaccines, and drugs); services (health and extension); and finance (start-up funds or credit). Promotion and support for large-scale commercial poultry production requires an in-depth and quantified analysis of the value chain to assess Somalia's potential competitiveness and identify the challenges to establishing an adequate input supply system and a secure health monitoring system.

Microenterprises. Although much of the livestock subsector needs efficient commercial investors and operators, there is a role for microenterprises in a number of ancillary activities. Such activities include the transformation of crop residues into fodder; commercialized fodder production from rangeland rehabilitation; livestock breeding and animal finishing/fattening; and cottage industries in value addition of honey, meat, hides and skins, bones, and milk. Facilitating the establishment and growth of viable community-based livestock-focused microenterprises requires much of the same support as in other economic sectors—namely, access to microfinance and training of communities in group dynamics, business development, product development, and marketing.

8.4.3 Policy and Investment Recommendations for the Crop Subsector

In the immediate prewar years, the crop subsector in southern and northwestern Somalia demonstrated its potential for meeting a very large share of domestic food demand and generating sizable export earnings. The near-term challenge is to enable the revival of cereals (maize, sorghum, rice, and millet); legumes (cowpea and mungbean); vegetables; and banana cultivation and to support other successful crops, such as sesame and lemons, while making all of them more productive. The medium- and long-term challenge is to attract larger-scale investment in expanding land under irrigated cultivation beyond prewar areas, raising yields to their full potential, and promoting higher value addition through processing.

In southern Somalia, only about half of the previously irrigated area is currently under cultivation; the rest suffers from more frequent floods and poor water flows. Road transport infrastructure in Southern Somalia is in such a state of disrepair that the current cost of transporting crops to markets is much higher than it used to be.

There is enormous potential for increases in crop production and productivity just from rehabilitating and upgrading prewar flood control and irrigation public infrastructure. Rehabilitation of this infrastructure could allow up to a doubling of cultivated areas within the riverine system of the Shabelle and Juba rivers, opening up significant additional crop areas for smallholders while still allowing for recession agriculture to continue. A feasibility study conducted in 2014 shows a potential irrigation area of more than 12,000 hectares just around Jowhar (SWALIM-FAO 2014).

In the northern and Southern dry lands, the challenge is to harvest the large volumes of water that arrive in a very short period of time (unpredictably and loaded with sediment and debris) and to access the groundwater available in many locations for many months after the rains have ceased, both along *wadis* and in natural underground rivers and reservoirs. Crop cultivation is still feasible and profitable in selected areas of such regions, but it does not respond well to conventional irrigation techniques, which are feasible in the southern regions. For instance, oasis farming in Puntland to produce cash crops for local markets could be considerably expanded with investments in more efficient water harvesting and usage techniques, including shallow wells, check dams, sand dams, spate irrigation, micro-irrigation, and adoption of other oasis agriculture practices.

In all regions of the country, Somali farmers rarely use improved seeds and inputs, good agronomic or climate-smart practices, or risk-mitigation strategies. Most banana farmers are familiar with farm inputs such as urea and nitrogen-phosphorus-potassium (NPK), but vegetable growers still use only animal manure to improve soil fertility. After three decades of emigration of skilled and educated professionals, there is also a dearth of technical capacity for managing irrigation systems.

A holistic approach is required to deliver quick, large, and sustainable production and productivity gains for staple food commodities and diversify horticulture, pulses, and other high-value crops. A comprehensive sectoral development program is needed that combines technical, social, and environmental feasibility in the context of climate variability and population growth. The main components of such a medium-term program should include the following:

- rehabilitation of prewar flood control and irrigation infrastructure along the two major rivers in Southern Somalia
- expansion of rain water catchment and moisture conservation and the introduction of control measures for soil erosion and gully formation in the central and northern regions
- institutional and human capacity building
- rehabilitation of prewar trunk and rural roads to improve the transport of inputs to farms and produce to markets
- establishment of an enabling environment (policy and regulations) for testing and improving awareness of, access to, and adoption of productivity-enhancing and resilient technologies.

The first four components should be pursued in parallel, rather than in sequence, as institution building without investments in infrastructure will not yield tangible gains and initial and partial gains in production and productivity from investments in infrastructure will likely prove unsustainable without complementary institutions and capacity building to operate and maintain them.

The rehabilitation of irrigation and flood control infrastructure, mainly along the Shabelle and Juba rivers, should aim at rehabilitation of all (or

most of) the prewar flood control and irrigation schemes—including headwork, primary and secondary conveyance systems, night/regulating storage tanks and on-farm structure offtakes, field water application and drainage technologies, and access roads—within five years. Selection of the infrastructure to rehabilitate should be based on biophysical, socioeconomic, and institutional criteria, as well as cost and potential for large-scale economic impact. Beyond the medium-term rehabilitation of prewar schemes, full technical and economic feasibility studies will be needed for proposed expansion or new projects.

There is also a need to focus on water catchment, storage, and efficient utilization in rainfed or groundwater-dependent areas. In Somaliland, Puntland, and other dry agro-climatic zones of Southern Somalia, investment priorities should focus on the rehabilitation and expansion of water harvesting infrastructure as well as on the promotion of soil and water conservation techniques using a watershed management approach. Infrastructure should include shallow wells, check dams, sand dams, soil bands, spate irrigation, micro-irrigation, and other water-saving technologies.

Several projects have been successful in Somalia. One is an EU-funded vegetable-growing project that relies on shallow wells and solar water pumps in the Dur area of the Sanaag region. It could be scaled up along most other seasonal water courses in all other dry areas of the country. Another is the construction of microdams for harvesting and storing water from seasonal rivers that can be used for on-farm irrigation during droughts.

The institutions and capacity-building component should aim at ensuring the following:

- better governance related to access to and use of land and water, including clarification of tenure systems and resolution of conflicts related to illegal occupation of farmlands
- clear responsibilities for water management and rehabilitated water infrastructure, agreed upon by stakeholders from communities and the Federal Government
- rebuilding of social capital to ensure efficient water use at the grassroots level through the establishment of sustainable water user associations
- partnerships with farmers, professional associations, and private investors in schemes to improve service delivery, input supply, and marketing
- consultations and agreement between the government of Ethiopia and the FGS, as well as coordinated planning over water utilization and agricultural development plans for the Shabelle and Juba basins.

The sustainable intensification and diversification component should aim at increasing productivity, reducing postharvest losses, building resilience, and mitigating risk across all agro-ecological zones.

Climate-smart agriculture promotes sustainable farming methods that would meet all of these goals. It requires the adoption of good agricultural practices, such as (a) intercropping (through mixed cropping, rotations, agroforestry, green manuring, and so on); (b) integrating livestock and crop production; and (c) integrating pest and disease management. Sustainable and efficient rainfed and oasis farming in Somalia's dry lands requires location-specific innovations, such as use of proper inputs; crop varieties that are tolerant to drought, diseases, pests, and floods; drip irrigation and efficient soil moisture conservation techniques; and methods for reducing postharvest losses.

Agriculture research and extension. Somalia needs to rebuild its agricultural research and extension system. It should promote a hybrid form of extension that combines a public extension system for small-scale farmers producing staple crops and a private sector–led extension network of cooperatives, agro-dealers, and contract farming extension for farmers involved in cash crop production.

As part of such an effort, in-country research capacity needs to be established, with strong operational linkages to international and regional research centers—including the Consultative Group on International Agricultural Research (CGIAR), the Intergovernmental Authority on Development, and national and international universities—to test innovations and identify scaling-up approaches. All new technologies entering the county should be tested before they are disseminated to the farming community.

Innovation hubs could be introduced in crop (and livestock) production zones across the country, linked to existing field schools. They could include hubs along the Shabelle and Juba rivers for testing irrigated crop technologies. Hubs would carry out field research in climate-smart agriculture approaches for existing food security crops (including orphan crops) and investigate how to increase productivity for fruits and vegetables. They would assess new germplasm with high production potential, seed system development, water use efficiency, conservation, transboundary pest and disease management, and postharvest loss reduction. The required learning/implementation process, which would provide valuable evidence-based policy recommendations to decision makers, would benefit greatly from the involvement of field technicians from the federal, state, and district authorities (where existing). New technologies would be promoted in specific zones based on their agro-ecological conditions.

Seed development systems. Somali farmers who raise staple food crops rely mainly on their own saved seeds. Other farmers import seeds, with the attendant risk of spreading viral diseases and pests and introducing new diseases.

Increasing reliance on a few crops presents some risks. Research needs to be strengthened to evaluate local germplasm and to receive and screen disease-free germplasm collected before the civil war and stored outside the country. Extension could offer certification systems and support the gradual development of both formal and informal seed systems, supporting community-based seed multiplication (including for root and tuber and fodder crops).

Ensuring access to good-quality seeds and multiple varieties for crop diversification (for sweet potato, cassava, and orphan crops such as sorghum, cowpeas, and mungbeans) would increase food security and expand multiusage crops (for human and animal feed, as well as for biofuels). In an ideal integrated seed system, both formal and informal seed systems would be used to create and disseminate improved seed varieties at scale. Building on the informal seed system is advantageous because it already works at scale, is market driven, moves a wide range of crops, works everywhere, rarely breaks down entirely, distinguishes between seeds and grains, and is highly dynamic. Strengthening the informal seed system must go hand in hand with building the formal seed system, because seed multipliers need guaranteed access to initial supplies of high-quality seed (either foundation seed or less costly certified seeds).

Input supply. There is a need to support the creation of an enabling environment for private sector–driven initiatives (for example, input suppliers, cooperatives, contract farming, other agro-dealer businesses) that would ensure the quality, accessibility, and on-time delivery of fertilizer, pesticide, seeds, water pumps, irrigation pipes, tools, and equipment.

Cereals. By 2019, the National Development Plan intends to increase the annual output of the two main cereals, maize and sorghum, by at least 20 percent, from 126,800 to 152,160 tons; double the number of households growing and consuming nutrient-dense vegetables, from an estimated 10,000 to 20,000 tons; and increase the annual cultivation of underutilized or orphaned crops, such as cassava, from 1,170 to 5,000 tons.

There are many constraints to increasing yields of rainfed crops. But investment in improved irrigation and water catchment infrastructure and farm management practices could double or triple yields and double the land under cultivation. Better postharvest and storage facilities and techniques for cereals at both the household and community levels are highly cost-effective and would contribute greatly to food security and income stabilization. The public sector should aggressively promote with awareness campaigns, technical assistance, and modest subsidies of private and community investments in storage facilities, which create a reserve to sell when prices are favorable, ensure better grain quality, and reduce exposure to dangerous aflatoxins and resulting losses (which are as high as 30 percent).

Sesame. Many sesame-processing companies operate in Somalia, and some of them are already exporting. Their growth potential depends largely on the extent of public investments in flood control, irrigation, and transport infrastructure. If these investments are made, private investment in both primary production and value addition is expected to follow. More efficient and higher-capacity pressing machines would increase sesame oil productivity, quality, and competitiveness in both domestic and export markets.

Access to equity or credit by the private sector has not proven a constraint to this subsector's remarkable growth. Therefore, the federal and regional government and their international development partners can focus their support on technical assistance, in order to promote both entry by new investors and expansion of existing ventures.

Bananas and other horticulture. The same interventions recommended for cereals and sesame would support the recovery and growth of pulses and legumes, roots and tubers, and other fruits and vegetables. The poor state of roads and storage facilities undermines the potential for horticulture. Public investment in improving transport links between farms and urban markets and private investment in cold-storage facilities are needed to support growth.

The banana subsector has high export potential to Gulf and other Middle Eastern markets. To realize its potential, this subsector needs three specific interventions:

- resolution of the land occupation by militia leaders and members with no farming background or knowledge that occurred in the early 1990s
- introduction of tissue culture technology that can provide uniform banana seedlings free from insects and diseases
- development of contractual arrangements and outgrower schemes between old and new banana and fruit marketing and export companies and plantation and smallholder farmers.

If the public sector improves security, resolves land disputes, and creates an enabling environment, private outgrower schemes will make the necessary improvements in production practices, postharvest handling, storage, and packaging.

All growers with 10 hectares or more of land under banana cultivation need to dig new boreholes or rehabilitate nonfunctional ones to irrigate the crop and strengthen resilience to droughts and river-drying. The government has only a regulatory role to play. To help reduce the high out-of-pocket cost of new boreholes for small banana farmers, however, it could channel financial assistance through cooperatives (with at least 10 hectares of land).

Sugarcane and Rice. Sugarcane production has ceased since the collapse of irrigation infrastructure and the looting of refining factories. Sugarcane remains one of the highest-yielding crops, well adapted to the soil and climate of southern Somalia's irrigated lands along its two major rivers. Sugar is one of the highest value-added agro-processed product.

Rice farmers in the Middle Shabelle have survived three decades of government absence, albeit at much reduced production levels. The rehabilitation and renewed operation of prewar public assets, including through hydropower generation in the Lower Juba and improved services, would greatly enhance economic recovery and employment in the surrounding regions and reduce the very large rice and sugar import bill.

In-depth analysis of the competitiveness of local production relative to imports is needed before public budgets and donor funds support the revival of the dilapidated prewar, publicly owned rice farms, sugarcane plantations, and sugar-refining factories around Jowhar in the Middle Shabelle and Mogambo and Mareerey in the Lower Juba. If private investors were willing to rehabilitate the assets in these subsectors in return for access to the land where the assets are located, it would be reasonable for the government to enter into joint ventures with them.

This scenario could conceivably apply to the rehabilitation of the Mareerey Juba Sugar Project to its end-1980 first-phase capacity. The government and the donor community would invest only in the rehabilitation of flood control and irrigation infrastructure and power generation.

The most realistic option for rehabilitating the Mogambo rice project would be to distribute the publicly owned land of the project to small farmers in the area, with the government and donors funding only the rehabilitation of irrigation, drainage, flood control embankments, and the rural roads linking producers to the market. Public funds could also be used to provide loans to enable cooperatives/associations to purchase needed agricultural equipment, including a small rice mill and tools and other inputs needed to grow rice and other crops.

8.4.4 Policy and Investment Recommendations for the Fishery Subsector

If it were properly managed and able to attract experienced investors, Somalia's fishery subsector could increase sustainable production (for both domestic consumption and export), incomes for fishers and traders, and government revenues. Although there are opportunities for freshwater fisheries, the best growth prospects are in Somalia's highly productive oceanic waters, which host small pelagic fish and tuna and tuna-like species during the southwest monsoon. Realization of this potential will depend largely on private investment to expand underexploited offshore fisheries; develop coastal and inland fisheries for domestic markets; and improve national nutrition, including by strengthening cold chains; and move into processing.

The public sector has a major role to play in fishery management and promotion, which are weak or absent; in licensing, which is nontransparent; and in landing site and transport infrastructure, which is in very poor condition following decades of neglect and underinvestment, even in Somaliland and Puntland. The following recommendations (Kelleher 2016) reflect the findings of chapter 7:

- Enhance the protection of offshore fisheries using the coast guard.
- License foreign fishing and use the revenue generated to develop the sector, starting with relatively peaceful and accessible areas, such as Somaliland and Puntland, and gradually including other areas as conditions improve.
- Support small-scale fishery production and marketing with equipment, cold storage, and marketing, through support of small and medium-size enterprises.
- Build capacity at all levels, including business development for stakeholder associations.

- Build fishing jetties, cold-storage facilities for fisheries association, and roads for access to markets in major urban centers and export locations.
- Ensure effective aid coordination by the FGS and the governments of Somaliland, Puntland, and other emerging coastal states.

Fisheries information and management. In the short term, two priorities can help increase sustainable fishery production and its contribution to the economic development of the country: (a) establishment of a comprehensive, secure, enabling environment, based on a stronger legal and clearer regulatory framework and the rule of law for private investors, including for licensing and (b) creation of a system for collecting data and estimating indicators.

Experts disagree on actual and potential volumes and values of landings of Somali fisheries, because there are no reliable official estimates and the estimates of individual studies are based on extremely limited data, scant scientific evidence, questionable self-reporting, and many methodological assumptions. A strong data collection and analysis framework is badly needed for reliably estimating potential catches, formulating evidence-based policy, making licensing decisions, and planning investment by both the public and the private sectors.

Alternatives to traditional ministry-run systems for fisheries information systems and management are highly recommended. Public institutions should limit their activities to making policy. Private sector entities should handle monitoring and surveillance, including research, quality control, extension services, and data collection, as well as license issuance and revenue management, as is the case in Puntland. Steps in this direction have already been taken. The wholesale embrace of such an approach requires a deep change in governance culture among politicians and broad stakeholder consensus.

A good fisheries information system would require capacity building; commitment from all stakeholders; stronger partnerships among local universities, suitable international academic and research partners, and regional fisheries management organizations; and effective monitoring of all (or at least the main) landing sites. The starting point for improving fisheries management is to develop a strong data collection and analysis framework on fishing activity, including effort, species identification, landed quantities, species mix in landings by fishing gear type, and stock status.[110] It is also important to start collecting price information (ideally both wholesale and retail) for the most commonly consumed and traded fish products, a task that could be added to the existing price survey work by the Food Security and Nutrition Analysis Unit, if modest funding for it could be secured. In parallel and while waiting for better data, a weight-of-the-evidence approach should be adopted, which the FAO has pioneered for generating key indicators, including actual and potential stocks, in the absence of more formal data.[111]

Highly migratory species' fisheries and processing. The most immediate opportunity for fiscal revenues is the licensing of highly migratory species fisheries to offshore vessel owners, especially for tuna. The first foreign applicants for licenses are already in place, but initiatives face political uncertainty and reluctance from various regions and the FGS regarding revenue sharing. It is recommended that support for public investment and other fisheries interventions by donors be tied to progress on transparent licensing agreements with tuna fisheries and public disclosure and sharing of revenues. Without a firm stance by development partners, it is likely that this revenue stream will continue to fall short of potential and the political process continue to be a source of conflict among different levels of governments and mistrust on the part of the public.

The private sector will decide whether to invest in expanding the two small tuna canning factories and/or to build more factories. Expansion of processing would require increased tuna landings. Some incentives, such as lower licensing fees for domestic tuna vessels, may help in this regard.

International hygiene experts embedded in the Somaliland and Puntland ministries for the last two years have produced manuals and training on the fish hygiene chain, certification, and inspection procedures, but they have not been applied in local markets and are mostly disregarded by the ministries. Without long-term funding, strong back-up support, and measurable targets for ministries to achieve to trigger further support, similar problems will occur in other aspects of governance.

Port infrastructure. Somalia has only a few natural harbors currently able to support large cargo and industrial fishing vessels, at Berbera, Bosaso, Mogadishu, and Kismayo, with the Hafun promontory having the potential to host a fifth port. None of these ports is buoyed or lit for fishery purposes. The International Maritime Organization has prepared detailed buoyage plans for all main ports, but funding to implement them has yet to be obtained. Other sites with potential for smaller semi-industrial fishing vessels include Maydh (now financed though the Somaliland Development Fund), Laasqoray, Qandala, Garaad, Hobyo, Jazeera, Merca, and Barawe. Major upgrades and expansion of cold chains, fish landing sites, and road links are needed, not only to supply more fish to inland Somali towns but to export to Ethiopia.

Fishery-related development opportunities at all ports are being missed for lack of planning. All of the main ports urgently require master plans that set aside areas for future fisheries infrastructure and guide complementary public and private investments in the medium and long terms in cold chains and transport infrastructure.[112] Detailed business plans, feasibility and design studies, and social and environmental impact assessments at each port are also needed. Table 8.4 presents estimates of the costs of port infrastructure.

For centuries, Mogadishu's Old Port was the main trading center of the Southern region, especially for the Banaadir and neighboring inland regions. Until construction of the new commercial port, in the 1970s, it was the main fisheries harbor in Somalia. The Old Port site provides the ideal location for the vital assets of fisheries' patrol vessels, for berthing of foreign vessels for inspection, and as the operational

Table 8.4: Estimated Costs of Building or Improving Fishery Landing Sites at Major Ports *(thousands of dollars)*

Site	Type of work	Construction	Environmental and Social Impact Assessment
Mogadishu Old Port	Port works	5,000	—
	Shore works	3,000	—
Bosaso	New port	15,000–20,000	500
Berbera Phase 2	Port works	5,000	Environmental Impact Assessment completed; business plan required
Hafun Peninsula	Shore works	3,000	250
Kismayo	Site works	2,000	100
	City landing	1,500	—
	Somali Marine Products Project	2,000	—
Total		**51,500**	**—**

Source: FAO Somalia (preliminary unpublished estimates).
Note: — Not available.

base for large-displacement domestic fishing crafts. The site is also ideal for access to markets in Mogadishu, because its jetty areas are in the heart of the city, adjacent to the Lido area. It could also house a fisheries authority, a joint monitoring control and surveillance operations room between fisheries and the navy or coast guard, and hygiene inspection facilities.

In addition to designation of at least part of the Old Port area for fisheries, rehabilitation and improvement to its land access are needed, as its waters have silted up. Coordination and agreement by various government agencies, donors, and the Turkish firm Al-Bayrak (which holds the concession to manage the Port of Mogadishu for a 10-year period) will also be required to ensure that plans to rehabilitate the harbor for fisheries purposes complement other plans for its commercial development.

A longer-term alternative may be to create a bespoke seafood park outside Mogadishu, based on an artificial landing T-jetty that is large enough to allow large tuna purse seiners to discharge. Similar to plans already sketched out for Bosaso, but less ambitious in scope, such a jetty would be suitable for exporting livestock as well as mooring patrol vessels. With careful planning, it would allow the development of an appropriate business hub based ashore, clustering seafood companies, cold storage, and associated businesses at a new site. Development of such a jetty would require $10–$14 million of public investment (based on preliminary and unpublished FAO estimates), which would be expected to crowd in private investment of at least this amount.

Bosaso is the key fisheries hub in Puntland and the only deepwater port on the Puntland coastline. The harbor is a vital source of revenue and Puntland's only commercial gateway to the outside world. Current import and livestock export demand means that the port is working at full capacity, putting great pressure on the fishing industry, which is currently operating below its potential and is under pressure to make way for more lucrative cargo vessels.

There are plans to expand port capacity through reclamation of the Bay of Bosaso. This area is vital to the fishing community, because it is the only area that is protected from the monsoon winds and deep enough for fishing boats. The fish market on the site and landings facilities there have been redeveloped and a pontoon has been installed for fish landing, which is working well. Although development is noncontroversial, there are no donor commitments to support the expansion of the port.

Plans have also been floated to develop a second port 10 kilometers east of the existing facility, for livestock, fisheries, and the hosting of patrol or naval vessels. Development of this new harbor is key to unlocking the fisheries potential of the entire region. The Bosaso town master plan, supported by UN-Habitat, includes new roads, a bypass to facilitate development, and use of this new harbor site.

The largest new private sector development in the Puntland fishery subsector, an 800-ton cold store and associated processing facilities, has already been sited east of Bosaso, close to the proposed new harbor location. It is recommended that the development plans for both the old and new harbors be refined, with full environmental impact assessments and business plans, for presentation to public and private investors.

The Hafun/Hurdiya Peninsula contains the only undeveloped deepwater harbor in Somalia. Sheltered from monsoon winds, close to both the best demersal and small pelagic fishing grounds off Somalia, and close to deepwater seamounts that attract larger tuna during the southwest monsoon, it is an ideal export-oriented fish-processing base. Substantial investment would be required to rehabilitate a facility that has not been used since it was bombed by the British Royal Air Force in 1941.

Before 1941, the area also had the largest salt pan facility in the world, exporting more than 140,000 tons of salt annually. There is considerable interest on the part of international commodity companies in reviving the salt facilities. One firm sent an engineering team to the site in 2015. It concluded that restoring and modernizing the salt pans would cost $3 million. In addition, the deepwater jetty needs to be rehabilitated with an 8-meter water depth at extreme low tides.

A facility of this nature would also provide a new livestock export terminal 500 kilometers southeast of Bosaso, providing an instant market for animal feeds made from byproducts of fish processing. In 2006, plans were drafted for the reconstruction of the jetty; they have not been subject to an environmental impact assessment. Constraints in developing the peninsula—in particular the lack of a paved road and the cost and availability of water, which would need to be piped in from 50 kilometers away on the main land or obtained from a desalination plant—should not be understated. But redevelopment of the facility would provide a major boost to employment and export revenue in the region, one of the poorest and most remote in Somalia.

Berbera has a containerized deepwater port, separated from a much smaller fish landing site. Rehabilitation of the landing jetty in 2015 greatly improved landings for artisanal fishing vessels, but this jetty is not suitable for industrial or semi-industrial fishing vessels. The FAO completed a full environmental impact assessment for the development of an industrial fishing harbor east of the existing landings quay, which will remain entirely separate from the commercial port. Such development would require dredging, creation of a new landings facility, and land reclamation for associated industrial processing development, but such works would be relatively inexpensive (about $3 million) and straightforward.

Jubaland has good potential for coastal fisheries, including shrimp and spiny lobster (crayfish), for which the now derelict Prodmaa factory was built in the 1960s. The beach in front of the town has no facilities for landing of fish, and the port area was not designed for fisheries, is farther from town, and is likely to face competition from cargo vessels. Land is available around Kismayo's natural harbor, but it has only one deepwater quay, with limited access. Unexploded munitions in a wreck at the entrance to the harbor require removal if port capacity is to be expanded. The FAO completed a concept design for the construction of a beach landing site. In addition, it scoped out refurbishment of the site of the crustacean-processing factory, but the site is subject to a protracted ownership dispute, endangering plans for its rehabilitation.

Road networks. The main road links throughout Southern Somalia are extremely poor. Most coastal settlements in all regions are accessible only by dirt road, and large swathes of the coast, including some settlements, have no coastal routes at all. Traditionally, maritime links were the main means of transport for most coastal communities, particularly in Puntland and Galmudug. They are insufficient for an expanding artisanal fisheries industry. State administrations have announced plans to create a network of tarmac roads to link port ports to urban centers and potential export markets, such as a direct route in Galmudug from Hobyo to Galkayo and on to the Ethiopian border, one in Puntland from the Hafun Peninsula to Garowe, and another in Banaadir/Hirshabelle from Warsheikh and Adale to Mogadishu. Investments in these road links are likely to be followed by significant increase in trade, particularly in fisheries products. In the case of Hobyo and Hafun, they will also stimulate moves to develop infrastructure for increased maritime cargo. None of these efforts has been funded, however; all remain aspirations.

Cold chains. A large share of Somalia's significant postharvest losses is related to the lack of or very poor quality of its cold chains. Small-scale (private) investments in solar refrigerators, insulated boxes, and fish handling training could have dramatic impacts on the availability and safety of fish for domestic consumption. There is also a need for more ambitious development of ice and cold-storage facilities, including freezer trucks for exports to Ethiopia. Previous public interventions have not worked well. Other options—including working through cooperatives, providing technical assistance for maintenance, training technicians, facilitating spare parts availability—might prove more effective.

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ENDNOTES

1 Recent GDP estimates are based on estimates of broad expenditure aggregates by the International Monetary Fund and the World Bank; prewar estimates are based on reliable estimates of sectoral production by line ministries and the Statistical Department of the Planning Ministry, aided by foreign statistical experts.

2 There are no reliable estimates of gross production values by sector or the sectoral breakdown of GDP. The IMF and the World Bank produced GDP estimates for 2012–17, but they are broad expenditures aggregates, not estimated based on production sectors or factor income. For this report, the World Bank estimated gross production values (volumes times prices) for various agricultural subsectors for 2000–12, using FAOSTAT production volume estimates of livestock products and crops multiplied by relevant prices from the patchy price datasets (no estimates were made for the forestry and fishery subsectors). These gross production values were then translated into rough estimates of sectoral value added following the methodology adopted in estimating the official national accounts for the 1980s (and endorsed by Swedish statisticians working in the Ministry of Planning). Although prewar estimates of gross production values were robust, the value added of all the livestock subsectors was assumed to be 100 percent of their estimated gross production values. The 2013–16 value added share of the livestock subsector estimated for this report in figure 1.2 assumes 95 percent. In the prewar national accounts, the value added of crop subsectors was assumed to be 70–95 percent of the estimated gross production values of specific commodities, with all major commodities at 90 percent. For this report, to estimate an updated ratio of value added to GDP by the livestock and crop subsectors, the 90 percent ratio was applied to the entire crop subsector for 2013–16. For frankincense, 99 percent was assumed for the 2013–16 estimate in figure 1.2.

3 With no production time series, available for the forestry and fishery subsectors, it is impossible to trace their historical performance. The sectors' contribution to GDP is believed to be minimal.

4 Production volume estimates come from national accounts for the 1980s, from FAOSTAT for the early 2010s, and from the database of the Drought Impact Needs Assessment (Somalia 2018). Prices come from the Food Security and Nutrition Analysis Unit (FSNAU), which monitors retail prices of major crop and livestock items. When prices were not available from the FSNAU, estimates from government and other sources, including neighboring countries, were used to approximate gross production values. The sectoral chapters discuss volume and value production estimates at the product level in more detail.

5 Recorded charcoal imports by the rest of the world are assumed to be either properly classified under the broader category of "cork and wood" and/or disguised and misclassified under the category "crude animal and vegetable materials," which also include gum and resin exports. See section 4.1.1 for the reasons for the likely misclassification.

6 There is a large and unexplained divergence between export totals based on product-by-product and country-by-country statistics captured by the UN Common Format for Transient Data Exchange (COMTRADE) on the one hand and export totals based on only country-by-country aggregate flows captured by the IMF on the other.

7 There is a very large and unexplained divergence between import totals based on product-by-product and country-by-country statistics captured by COMTRADE (partner countries) and import totals based on aggregate flows captured by the IMF (also based on partner country reporting). For instance, total imports, including nonfood nonagricultural imports from Somalia were $2,143 million in 2014 according to the COMTRADE data but $3,482 million according to the balance-of-payments statistics in the latest IMF report (IMF 2016).

8 Khat is captured under "raw vegetable matter" through 2010 and likely partly misclassified and included under "vegetables and fruit" since 2011.

9 These numbers reached 2.4 million people in 2009 and 2011, when a heightened insurgency exacerbated the impact of severe droughts in Southern Somalia.

10 See the February 2017 Humanitarian Bulletin by the UN Office for the Coordination of Humanitarian Affairs (OCHA) (http://reliefweb.int/sites/reliefweb.int/files/resources/somalia_humanitarian_bulletin_january_2017.pdf)and the FEWS (http://www.fews.net/east-africa/somalia/special-report/february-21-2017) and subsequent updates.

11 The average the river flow down the Juba River at Luuq (near the Ethiopian border) is 186 cubic meters per second. The average flow on the Shabelle River at Belet Weyne (also on the Ethiopian border) is 186 cubic meters per second (see annexes A1 and A2 of SWALIM and FAO 2009).

12 Most shallow wells are less than 20 meters deep. The water yield from shallow wells varies, depending on the aquifer. Most yield 2.5–10 cubic meters per hectare. Most boreholes yield 5–20 cubic meters per hectare. Most boreholes are 90–250 meters deep, but some are more than 400 meters deep (SWALIM 2012).

13 To support these interventions, Somalia Water and Land Information Management (SWALIM) developed a tool for collecting and managing past and current information on the irrigation infrastructure. Its irrigation management information system provides information (both spatial and tabular) on ongoing and planned irrigation projects, providing users data with a platform for learning what is available, querying the system for specific data sets, and downloading data in various formats (PDF documents, maps, spreadsheets).

14 These varieties are IR22, the most commonly cultivated IR24, and IR27.

15 Paddy rice yields have oscillated from more than 6 tons per hectare in good years to a low of 1.5 tons per hectare in drought years. According to an assessment by the Somali Agriculture Technical Group, only about 100–150 hectares were under rice cultivation at the peak of the most recent severe drought (during the Deyr 2016 season), when the Shabelle River dried up (see sections 6.1.3 and 6.3.3 in chapter 6).

16 Al-Shabaab was the youth wing of the Islamic Courts, which ruled Mogadishu for a short time in the late 2000s and morphed into an extremist and terrorist organization after the Islamic Courts disbanded to join

the FGS. It has been waging an insurgency against all levels of governments, allowing neither development nor emergency relief activities in the areas under its control, and collecting its own taxes from local communities and businesses.

17 Before the civil war, the Agricultural Development Corporation, a public agency under the Ministry of Agriculture, maintained large, modern grain storage silos in Mogadishu and Baidoa (Bay region). The silos were built with Italy's assistance and managed by skilled workers. As a result of looting and lack of maintenance, none of them remains functional.

18 Only governments are subject to the general rules of the World Trade Organization.

19 USAID supported the partnership between the SATG and the Ministry of Agriculture as part of its Partnership for Economic Growth Project.

20 As a result of these efforts, the university produced graduates in various disciplines relevant to agriculture, including crops, veterinary science, geology, chemistry, and engineering. Thanks to international scholarships funded by the donor community and managed by the government, some of its graduates were able to pursue postgraduate programs abroad. Most found ready employment in government ministries and agencies, public enterprises, or the private sector.

21 Institutions offering majors in agricultural, veterinary, and fishery sciences are Amoud University (Somaliland), Buroa Universities (Somaliland), East African University (Puntland), Hiiraan University (Hiiraan), Baidoa University (Bay Region), City University (Mogadishu), the Berbera Maritime and Fisheries Academy (Somaliland), the Marine Resources School (Mogadishu), and the Derusalm Agriculture School (South Central). Initiated as a donor-funded project in 2002, the Intergovernmental Authority on Development Sheikh Technical Veterinary School and Reference Centre, located in the Sahil region in Somaliland, is a regional knowledge institution. It collaborates with the Ugandan Makarere University, which provides training to professionals in the Horn of Africa on topics related to animal health, food safety, livestock business development, and dryland and ecosystem management.

22 Before the civil war, the Ministry of Agriculture had six departments: Crop Production, Research and Extension, Plant Protection, Water and Land Management, Planning, and Administration. They were adequately staffed and had the office space and equipment needed to perform their duties.

23 SWALIM is an information management program funded by the European Union, the United Nations Children's Fund (UNICEF), and the Common Humanitarian Fund and managed in Somalia by the FAO. It aims to provide high-quality information on water and land, which is crucial for relief, rehabilitation, and development initiatives in Somalia (http://www.faoswalim.org). FSNAU is a program managed by the FAO that informs development planning to address underlying causes of food and livelihood insecurity and malnutrition. Information is collected by a team of professionals all over Somalia. The information is used to assess emergency food security needs in different parts of the country (http://fsnau.org/what-we-do). FEWS is a global early warning and analysis system on food insecurity, created by USAID in 1985 to help decision makers in 35 developing countries plan for humanitarian crises on the basis of evidence-based analysis. Somalia is one of the countries in East Africa covered by the program (http://www.fews.net/east-africa/somalia).

24 Evapotranspiration refers to the sum of evaporation and plant transpiration from the earth's land and ocean surface to the atmosphere. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and water bodies.

25 In the northeastern regions of Sanaag, Bari, and part of Nugaal, Acacia ankokib is endemic at lower altitudes; Acacia manubensis is confined to semi-evergreen bushland on limestone at higher altitudes (see http://www.iucnredlist.org/details/34501/0 and http://www.iucnredlist.org/details/links/32879/0). In the southcentral regions, Acacia Senegal is endemic. The authors thank Shire Musse for providing this information.

26 In Puntland, for instance, excessive cutting of trees for charcoal has already caused massive environmental degradation of the land, including widespread soil erosion and gully formation.

27 This misclassification of (illegal) charcoal exports may be behind the surprising and otherwise inexplicable jump in gum and resin exports recorded since 2014 (see figure 4.2 and discussion in the next section).

28 In 2013, the Voice of America reported that "convincing Middle Eastern ports to prevent Somalia charcoal imports has been difficult" and that most charcoal exports originated from Kismayo port, then controlled by Al-Shabab (November 19). Kismayo Port is currently controlled by the recently formed government of Jubaland, under the political umbrella of the FGS. No charcoal exports from the port have been recorded since 2014. However, the damage done to the forested areas surrounding it in the preceding decades is still visible, and its negative consequences are still unfolding.

29 Before the civil war, a state monopoly controlled the legal export of frankincense and myrrh. Most exports went to China, France, and Germany. In recent years, both Saudi Arabia and China emerged as important buyers, but information is sketchy.

30 In ancient times, frankincense was sold to the Egyptians, who named this part of the north the land of Punt (Puntland)—the land of incense.

31 The survey ranks countries across four dimensions of climate impact: extreme weather, sea level rise, agricultural productivity loss, and overall. Rankings are based on a comprehensive dataset described in Wheeler (2011).

32 HoA-REC&N is an autonomous research institution that facilitates, strengthens, and advocates initiatives related to sustainable land use planning, integrated water resources management, ecosystem management, climate change and energy, and value chain development. It comprises more than 40 indigenous civil society organizations, higher learning institutions, and research centers in Djibouti, Ethiopia, Kenya, Somalia, South Sudan, and Sudan.

33 In September 2000, all Gulf countries halted imports of live animals from the Horn of Africa following an outbreak of Rift Valley Fever in Saudi Arabia and Yemen. The import ban was lifted in 2002 by every country except Saudi Arabia, which kept it in force until 2009. A new ban was reimposed by Saudi Arabia in December 2016.

34 The U.S. dollar exchange rate of the Somaliland shilling (SlSh) dropped from SlSh 3,487 in September 2000 (when the ban was imposed) to SlSh 6,200 in December 2002.

35 Funk and Verdin (2009) find that the long rains of 2009 were the driest in at least 60 years throughout much of the Horn region.

[36] Ocean acidification is the ongoing decrease in the pH of the earth's oceans caused by the uptake of CO2 from the atmosphere. According to Columbia University's Lamont-Doherty Earth Observatory, the oceans have absorbed a quarter of the carbon dioxide humans have put into the atmosphere over the last 200 years.

[37] The IPCC acknowledges that its models have difficulty capturing regional processes affecting rainfall (Funk, Eilerts, and Davenport 2010).

[38] FSNAU-conducted baseline studies in the Guban pastoral area (in 2014) and eastern Golis Mountain range––a frankincense, goats, and fishing livelihood zone— (in 2012) confirm that market purchases of staple and nonstaple foods are the primary food source for all groups, followed by consumption of milk and meat.

[39] According to the FAO (http://www.fao.org/somalia/programmes-and-projects/livestock/en).

[40] The FAO estimated that exports accounted for about half the offtake, household consumption for about a third, and other domestic consumption for about 17 percent. Livestock mortality was estimated to be below 5 percent. A study by the World Bank and UNDP (2007) confirms these estimates.

[41] The estimated gross production value of milk (the retail price of which is about $1 per liter) and other products is a multiple of livestock production value (see table 1.2 in chapter 1).

[42] Fattening and finishing are usually used interchangeably; both describe intensive highly nutritious feeding to promote fast growth and fat deposition to achieve desired carcass quality. The term finished animals refers to animals that have been fattened and are ready for slaughter.

[43] Agro-pastoralist areas in Somaliland can be found in the Awdal region (near Borama and Baki), the Woqooyi Galbeed region (near Gebilley), and the Togdheer region (near Burao and Odwyne). Agro-pastoralism is also found in several areas of Puntland (near Bosaso and in the Sanaag and Nugal regions, such as the Eyl district of Nugal and near Shumbiraalay, Cuun, and Jibagaale). Puntland does not have rivers like the southern areas of Somalia have, but it has large and only very partially tapped groundwater (rivers and reservoirs).

[44] The livestock populations in these dairy farms vary from a few head to as many as 150 head of dairy camel and 15 dairy cattle, according to unpublished information from FAO Somalia.

[45] When referring to the livestock production model in this chapter, settled farming and stall (confined) feeding systems—popularly known as zero-grazing in countries such as Kenya—are not considered unless indicated otherwise, because they are not common in Somalia, though they have started to appear in peri-urban areas.

[46] Imported species include Leucaena leucocephala, Napier grass, Sudan grass, alfalfa, and Dolichos lablab.

[47] Starting in 2014, the Somali Agriculture Technical Group (SATG) introduced and tested several forage species in Afgoi, in the Lower Shabelle region, including Sudan, Rhodes, and Napier grasses; alfalfa; and dolichol. All proved highly adapted to the environmental condition of Somalia. Unlike other grasses, for which seeds must be imported from neighboring countries, the seeds from Napier grass are readily and locally available.

[48] At the continental level, the African Union proposed in 2010 a policy framework that focuses on securing and protecting the livelihoods and rights of pastoral communities and reinforcing the contribution of pastoralism to national, regional, and continent-wide economies. Regional institutions, such as the Intergovernmental Authority on Development, are key to harmonizing the national policies of their members. Its Drought Disaster Resilience and Sustainability Initiative provides a comprehensive regional framework for resilience-enhancing policy development and investments in the region's arid and semiarid lands. In 2013, the Federal Government of Somalia prepared a Country Programming Paper that outlined its vision for the subsector's development.

[49] Somaliland's bushy grassland areas inland provide a good source of wet-season grazing and are favored for camel and goats because of their browsing habits. Its coastal grasslands are used for livestock grazing, especially in the dry season, as water is more available in these areas than in the woodlands. In Puntland, the best pastures are found in the high plateaus of the western part of Mudug (straddling Ethiopia), in the Golis Mountain range, and in the low Nugal valley (around Garowe).

[50] During vaccination campaigns spearheaded by the FAO since 2012, (individual animal) average sero-prevalence of 62 percent has been observed, with a low of 39 percent in the northwestern region and a high of 74 percent in southern Somalia, much higher than the 5.5–37.6 percent range found in 2001 baseline surveys. No studies have yet been conducted to determine mortality and morbidity rates.

[51] The veterinary code for the FGS also covers Puntland.

[52] Different animals are vaccinated each year, including young animals (usually less than three months of age) that were not vaccinated during the previous round.

[53] Before September 2009, exports from Somaliland to Saudi Arabia transited through the livestock quarantine facilities at the port of Djibouti, increasing marketing costs for Somaliland traders and constraining export volumes to the handling capacity of the port (Khadijah and Kabue 2012). Transshipping from Puntland and more recently from Mogadishu through third countries to circumvent export bans has a similar negative cost impact.

[54] The FSNAU's most recent point estimates were derived by taking very disaggregated estimates of the 2014 human population and household sizes from UNFPA and multiplying household size by the average number of animals per household, as found in various surveys of pastoral households over the past decade.

[55] Information on herd size and dynamics is scarce. FAO Somalia has documented changes in herd composition in Sool and Sanaag. For middle-class and wealthier households, the number of camels in their herds declined drastically between 1989/99 and 2004/05 but was maintained between 2004/05 to 2009/10. Over the same period, middle-class and wealthier households moved away from keeping cattle.

[56] This unpublished paper by Oxfam is cited in Eid (2014), who provides a detailed analysis of the cross-border livestock trade between Ethiopia and Somaliland, including policy changes instituted by Ethiopia to regulate cross-border trade, and by Lind and others (2016), who analyze pastoralist systems in the dry lands of eastern Africa.

[57] A first ban was imposed in 1997 and lifted in 1999. Before it, Saudi Arabia imported about 3–3.5 million animals from Somalia. A second ban was imposed in 2001 and lifted in 2009. These bans caused substantial declines in prices for pastoralists, although they stimulated a redirection of livestock exports to other countries, including Djibouti, Yemen, Oman, and the United Arab Emirates. Exports from Bosaso, for instance, rose

significantly in 2002, the year after the start of the second Saudi import ban; increased port fees at Djibouti port around this time likely contributed to a rerouting of traditional exports from Somaliland through Bosaso instead of through Berbera. After the lifting of the ban, direct exports from Bosaso to Saudi Arabia replaced the previous indirect exports. In December 2016, Saudi Arabia once again suspended livestock imports from Somalia, after 2,970 head of cattle shipped from Somalia tested positive for Rift Valley Fever. Government and FAO officials who accompanied the Saudi delegation during its field visit to the quarantine facilities in Berbera, Bosaso and Mogadishu in March 2017 provided strong scientific evidence that there was no Rift Valley Fever virus circulation or outbreak in any part of Somalia. The false positive test results were solely from a same-day shipment to Saudi Arabia of an ill-timed vaccination. Nonetheless, the Saudi authorities remained concerned about the operational standards of the Somali quarantine facilities and lifted their import ban only for the three months of the Haji season (July– September 2017).

58 Cross-border trade, though largely unofficial and unrecorded, is also believed to have been growing steadily.

59 In 2012, the LMIS provided quality-segregated price data on about 84 percent of sheep and goats, 56 percent of cattle, and 55 percent of camels exported from Somaliland.

60 The World Bank mission to Somalia in June 2016 visited a small, home-based, woman-owned business in Garowe. Warshada Caanaha Hanad produces and sells pasteurized camel milk and yoghurt from goat milk out of its small shop. High demand for these products ensures that its limited output is sold out every day. An independent survey commissioned by the World Bank identified only one other new, modern (albeit still fledging) dairy business in Mogadishu (OOG Dairy Factory). (For an annotated list of agro-processing businesses, see appendix H.) No other individuals or firms in the country appear to process fresh milk, including in dry powder or cheese form.

61 A survey conducted in Somaliland by the FAO in 2011 indicated that shoats constituted 93 percent of the total livestock slaughtered in the six towns surveyed. The situation is likely similar in Puntland. Beef consumption is prevalent in the more populous southcentral regions of Somalia.

62 Data in the national accounts (FGS 1989) based on the purchases of hides and skins by the Somali Leather Agency, a government marketing monopoly, differ considerably from data from FAOSTAT, which show a high of 6,600 tons (estimated equivalent of 8.9 million head) in 1980, falling to 3,000 tons (estimated equivalent of 4 million head) by 1988. The drop in the official figures in the late 1980s was likely related to the much lower prices offered by the Somali Leather Agency to sellers.

63 Poultry feed constitutes almost 70 percent of poultry production costs.

64 This section summarizes the findings of the Livestock Working Group, composed of officials and experts from the federal and state governments, the FAO, the World Bank, and other international development partners that produced the multisector Drought Impact Needs assessment, released in December 2017. The methodology and estimates of damages and losses were discussed and agreed upon in October 2017 in Mogadishu.

65 The federal and state governments, the FAO, and the World Bank discussed and agreed on the methodology for and the physical and monetary estimates of damages and losses in October 2017.

66 During a normal Gu season, 60–70 percent of the area is dedicated to cereal and 30–40 percent to cash crops; during a normal Deyr season, 40–60 percent is planted with maize and 40–60 percent with horticulture.

67 FAO Somalia is implementing an EU-funded project "Reviving Spate Irrigation," to expand the area irrigated over the next three years.

68 Red vertisols are the best soils (SWALIM and FAO 2007e).

69 "In Somalia, the southern part of the Shabelle River has run dry, the Dawa River is drying faster than normal, and the Juba River has reached very low levels. Most water points in worst-affected areas of the three countries are in near-dry status. . . irrigated crop production has also been impacted as the drought extends over key river basins" (ReliefWeb, February 17, 2017 [http://reliefweb.int/report/ethiopia/horn-africa-call-action-february-2017-enar]). See also Puntland News24, February 5, 2017 (http://puntlandnews24.com/2017/02/05/ethiopia-closes-shabelle-river-and-turn-to-parched-playgrounds-for-children/).

70 The decrease in the Juba River flow would not be as drastic, because three rivers combine in Ethiopia to form the Juba at the border with Somalia. It would nonetheless increase resource pressure downstream.

71 Indeed, together with Bakool, Puntland is one of the regions worst affected by the drought. In early February 2017, various UN agencies issued a joint famine warning, based on visible signs of crop failures, much increased malnutrition, spikes in water and staple food prices, and mass animal deaths.

72 Detailed data disaggregated geographically are available only for 1995–2016 (FAOSTAT data for earlier years are available only nationwide).

73 Estimates for 1998–2009 are not comparable with those from 2010 onward, because different methods were used to college the data. Until 2009, data were collected using Participatory Rapid Assessment (PRA) techniques. Since 2009, data collection has been done using the Pictorial Evaluation Tool (PET) approach, a more precise methodology.

74 Production estimates by FAOSTAT are much lower (at 35,584 tons in 2014 and 28,640 tons in 2015), than either the FSNAU or the Somali Agriculture Technical Group estimates.

75 Banana production from farms geared for export was tightly monitored and thus believed to have been fully captured in official statistics gathered by banana agencies and later by the private company Somalfruit and supplied to FAOSTAT. In contrast, most and possibly all of the production by small-scale farmers intended for domestic consumption was neither monitored nor ever estimated by government statisticians, and the monitoring for statistical purposes of discarded lower-quality bananas (scarti in Somali, from the Italian word of the same meaning) at collection centers intended for exports is believed to have been very inconsistent.

76 Two private companies, FruitSom and Somali Fresh Fruit, handled these small test exports to the Middle East (FGS 2014).

77 In 2015, SATG interviewed 24 banana growers for a study of the subsector in the Afgoi area (in the Lower Shabelle region). They indicated that once the crop is established, they harvest every three months. Their average yields were 21.4, 14.3, 15.6, and 22.2 tons per hectare for the Gilaal, Gu, Haga, and Deyr seasons, respectively. The average annual yield was 73.5 tons per hectare, well above the prewar estimate of 35–45 tons per hectare.

[78] Although watermelon is eaten as a fruit, it is a member of the cucumber family and is grown using vegetable production systems. Tomatoes are technically fruits but are eaten and raised as vegetables.

[79] This section summarizes the findings of the Crops Agriculture Working Group, composed of officials and experts from the federal and state governments, the FAO, the World Bank, and other international development partners for the multisector Drought Impact Needs Assessment (FGS 2017a). The methodology and the estimates of damages and losses were discussed and agreed upon in October 2017 in Mogadishu. The crops included are those for which data on production, areas under cultivation, yields, and farmgate prices were available or could be estimated (from satellite imagery, remote sensing, rapid field surveys, or experts' guesstimates) for the drought period and for a predrought (2013–15) baseline.

[80] This estimate includes all fields cultivated in a four-year period and fallow areas, which represented about half of the former.

[81] See chapter 2 for historical and current estimates of land under controlled or recession flood irrigation.

[82] At least 32 medium- to large-scale irrigation schemes and infrastructure were identified and mapped in the Shabelle and Juba River basins. Some of them are described in chapter 2, others in appendix B (SWALIM and FAO 2007a).

[83] Field experience by the FAO in Somaliland has shown that a well-managed acre of natural rangeland pasture can easily produce 1.8 tons of fodder—or 20 truckloads fetching up to $350 during lean periods (FAO internal unpublished assessment).

[84] The old 825,052 square kilometer estimate did not include the waters around Socotra Island (administered by Yemen). Persson and others (2015) estimate the size of Somalia's EEZ encompassing the waters around Socotra at 831,000 square kilometers (see figure 7.4).

[85] Since 2014, with assistance from the FAO, ministries in Somaliland, Puntland, Galmudug, and Jubaland have registered about 7,000 fishers and 1,300 vessels and collected detailed information about their fishing patterns, target species, [small] vessel use, and collections by hand, surface diving, and scuba diving. Estimated registration of fishers is 90 percent in urban areas such as Bosaso and 50 percent in remote coastal areas, where hand gathering by gleaners is very seasonal and fishing stations are often uninhabited during the hottest summer months (gleaners, mostly women and children, walk in shallow water or exposed land to pick up snails, shells, sea cucumbers, urchins, seaweed, and fish in habitats exposed to low tide). The Banaadir and South West regions and other areas dominated by Al-Shabab saw no registrations.

[86] Incomes are about $7–$15 per fishing day, with fishing occurring about 180 days a year (Kelleher 2016).

[87] No Somali governments have submitted official data on domestic inland and marine catches to the FAO since 1982; only scattered and partial information is available from FAO Somalia staff or other sources after that year. Most post-1982 estimates of domestic catches in the FAO global database (such as 200 tons in inland waters or 29,800 tons in marine waters by Somali vessels) are just unverified repetitions of historical estimates before 1982.

[88] FAO fishery experts believe that some of these figures, in particular for tuna and tuna-like species foreign catches, may have been overestimated, in particular for the period after the outbreak of piracy activities off the coast of Somalia in 2007. Overrestimation is related to the methodological limitations inherent in reporting by Regional Fisheries Management Organizations, including the allocation of catches to geographic squares that may well include catches outside the EEZ boundaries, as some vessels have been fishing close to but not inside the EEZ, especially since 2007, and assumptions about species groupings. Until 2014, Somalia did not have fishing territorial limits compliant with international law; catches outside the EEZ cannot necessarily be considered as being in Somali waters or illegal. Financial incentives have probably induced underreporting by licensed vessels without observers on board (to minimize license and tax payments) and by illegal unlicensed vessels.

[89] This estimate of the fishery production potential of Somalia's waters (the total biomass of marine life that could be extracted annually) needs to be treated with extreme caution, because the methodology employed has many limitations and a large proportion of the estimated biomass is either small pelagic or mesopelagic. Such species are found 200–1,000 meters below the ocean surface and do not represent a harvestable resource, particularly in Somalia (Rosenberg and others 2014). In his background note for the World Bank, Kelleher (2016) cites a much lower sustainable potential, of about 200,000 tons a year; his estimate for small pelagic species (scad, sardines, anchovies, and others) is 70,000–100,000 tons a year, subject to high seasonal variability.

[90] There is a long history of illegal, unreported, and unregulated violations by foreign vessels, mainly from Asia. They include violations by Iranian purse seiners, Chinese and Korean longliners, Sri Lankan gillnetters, and various demersal trawlers, including Egyptian and (possibly) Yemeni vessels. Foreign licensed and unlicensed catches in Somali waters in 2013 were estimated at 132,000 tons. "Losses" from illegal fishing are estimated at $100–$450 million (Kelleher 2016), but such estimates need to be treated with caution.

[91] The migration routes of tropical tuna pass through the Somali EEZ; high-value skipjack, yellowfin, and bigeye are present in the EEZ for at least four months of each year, during the southwest monsoon. There are different seasons for the mainly Asiatic longline fleet targeting large yellowfin and bigeye tunas.

[92] See the status summary for species of tuna and tuna-like species under the IOTC mandate, as well as other species affected by IOTC fisheries, at http://iotc.org/science/status-summary-species-tuna-and-tuna-species-under-iotc-mandate-well-other-species-impacted-iotc.

[93] The Ministry of Fisheries and Marine Resources presented such information during the 19th Session of the IOTC (http://www.iotc.org/documents/report-presumed-iuu-fishing-activities-eez-somalia).

[94] The UN Monitoring Group on Somali and Eritrea monitors number of licenses and revenue generated (UNSC 2015).

[95] The project was undertaken by the FAO with the NGO CEFA (OSRO/SOM/512/CHA).

[96] See http://www.un.org/Depts/los/LEGISLATIONANDTREATIES/STATEFILES/SOM.htm.

[97] See http://www.icj-cij.org/en/case/161.

[98] The law is available at http://mfmr.gov.so/en/wp-content/uploads/2015/11/Official-English-Translation-of-Ratified-Somali-Fisheries-Law-8.pdf. For a review of national and state-level fishery legislation, see TACS (2014).

[99] Even if fisheries management measures exist, they are not well enforced. Relatively simple measures—such as a minimum size for lobster, the return of egg-bearing females to the sea, and replacement of the wasteful use of tangle nets for lobsters with a diver fishery—could make a significant difference (Kelleher 2016).

[100] Because of insecurity at the time of its design, this project was not extended to Banaadir (Mogadishu) and to the South West and Hirshabelle states.

[101] Fisheries production information from Jubaland and South West is largely anecdotal.

[102] Many of these vessels were either owned by or chartered to Somali businessmen, who manage the collection operations.

[103] Different sources provide different values for the potential value of lobster harvests. It is also unclear whether the weight reported is of the whole lobster or only the tail. More than 100 tons of tails were exported through Bosaso airport between 2003 and 2015. Other exporting airports are Garowe and Galkaio (Kelleher 2016).

[104] Gillnets are so effective that their use is closely monitored and regulated by fisheries management and enforcement agencies in most countries. Mesh size, twine strength, and net length and depth are all closely regulated to reduce bycatch of nontarget species.

[105] Kelleher (2016) reports that the Laasqoray tuna cannery has been rehabilitated by the private sector with the support of UNDP and that seven cold stores and three fish canneries are in operation in Puntland.

[106] Many Zeyla-based fishers have migrated to Djibouti, because Zeyla has suffered from sea-level rise, causing the loss of about two-thirds of the town between 2012 and 2014, with salt water infiltrating the freshwater aquifer (Kelleher 2016).

[107] An example of this short-term, quick-profit outlook is the rapid growth in the last couple of years of a lucrative fishery for Gulper shark in the Gulf of Aden.

[108] Given the magnitude of malnutrition in Somalia, some analysts have gone so far as to recommend that "agriculture should be driven by nutrition goals. . . [moving instead] from the era of thinking of improved nutrition as an optional extra objective to one where it is a raison d'être" (Haddad 2010). Interventions that combine and enhance synergies between promoting agricultural growth and directly improving nutrition are likely to produce the most robust poverty reduction results (Herforth and Harris 2014).

[109] The tree's green leaves are unpalatable to camels and goats, who browse its pods, spreading its (invasive) seeds. The pods are rich in protein and sugar, and they are available during dry periods. Milled Prosopis pods added to fodder provide a major protein/nitrogen boost. Despite their intrinsic nutritional value, the pods are rarely collected and processed as animal feed. The tree's stems contain a gum similar to gum arabic. Mesquite has been consumed for millennia, in flour, syrup, alcoholic beverages, and even a kind of coffee. The tree can be used as lumber for window frames, doors, and light carpentry, with its bark used to make baskets, fabrics, and medicinal products (Awale and Sugule 2006). For a compendium of the scientific literature on Prosopis, see http://www.feedipedia.org/node/554.

[110] A pilot project by the FAO in the early 2010s to assist the Federal Ministry of Fisheries in data collection failed. Future projects need to consider the lessons learned from this pilot.

[111] The weight-of-the-evidence approach combines data from as many sources as possible—fish traders, fishers, scientists, geographic information system (GIS) habitat maps—to build a stock-by-stock picture of both the current population and landings value and potential values if stocks recover. The process brings together the public and private sector actors needed to develop longer-term investment plans for fisheries and associated infrastructure. Participation by private sector interests in this assessment may give them greater confidence about committing funds.

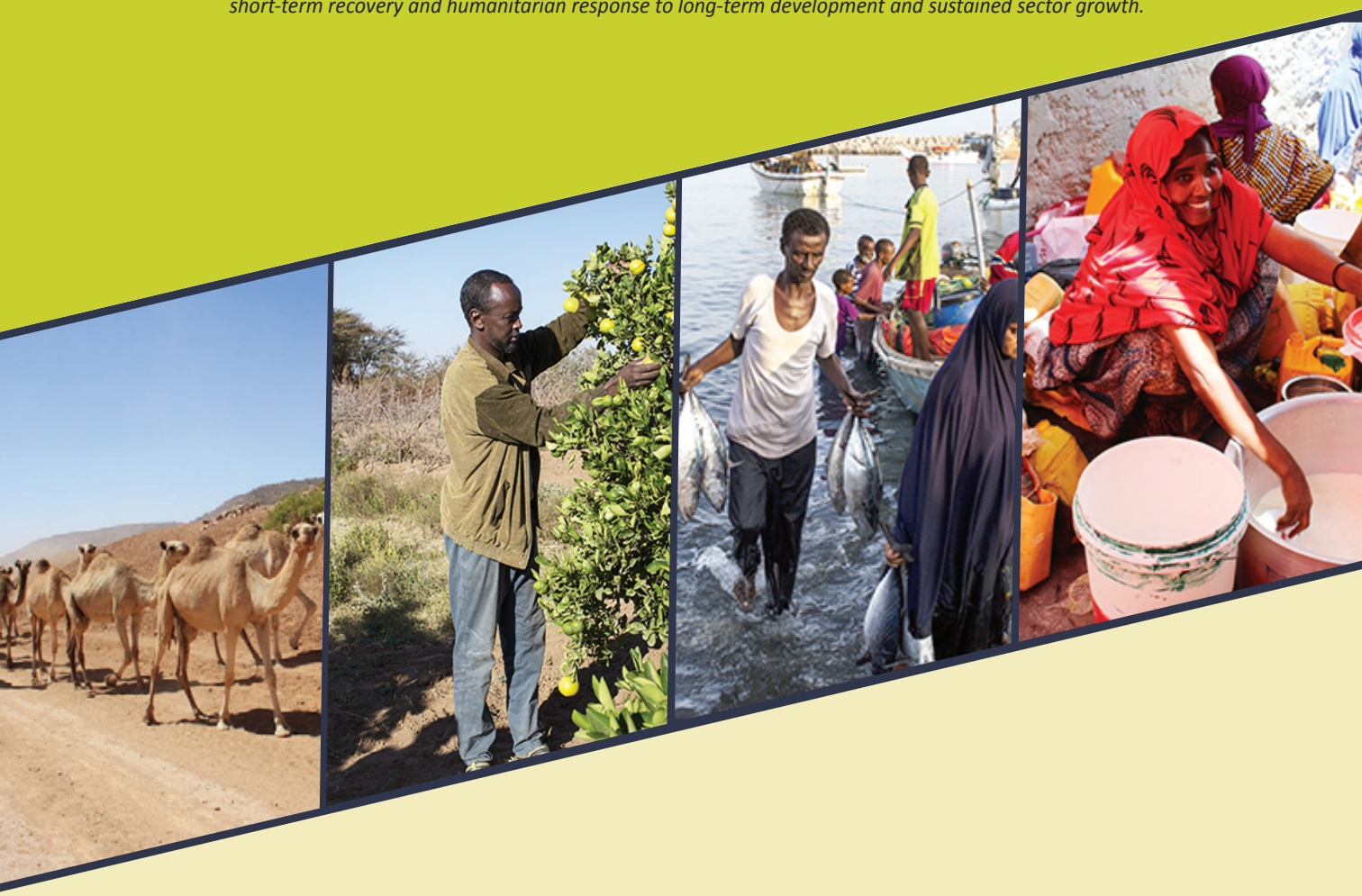
[112] The preliminary cost estimates shown in table 8.4 are very rough and only indicative, as only Berbera Phase 2 has been subject to an environmental impact assessment. Once land ownership issues are resolved, all ports will need to draft designs and conduct social and environmental impact assessments.

Rebuilding Resilient and Sustainable Agriculture in Somalia

Following more than two decades of civil war, Somalia has made important progress in recent years with the establishment of permanent political, economic and security institutions. This points towards a future with stronger prospects for peace and for economic and social development. Indeed, development and jobs can contribute to improving the security situation and create more incentives for political settlement. Now is a propitious time for both the government and the international development community to assess the medium and long-term development needs of the Somali economy and start planning to address them.

Agriculture remains key to the livelihood of half of Somalia's population that still lives in rural areas. It is also key to the country's food security and economic growth prospects. Somalia's landmass encompasses vast tracts of arable land and a variety of agroecological zones conducive to agricultural expansion. There are large areas suitable for livestock grazing, browsing, and fodder production to support the country's growing markets and export trade; others with fertile alluvial soils for staple cereals, oil seeds, legumes, and horticulture crops. Its forests provide prized gums and resins for both export and local markets. The country's waters are home to a diverse range of valuable reef and pelagic marine species.

Supporting agriculture sector recovery, strengthening its climate resilience, and improving its overall performance will not only boost prospects for sustained economic development, but will also help cement peace and security, alleviate poverty and malnutrition, and enhance health outcomes in both rural and urban areas. This report provides information and analyses that will help inform and guide Somalia's federal and state governments and their international development partners as focus shifts from short-term recovery and humanitarian response to long-term development and sustained sector growth.



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