



# Somalia's Agriculture and Livestock Sectors: A Baseline Study And A Human Capital Development Strategy



Dr. Hussein Haji and Dr. Mohamed Farah Shiridon

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## EXECUTIVE SUMMARY

As Somalia transitions from more than three decades of conflict to partial stability in many parts of the country, there is an opportunity for sustainable development. The national stocks of natural resources (fertile soil, livestock, fisheries, minerals, oil and gas) hold opportunities not only to improve living standards and food security for the population of nearly 16 million,<sup>1</sup> but also to provide a platform for advancing human capacity in trades, skills and technologies.

However, decades of conflict, recurrent droughts and floods that have internally displaced millions, coupled with weak governance have undermined Somalia's human capital and state effectiveness. This has compromised delivery of basic social services such as healthcare and education, impeded legitimate revenue collection efforts and allowed corruption and illegal taxation throughout the country. As a result, the private sector and economic growth have been severely underdeveloped. In the absence of strong coordination and effective investment in capacity development, any current gains or hopes for future reform initiatives are in danger of reversal. Pervasive human capacity gaps present a threat to ownership, scaling up and the sustainability of efforts and results.

This baseline study seeks to understand skills development in the agriculture and livestock industry; the availability of existing training and whether it meets the needs of the marketplace; challenges affecting human capital development in agriculture; and the key assets and resources for skills development in the sector. The research also identifies key stakeholders, partners and processes influencing human capital development in the sector.

The Somali Agriculture Technical Group (SATG) developed tools for the study and briefed field enumerators prior to conducting consultations with stakeholders, including academic institutions (agriculture and livestock), students, federal and state ministries, the private sector, NGOs and professional associations. Data gathered from various stakeholders was compiled and analyzed following standardized procedures.

Findings specifically relate to existing agriculture and livestock skills development, knowledge value chain mapping and skills needs for the sector to reach its potential. This study is one component of a wider baseline study that will inform a national human capital development strategy, which is linked to the National Development Plan (NDP-9).<sup>2</sup>

From June to December 2019, a sample consisting of faculty, staff and students from a total of 18 academic institutions with majors in agriculture and animal science were interviewed. These institutions are located in Benadir/Mogadishu (7), Puntland (3), South West (3), Hirshabelle (3), Galmudug (1) and Jubaland (1). Only one of the 18 institutions is public (Somali National University) while the others are privately owned. One-hundred-and-eight-five faculty and staff members were interviewed in 17 of the 18 institutions. Only 11 (6%) reported receiving a PhD, while 111 (60%) reported receiving an M.Sc. Half of the 18 institutions (9 of 18) had fewer than 10 faculty and staff in agriculture and animal science, and six of the 18 institutions had fewer than five faculty and staff. The total number of students graduating from these institutions each year is 400-500. Approximately 86% of students are male and 14% are female. Twenty percent of the 78 students interviewed reported that the quality of education was "poor" and this percentage was higher at institutions outside Mogadishu.

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<sup>1</sup> POPULATION ESTIMATION SURVEY 2014 SOMALIA; <https://bit.ly/2zqn1YV>, last accessed on 26 May 2020. P. 4; also page 44, states that population growth rate is 'estimated at around 2.8 percent'.

<sup>2</sup> Page 256 of the NDP-9 states: "The Ministry of Planning in close consultation with the Ministries of Labor and Education commissioned in 2018 a research consortium [consisting of the Heritage Institute for Policy Studies and the City University of Mogadishu funded by the Somalia Stability Fund (SSF)] on the creation of an inclusive, indigenous and sustainable Human Capital Development Mechanism (HCDM)." Somalia National Development Plan 2020-2024, Ministry of Planning, Investment and Economic Development, available online at: <http://mop.gov.so/wp-content/uploads/2019/12/NDP-9-2020-2024.pdf>, last accessed on 26 May 2020.

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About 176 employees of federal or state ministries of agriculture and livestock were interviewed. Of these, 157 (89%) are male and the remaining 11% are female. Both federal and state ministries reported that 87% of the students graduating from university are not proficient in the field of agriculture and livestock.

## Key Findings

- All stakeholders interviewed for this study agree that there is a serious skills gap in the agriculture and livestock sectors. Private sector interviewees reported that while universities are the main centers of education and training for agriculture and livestock skills development, most graduates lack the technical understanding and know-how to address and effectively implement technical activities. There are serious skills gaps in all aspects of science-based programs.
- Most universities lack the capacity to design strong curricula and only engage in limited use of high-end technologies, mainly due to a lack of research capacity, adequately trained instructors, laboratory facilities and innovative approaches to teaching.
- Women play a prominent role in agriculture through crop planting, weeding, threshing, cultivation, winnowing and marketing of agriculture commodities, yet over 80% of agriculture students, ministry employees and university lecturers are male. Only 3.8% of the interviewed university faculty and staff in agriculture or veterinary sciences are female. Female enrolment in agriculture and veterinary sciences is also low (14%), indicating that these subjects are not attractive or accessible to female students.
- International and local NGOs and ministries of agriculture and livestock are the major employers of university graduates. Due to the limited number of positions in the public and private sectors, the poor quality of education and the fact that most universities do not provide hands-on experience, most students are unable to secure jobs after graduating from university, and must resort to self-employment in areas unrelated to their courses of study.
- Most of the universities surveyed were established in 2013 and 2014, among them the Somali National University (SNU), which was re-established in 2014. SNU was the only university that existed in Somalia before the civil war began in 1990.
- The interviewed stakeholders and students strongly believe that the proliferation of universities in recent years has been in response to profit motives, with minimal effort given to offering high-quality education. Only 10% of interviewed students reported that the reason for the opening of new universities is to introduce new professions and relevant technologies.



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## Strategic Interventions



*Applied learning opportunities should be established through internship partnership programs in agriculture/animal science, research and innovative technology development between universities, government institutions and the private sector.*

- **Quality control.** Agriculture and veterinary science universities must adopt and adhere to standardized quality control measures governing curricula and demonstrated skills by graduates. Selection criteria must be set by the Ministry of Higher Education or other accredited agencies to oversee the curricula, verify graduates' skills and enforce quality standards required for graduation. Academic institutions must conduct periodic assessments of students to verify their skills and preparedness for the agriculture/livestock sector. All graduating students should be measured according to a standardized qualifications framework.
- **Internship program.** Applied learning opportunities should be established through internship partnership programs in agriculture/animal science, research and innovative technology development between universities, government institutions and the private sector. These internships should focus on areas relevant to the agriculture sector and help students prepare to compete in the labor market.
- **English language.** English is the main language required by employers including international development agencies, international NGOs, government institutions and the private sector. All universities should screen for English proficiency on entry and provide advanced English language skills training where necessary.
- **Technical schools.** Technical colleges and schools should be established in the agriculture and animal husbandry fields, with curricula in science and applied technology calibrated to the needs of the employers and the market. The specialties of each school should be strategically selected to reduce duplication and allow each of Somalia's states to host at least one technical school at which students from neighboring regions can study.
- **Self-employment.** Coursework covering agribusiness, entrepreneurship and soft business skills should be provided for students planning self-employment, as a supplement for their academic and technical skills.
- **Strategic micro-grants/access to credit schemes.** Strategic micro-grants or credit schemes should be set up to help graduates pursue self-employment in the agriculture/livestock sector. Relevant ministries such as finance and commerce should coordinate to incentivize new business development in areas of national strategic interest.

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## Section 1: Introduction

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*Agriculture (including livestock) is the backbone of the Somali economy, contributing over 90% of the country's total exports, 60% of its GDP and employing over 80% of its population.*

Agriculture (including livestock) is the backbone of the Somali economy, contributing over 90% of the country's total exports, 60% of its GDP and employing over 80% of its population.<sup>3</sup> Though Somalia was close to feeding its own population in the early 1980s, the collapse of the state and consequent loss of infrastructure and institutions led to a drastic drop in productivity. Somalia's agriculture is severely underdeveloped due to a lack of government support, recurrent droughts and poor technical skills. According to a 2017 World Bank report, Somalia will be highly dependent on food imports and foreign aid for the foreseeable future.<sup>4</sup> Somalia does not maintain national food reserves,<sup>5</sup> nor does it have an import policy to regulate food prices as a form of public protection, which leaves its poor (80% of the total population)<sup>6</sup> exposed to food security risks when hit by the volatility of global food prices.

Agriculture and livestock face multiple constraints which limit productivity and decrease efficiency, including unpredictable and extreme weather patterns, underdeveloped and fragmented markets, poor value addition and lack of access to quality inputs such as seeds, fertilizers and animal vaccines. Perhaps the most impactful of the many constraints is a severe underdevelopment of skills leading to poor human capital development. Addressing skill gaps is critical to achieving national development planning goals towards sustainable economic growth as stipulated in the 9th National Development Plan (NDP-9).

Prior to the state collapse, growth achieved in the agricultural sector was largely attributed to the concerted efforts of skilled human resources in the agriculture and livestock value chains. Since then, the country has suffered from a chronic brain drain and the collapse of agriculture and livestock infrastructure and institutions. Growth in the sector, which was once the primary driver of the Somali economy, has slowed down, leading to increased unemployment, poverty and starvation. Unemployment, particularly among the youth, has led to serious calls to re-examine the state of the current agricultural education system.

With the restoration of peace and relative stability in many parts of Somalia, the local economy is growing and the private sector is recovering from many years of civil unrest. Economic growth brings advances in industry that requires skilled workers. In recent years, a number of value addition businesses have been established that require high technical skills. These include a maize mill and sesame seed processing plant for export markets, as well as agriculture laboratories for soil analysis, seed quality control and banana tissue culture. Other businesses include those that engage in animal feed processing and packaging, climate-smart agriculture such as drip irrigation and central pivot irrigation systems for fodder production. These innovative technologies are making a demonstrable impact on productivity but require high-end technical skills that are not readily available in the country. Most emerging businesses must seek technically proficient workers from neighboring countries, which is a challenge due to incoming workers' security concerns and the increased cost of hiring technically skilled expatriate workers.

The purpose of this study is to produce a comprehensive report on the state of human capital in the agriculture and livestock sector in Somalia, specifically related to the skills development and value chain enhancement required for the sector to reach its potential. It feeds into a wider thematic study that will inform a national human capital development strategy.

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<sup>3</sup> “Rebuilding Resilient and Sustainable Agriculture in Somalia,” Somalia Country Economic Memorandum, Volume I, World Bank/UN Food and Agriculture Organization (FAO), 2018, available online at: <http://documents.worldbank.org/curated/en/781281522164647812/pdf/124651-REVISED-Somalia-CEM-Agriculture-Report-Main-Report-Revised-July-2018.pdf>, last accessed on 26 May 2020.

<sup>4</sup> Ibid.

<sup>5</sup> All countries have food reserves that are utilized and released to the public in the event of food shortages caused by major disasters such as droughts, field invasions by insects or diseases. These are also used to stabilize food prices, particularly when there are food shortages. The Agriculture Development Corporation, mainly administered by the government, played that role in Somalia prior to the civil war.

<sup>6</sup> NDP-9 states: “69 percent of Somalis live under the international poverty line of US\$1.90 a day (in 2011 PPP dollars). Disaggregated data, along with the levels of severity of poverty, indicate that internally displaced persons (IDPs) and the rural population (both agro-pastoralists and nomads) have the highest rates of monetary poverty. An additional 10 percent of the population live within 20 percent of the poverty line, making almost 80 percent of the entire Somali population vulnerable to external shocks such as natural disasters, conflict and economic disruption.”

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## Methodology

The methodology consisted of:

1. Developing tools and training field enumerators. A Mogadishu-based team led by the authors conducted a desk review on human capital development in the agriculture and livestock sector in Somalia. A number of documents on post-war human capital development were reviewed and compared with the current situation in Somalia.

The research team also formulated quantitative tools to assess the capacity of various university faculty members and students as well as ministries of agriculture and livestock with regard to human capital development. These tools were applied to enable verification and triangulation of information, including the following:

- Survey questionnaires specific to each group
- Desk review of secondary information
- One-to-one interviews with stakeholders
- Key informant interviews (KIIs)
- Group interviews
- Focus group discussions (FGDs)
- Direct observation
- Visual methods (mapping, ranking and scoring)

Field enumerators with experience using quantitative and qualitative data collection tools were identified and trained. While most data was collected in Mogadishu, data collection also took place in the federal member states (FMS). The project team leader coordinated all the field activities with field enumerators.

2. Consultation with stakeholders. Focus group discussions and one-to-one interviews were conducted with the following stakeholders:

- Public universities, to assess the capacity of human resources in the agriculture and livestock fields and the number of students and professionals

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- Private universities, to provide a clear understanding of student enrolment in agriculture and veterinary science faculties
  - Technical schools, to identify available technical skills in agriculture and livestock
  - Traders, to identify the level of technical skill in the agriculture and livestock trade
  - Agri-processors, to assess existing challenges and skills gaps in the productive sectors
  - Agriculture and livestock exporters, to assess existing skills and export opportunities
  - Agriculture and livestock professionals, to identify challenges and opportunities facing the industry
  - Government institutions, to assess the capacity of federal and state ministries of agriculture and livestock and examine whether the available capacity is in line with the targets and deliverables of the ministries.

Researchers also:

- Conducted literature reviews of existing agriculture and livestock-related policies, data, plans and strategies
- Reviewed other national strategies for skills building, human resource development and improving productivity in the sector
- Developed protocols for data collection tools
- Collected relevant data on agriculture and livestock-related trainings, programs and practices at the national and FMS level.

## Section 2: Contextual Analysis of Agriculture and livestock sectors

It has been almost three decades since the collapse of the central government and the start of the Somali civil war in December 1990, which resulted in the dissolution of government institutions, a complete collapse of law and order, destruction of infrastructure, mass starvation and the loss of many lives. Crop production in particular was severely affected by the disappearance of support services such as agricultural research and extension. The export of bananas and other important commodities such as sugarcane and grapefruits came to a halt, damaging the potential for agricultural growth. State and foreign-owned commercial farms and infrastructure for processing crops such as bananas, sugarcane, cotton, rice and fruit were totally abandoned. Recurring droughts, the deterioration of flood control, irrigation and transport infrastructure and the mass migration of skilled and educated professionals to neighboring countries exacerbated these challenges.

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In contrast, the livestock export industry remained partially functional, mainly due to demand for live animals from Saudi Arabia during the annual Hajj pilgrimage. One legacy of the civil war is the continued presence of a large group of internally displaced persons (IDPs), mostly living in acute poverty and destitution in urban centers and nearby refugee camps and almost totally dependent on international relief assistance and food aid.

Like government institutions, educational institutions in agriculture, veterinary sciences and animal husbandry including technical schools in various regions were deserted and destroyed. Most campus buildings became rudimentary housing facilities for IDPs affected by the civil war and drought.

Despite these prolonged challenges, the agriculture and livestock sectors remain Somalia's main sources of economic activity, employment and exports critical to economic recovery and long-term development. The country's vast landmass contains a variety of agro-ecological zones that with proper attention could support expanded and more efficient production for both domestic and export markets. There are large areas suitable for grazing and fodder production for livestock, as well as others with fertile alluvial soils for staple cereals, oil seeds, legumes and horticultural crops. Somalia's forests provide gum and resin for both export and local markets and charcoal for cooking. Restoring the forestry sector after recurrent drought and improving overall performance will not only strengthen and sustain economic development but also help cement peace and security. In recent years, there has been strong diaspora investment in the private sector with considerable interest in the productive sectors. Donors likewise have demonstrated continual interest in supporting the productive sectors, which is a positive move toward peace and prosperity. Tangible improvements cannot be realized without sustained investments in critical skills and further development of human resources.

While banana and sugarcane exports ceased during the civil war, sesame and dried lemon have emerged as major export crops with an annual revenue in 2015 of around \$34 million and US\$40 million respectively. Unlike bananas, these are non-perishable products and they are exported mainly to India and Middle Eastern countries. Livestock provides the highest foreign currency earnings, totaling about \$691 million in 2015 and \$627 million in 2016. These earnings declined significantly in subsequent years (\$395 million in 2017 and \$345 million in 2018),<sup>7</sup> due to Saudi Arabia's ban on livestock imports from Somalia. Exports of small ruminants (sheep and goats) to Saudi Arabia during the Hajj season account for 70% of Somalia's total exports of these animals.

In contrast to agriculture and livestock exports, there has been a steady and large increase in agricultural imports from US\$82 million in the late 1980s to almost US\$1.5 billion in 2015.<sup>8</sup> This has mainly been driven by rapid population growth and urbanization and the collapse of domestic crop production. Agriculture imports include cereals (rice, wheat flour and spaghetti), cooking oil and sugar.

Somalia receives substantial humanitarian assistance from international charities and development organizations. Cash-for-work, food distribution and unconditional cash distribution to IDP camps have become major activities for NGOs and development organizations in Somalia. While this provides immediate food security to millions of Somalis affected by drought and conflicts, it does not provide any sustainable solution to food shortages and crises. Most IDPs are now dependent on food aid and cash distribution to a point where they have lost the desire to re-engage in the productive sectors to earn a living for their families.

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<sup>7</sup> "Somalia Exports," Trading Economics website, <https://tradingeconomics.com/somalia/exports>, last accessed on 26 May 2020.

<sup>8</sup> "Rebuilding Resilience and Sustainable Agriculture in Somalia."

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Past studies clearly suggest that the lack of human capacity, investment opportunities, functional financial institutions, infrastructure, credit and an enabling environment are the root causes of food crises.<sup>9</sup> There is increasing understanding among donors of the negative impact of large-scale humanitarian assistance and a desire to invest in long-term sustainable solutions. The humanitarian assistance camp still dominates these discussions because recurrent droughts, flooding and chronic insecurity cannot be ignored. While humanitarian assistance is justifiable for short-term interventions, there is also a need to create employment opportunities for youth and IDPs who rely mainly on cash or food distribution. The productive sectors are well positioned to play a vibrant role in developing durable solutions to food crises and pervasive unemployment. The private sector requires a conducive environment, including policies, regulations, security and robust financial institutions, to invest in Somalia.

Reviving the productive sectors will require major investments in infrastructure rehabilitation; expansion of primary production and market value through better and more modern input supplies (seeds and agro-chemicals), production methods, transport and storage links; value addition through processing to provide the population, including women and youth, with new income-generating opportunities; improvement of regulatory frameworks for agriculture and livestock products; and strengthening financial institutions. Most future employment growth in Somalia will come from the revival of agriculture and the processing of its products. As the livestock export sector has become very unpredictable due to droughts and export bans, new employment opportunities will mostly be in value addition (for example dairy, meat and hides and skins processing and packaging). The development of product quality control systems, including rigorous laboratory testing to avoid food poisoning and product contamination, is crucial to reviving the productive sectors and export markets.

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Pillar 3 of the National Development Plan for 2020 – 2024 (NDP-9) is the largest and most ambitious component. It calls for agriculture and livestock development strategies and interventions to maximize progress. At the heart of Pillar 3 is the intent to transform the economy by improving the resilience of traditional livestock and crop production industries to better meet growing challenges from droughts, floods and climate change, while at the same time inducing private sector growth to broaden and sustain the growth base and provide greater employment opportunities.<sup>10</sup>

NDP-9 calls for the creation of a more business-friendly environment by updating administrative and bureaucratic procedures and providing tailored advisory services to encourage micro- and small enterprises to become part of the formal economy. It also calls for improvements in market regulations to increase economic efficiency across sectors. Private sector targeted interventions are central to NDP-9 and will support Somalia's progress towards the UN Sustainable Development Goals.

Building a holistic and competitive economy capable of taking advantage of emerging regional trade markets is the best route to broadening economic growth and mobilizing revenue in the medium to long term. NDP-9 shows the government's commitment to promoting investment in trade corridors linking Somali ports to neighboring countries while developing a strategy to encourage labor-intensive industries along these corridors. In addition, efforts are being made towards accession to the World Trade Organisation (WTO) and the Common Market for Eastern and Southern Africa (COMESA).

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<sup>9</sup> “Economic Growth Assessment of South-Central Somalia,” USAID, 2013.

<sup>10</sup> “Economic development (Pillar 3),” NDP-9, pp. 182-200.

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There are three overarching strategic areas in Pillar 3: enhancing institutions to develop legal and administrative capacity to create a more business-enabling environment; rehabilitation and expansion of key infrastructure to support growth and generate employment; and expanding opportunities and access to public services for all Somalis as a sustainable path to poverty reduction.

## 2.1 Government institutions

The existence of agriculture and livestock ministries with specific policies, administrative functions and resources dates back to the colonial era. The post state collapse national Ministry of Agriculture and Livestock had well-developed administrative structures supported by both management and specialized technical capabilities. Like other public institutions, the collapse of the central state destroyed the ministry's capacity, as well as its assets and infrastructure. The structure of the current federal Ministry of Agriculture and Irrigation (MOAI) as well as the Ministry of Livestock, Forestry and Range by and large mirrors the old system, albeit with large development needs to fulfil ministerial missions effectively.

The Somali government and its developmental partners are making an effort to promote the establishment of an inclusive political dialogue. They are also developing legal frameworks, establishing and strengthening the capacities of key institutions and introducing core government functions in the course of FMS formation. Puntland is the oldest FMS, having formed as an autonomous region of Somalia in 1998 with fairly stable and functional administrative structures, while the states of Jubaland, South West, Galmudug and Hirshabelle have emerged more recently.

The country still lacks coordinated decision- and policy-making as well as harmonized functions, mandates and targets for federal and state ministries of agriculture and livestock. It is a major challenge to develop a joint strategy to improve food security, rehabilitate agricultural infrastructure, induce growth, create employment and generate income. A 2018 joint World Bank-FAO study identified weak institutions, lack of coordination, insecurity, persistent insurgency in the most fertile agricultural areas and dilapidated infrastructure as major obstacles to Somalia's economic development.<sup>11</sup> In recognition of these challenges, a recent assessment by Adam Smith International (ASI) and SATG concluded that both federal and state ministries of agriculture are unable to deliver their mandates due to lack of office space, transportation, research and extension facilities, quality control laboratories, testing and screening of emerging diseases and insects and financial resources.<sup>12</sup> Most current staff of the federal and state MOAI are inexperienced in conducting agricultural activities such as technology testing and transfer using off-the-shelf technologies, value chain analysis and support services for the farming community. The annual budget allocated to the ministries is only enough to pay salaries for employees.

Similar consultations conducted by the Livestock Sector Development Strategy (LSDS) have found that both federal and state ministries of livestock suffer from major capacity and resource gaps, which inhibit their ability to deliver even the most basic services.<sup>13</sup>

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A 2018 joint World Bank-FAO study identified weak institutions, lack of coordination, insecurity, persistent insurgency in the most fertile agricultural areas and dilapidated infrastructure as major obstacles to Somalia's economic development.”

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11 “Rebuilding Resilience and Sustainable Agriculture in Somalia.”

12 “Functional review of the Federal and State Ministries of Agriculture and Irrigation,” ASI/SATG Outreach Program, 2019.

13 “Functional review of the Federal and State Ministries of Agriculture and Irrigation.”

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Budget allocations and physical facilities are limited, with most staff lacking up-to-date training and specialization. Due to this lack of domestic capacity, the livestock exporting companies acquire technical support from outside the country to perform animal inspection and disease identification. Weak capacity is exemplified by the poor conditions of the public laboratories and the lack of accreditation and supervision of private laboratories at the quarantine stations. These governance issues severely limit the government's ability to develop effective policies and strategies for improving productivity and supporting growth in the productive sectors.

## 2.2 Private sector

Value addition is a major challenge in the agriculture and livestock value chains. At present there is no value addition for most crops grown in Somalia, either for local consumption or for export markets. Most revenue from livestock is generated by exporting live animals. Sesame and lemons are the largest export crops, but these exports are limited to specific markets, mainly Dubai and India, where the product is re-branded and shipped as a new product to other international markets. The collapse of dried lemon exports due to diplomatic tensions between Somalia and the UAE has increased the supply of fresh lemons in local markets to a point where the domestic selling price is no longer sustainable for producers.

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Somali farmers enjoyed the glory of being the largest banana producers in East Africa as far back as the 1920s.<sup>14</sup> At its peak, land used in Somalia for banana production reached 12,000 hectares and the industry employed over 120,000 people.<sup>15</sup> Prior to 1990, banana farmers produced almost 75% export quality bananas with an average yield of 25-30 metric tons per hectare per year (mt/ha/year). The main export markets were Italy and the Gulf countries. In 1990, Somalia's banana exports were worth \$96 million,<sup>16</sup> then all but ceased after 1991.

Banana farmers are currently experiencing lower yields than before the civil war, though production potential is much greater (40-50 mt/ha/year).<sup>17</sup> This low yield is mainly attributed to the traditional planting system using suckers from old fields,<sup>18</sup> poor production practices and a shortage of uniform and disease-free planting materials. On average, about 30% of planted material is lost due to poor emergence and the rest evolves into non-uniform plants, resulting in low yields and poor economic returns to banana growers. To overcome these challenges, emerging entrepreneurs are coming up with more innovative ways to produce clean seedling materials for commercial banana farmers. One innovation is the establishment of banana tissue culture laboratories that provide clean and uniform plants for export markets. Tissue culture banana seedlings are widely used in all banana-producing countries as they establish more quickly, grow more vigorously, have a shorter and more uniform production cycle and produce disease-free plants with a higher yield than conventional plants.<sup>19</sup>

The Somali government is committed to restoring banana production and export markets. The federal Ministry of Agriculture and Irrigation along with the Ministry of Trade and Commerce is working in partnership with private industry and organizations such as Growth, Enterprise, Employment and Livelihoods (GEEL) supported by USAID and FAO to promote the banana revitalization initiative.

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14 “Functional review of the Federal and State Ministries of Agriculture and Irrigation.”

15 “Functional review of the Federal and State Ministries of Agriculture and Irrigation.”

16 “Functional review of the Federal and State Ministries of Agriculture and Irrigation.”

17 “Rebuilding Resilience and Sustainable Agriculture in Somalia.”

18 Banana farmers in Somalia generally use old suckers as planting material to grow new banana fields, but these are heavily infested with insects and diseases, resulting in major losses soon after establishing new crops.

19 Banana tissue cultures require sophisticated laboratory and technical knowledge that is not readily available in Somalia.

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*Interest in the banana trade from Turkey, Qatar and Middle Eastern countries is growing. In recent years, small shipments carrying Somali bananas have reached destinations including Turkey and the United Arab Emirates.*

Under these partnerships, commercial banana farmers and ministry staff are participating in overseas trade shows and receiving training in countries like Costa Rica to acquire first-hand experience and knowledge of banana production practices using state of the art technologies.

Interest in the banana trade from Turkey, Qatar and Middle Eastern countries is growing. In recent years, small shipments carrying Somali bananas have reached destinations including Turkey and the United Arab Emirates. This is expected to increase as banana producers, development organizations and the ministry are working together to improve the production levels and enabling environment for the banana trade. To meet these goals, strong skills in banana production and the use of state of the art technologies are crucial.

The development of value addition through food processing for crops such as maize, sorghum, cowpeas and mung beans is constrained by the distribution of food aid and food imports into the country. Many farmers have abandoned growing these crops due to lack of incentives and price fluctuations after the crop is harvested. On average, the country currently produces about 200,000 metric tons of cereals per year, which is only half of the total domestic demand.<sup>20</sup> A new value chain for maize processing and packaging has recently been introduced and established near Mogadishu by SomGrain Company with an investment of over US\$5 million. This will likely increase the demand for cereal crops and provide price stability in the market. However, for these industries to flourish and compete with world prices and standards, technical know-how on agriculture and food processing is crucial.

### Section 3: The Historical Perspective of Human Capital Development in Agriculture Sector

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*The Somali National University (SNU), which was the only university that existed before the civil war, had 15 colleges with a student enrolment of about 5,000 and a teaching staff of about 700. The university provided free education, food and accommodation to all students*

The civil war and the resulting political unrest had a devastating impact on the education sector in Somalia. All prewar technical schools and colleges were destroyed and some became housing facilities for IDPs. This resulted in a mass emigration of skilled and experienced professionals to other countries. The Somali National University (SNU), which was the only university that existed before the civil war, had 15 colleges with a student enrolment of about 5,000 and a teaching staff of about 700.<sup>21</sup> The university provided free education, food and accommodation to all students and received considerable financial support from the EU, the US, Canada, Saudi Arabia and Italy, including teaching support from various Italian universities. Some departments, including agriculture, had collaborative programs with American and Canadian universities. As a result of these valuable inputs, SNU produced a considerable number of graduates in various disciplines relevant to agriculture, including crops, veterinary science, geology, chemistry and engineering. Through international scholarships funded by the donor community, a large number of university graduates were able to take part in specialized postgraduate programs abroad, and upon returning to the country most readily found employment in government ministries, agencies, public enterprises or in the private sector. On average, faculties of agriculture, animal husbandry and veterinary sciences produced 20 to 30 students each per year.

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20 FAO Food Security and Nutrition Analysis Unit (FSNAU), 2018.

21 “SNU History,” SNU website, <https://snu.edu.so/about/#1583190813754-6e636511-af6d>, last accessed on 26 May 2020.

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Prior to the civil war, the quality of university education was highly rated as most university lecturers were well skilled in their field of specialization. Professors were hired for their knowledge, credentials and competence. Apart from the teachers' training college (Lafoole) located near Afgoye, most science courses were taught by Italian professors who had a direct affiliation with SNU. To be admitted to the various faculties, students had to go through a competitive entry examination, and in preparation for full enrolment, students were compelled to complete a six-month training course in Italian, the language in which all science courses were taught.

SNU's faculties were fully equipped with administration offices, classrooms, laboratories, research facilities, a health unit, a food court and rooms for boarding students. As all students and professors stayed on campus, the environment was conducive for interaction among students and professors after class hours. Accommodation, food and university fees were free to all students.

In the faculty of agriculture and veterinary sciences, the teaching curriculum and courses were the same as those offered at Italian universities, starting with advanced biology, mathematics, chemistry, physics and general economics during the first two years of enrolment. Specific courses related to agriculture and veterinary sciences like agronomy, physiology, pathology, entomology, agriculture economics, anatomy, statistics, accounting, genetics and plant or animal breeding were offered during the third and fourth years of study. Practical field visits to public and private farms as well as to research and extension centers were a routine part of the curriculum.

In addition, student internships were administered through public institutions like the sugarcane production and processing industry in Mareerey and Jowhar, the Rice Development Project in Faanoole, the Dry Land Agriculture Development Project in Baidoa, the Central Agriculture Research Station (CARS) and the agriculture extension service. As a prerequisite for graduation, all students were required to conduct a comprehensive thesis project based on actual research trials managed either in the field or in the laboratory. The field trials were generally administered in partnership with CARS in Afgoye, about eight kilometers from the faculty of agriculture. This was an excellent opportunity for students to be involved in research trials and demonstration plots run by the research department of the Ministry of Agriculture and to work closely with CARS researchers on their thesis work.



*All students graduating from SNU were granted jobs in public institutions that were readily available to absorb fresh graduates.*

In addition to agriculture and veterinary sciences, the SNU administered various other academic programs, including the faculties of medicine, engineering, industrial chemistry, geology, economics, the law school and the teachers' training college. All of these were coordinated through Ministry of Higher Education policies and regulations. All students graduating from SNU were granted jobs in public institutions that were readily available to absorb fresh graduates. The agricultural research and extension services of the Ministry of Agriculture were major employers for graduates of the faculty of agriculture. On average, about 30 students graduated from the faculty every year.

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Currently, in the absence of government-supported educational institutions, community- and privately-supported schools and universities have emerged throughout the country, with some offering degree programs in agriculture and veterinary sciences. Institutions offering majors in agriculture and animal sciences include Amoud University (Somaliland), Burao University (Somaliland), East African University (Puntland), Hiiraan University (Hirshabelle) and Baidoa University (South West). Most agriculture and veterinary universities are based in Mogadishu, including the City University of Mogadishu, Benadir University, Jazeera University, Plasma University, SNU, Job Key University, Abrar University, Darul-Hikma University and Zamzam University. SNU has recently started enrolling students in various faculties including agriculture and veterinary sciences.

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*Sheikh Technical Veterinary School and Reference Centre (ISTVS), located in the Sahil region of Somaliland, is a regional institution that collaborates with Uganda's Makerere University to provide training to professionals in the Horn of Africa*

Initiated as a donor-funded project in 2002, the IGAD Sheikh Technical Veterinary School and Reference Centre (ISTVS), located in the Sahil region of Somaliland, is a regional institution that collaborates with Uganda's Makerere University to provide training to professionals in the Horn of Africa on topics related to animal health, food safety, livestock business development and dry lands and ecosystem management.<sup>22</sup>

Due largely to limited higher education policies and regulations, the current education system is perceived as a cycle of unemployment for graduates. To break this cycle, complex human resource supply and demand processes need to be analyzed to assess the impact of various contributing factors and policy options. Graduates of agriculture and veterinary faculties constitute the supply whereas the demand stems from various employment avenues. Agencies employing trained agriculture and veterinary professionals are grouped under various sectors including government (ministries of agriculture and livestock), private sector, academic institutions, NGOs, self-employment and others not directly related to agriculture. The number of trained agriculture and veterinary graduates in each of these sectors depends on sectoral growth and the ability to absorb fresh graduates. At present, sectoral demand is too low to absorb graduating students, especially those graduating from universities with weak, substandard curricula. The low demand is attributed to poor investment in the sector and lack of security and an enabling environment. Universities are often not equipped to meet the existing demands of the public and private sector.

Actual employment depends on graduates' skill sets including technical skills and soft skills (managerial, behavioral, communication). If the skill set does not match the employer's expectations, employment may be lost to graduates from competing disciplines such as management or science. Any skills gap reduces job opportunities, aggravates existing unemployment problems and discourages students from opting for these courses, affecting the supply of well-trained human resources. Demand, supply and skill set are three important dimensions for developing future scenarios regarding trained agricultural and veterinary human resources.

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<sup>22</sup> ISTVS Facebook page, <https://www.facebook.com/IgadSheikhTechnicalVeterinarySchool/>, last accessed on 26 May 2020.

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## Section 4: Key Findings

### 4.1 Academic institutions

A total of 18 academic institutions with majors in agriculture and animal sciences were surveyed, most based in Mogadishu. Table 1 shows the year that these universities were established, the oldest being East African University (1999) and the newest being East African University in Garowe and Zamzam University in Baidoa, both established in 2017. Half of these universities were established in 2013 and 2014, and SNU was the only one that existed before the civil war. East African University, Zamzam University and Plasma University have branches in Garowe, Baidoa and Jowhar respectively. Plasma University reported the highest number (19) of lecturers holding M.Sc. degrees, followed by Benadir (18) and SNU (17). It has taken more than a decade to re-establish academic institutions in Somalia, and unlike the previous system, most of the universities are privately owned.

**Table 1: Universities surveyed, locations, year established**

<b>University</b>	<b>City</b>	<b>State</b>	<b>Year established</b>
East African University	Bosaso	Puntland	1999
Puntland State University	Garowe	Puntland	2004
Benadir University	Mogadishu	Benadir	2008
Lower Shabelle University (LSU)	Marka	South West	2010

Plasma University	Mogadishu	Benadir	2010
Hiraan University	Beletweyne	Hirshabelle	2010
City University of Mogadishu	Mogadishu	Benadir	2012
Upper Jubba University	Kismayo	Jubaland	2013
Plasma University	Jowhar	Hirshabelle	2013
Red Sea University	Galkayo	Galmudug	2013
Baidoa International University	Baidoa	South West	2014
Somali National University (SNU)	Mogadishu	Benadir	2014
Zamzam University	Mogadishu	Benadir	2014
Somali International University	Mogadishu	Benadir	2014
Job Key University	Jowhar	Hirshabelle	2014
Abrar University	Mogadishu	Benadir	2014
East Africa University	Garowe	Puntland	2017
Zamzam University	Baidoa	South West	2017

Further analysis was conducted to assess the universities' capacity in terms of staff, academic credentials, level of training and experience (Table 2). The assessment revealed that most universities offer basic courses (introductory math, biology and physics) as well as core courses (botany, principles of crop production, crop protection, animal husbandry, plant and animal anatomy, crop and animal physiology) that are important for graduation.

SNU reported the largest faculty with 30 lecturers (10 with B.Sc. degrees, 17 with M.Sc. degrees and three with Ph.D. degrees). This was followed by Plasma University with 22 lecturers, most of whom hold M.Sc. degrees. In general, the number of lecturers at all universities with M.Sc. degrees (111, 66%) is greater than those with B.Sc. (63, 27%) or Ph.D. degrees (11, 6%). SNU, Zamzam, Job Key and Plasma have the highest number of B.Sc. lecturers. While most lecturers who hold B.Sc. degrees are local graduates, most lecturers with M.Sc. and Ph.D. degrees are graduates of foreign universities (mostly in Africa and Asia). Seventy-one percent of the lecturers had at least four years of teaching experience.

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Only 3.8% of lecturers are female, which clearly shows that agriculture and animal sciences are not attracting sufficient number of female students

Only 3.8% of lecturers are female, which clearly shows that agriculture and animal sciences are not attracting sufficient number of female students. Universities based outside Mogadishu such as Hiiraan, Puntland State, East Africa, Upper Juba and Red Sea have far fewer faculty (Table 2). The number of faculty range from three at Upper Juba Veterinary University to six at East Africa Veterinary University. These numbers are too low to deliver the required courses. The number of lecturers reported may not be a true representation as most university lecturers in Mogadishu and the FMSs are freelancers and teach at various universities simultaneously. For example, a plant pathologist at Benadir said he taught the subject in various universities. Details of the courses offered and the lecturers' gender, academic credentials and years of experience are listed in Table 2.

**Table 2: Agriculture and veterinary lecturers' gender, academic credentials and years of experience**

University	Specialization	Gender		Academic credentials			Years of experience		
		Male	Female	B.S c.	M.S c.	Ph. D.	1-3	4-6	> 6
Benadir	Agriculture	19	0	1	18	0	0	5	14
City University of Mogadishu	Agriculture	11	0	0	10	1	0	11	0
SNU	Agriculture	29	1	10	17	3	0	27	3

Zamzam	Agriculture	11	0	0	11	0	11	0	0
Somali International	Agriculture	13	0	0	12	1	6	6	1
Plasma	Agriculture	22	1	4	19	0	8	12	3
Job Key	Agriculture	12	1	10	3	0	2	2	9
Puntland State	Animal science	5	0	0	4	1	5	0	0
East African	Animal science	6	0	0	6	0	6	0	0
Abrar	Agriculture	5	0	1	4	0	0	5	0
Lower Shabelle	Agriculture	7	2	3	5	1	4	1	4
Hiiraan	Agriculture	4	0	3	1	0	0	4	0
Red Sea	Animal science	5	0	0	5	0	2	3	0
East African-Bosaso	Animal science	5	0	2	3	0	3	2	0
Upper Juba	Animal science	3	0	0	0	3	3	0	0
Baidoa International	Agriculture and animal husbandry	7	1	3	4	1	3	3	2
Plasma-Jowhar	Agriculture	14	1	15	0	0	1	11	3
<b>Total</b>		<b>178</b>	<b>7</b>	<b>51</b>	<b>122</b>	<b>11</b>	<b>54</b>	<b>92</b>	<b>39</b>

## 4.2 Student enrolment

A detailed analysis of student enrolment in agriculture and animal science faculties is presented in Table 3. Zamzam University has the largest total agriculture student enrolment (387) followed by SNU (287) and Plasma University (250). On average, there are 481 students enrolled at all universities per class year. If one considers all agriculture and animal science teaching universities not included in this study and students graduating from overseas universities, the number could rise to 600 per year.

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On average male students make up 86% of enrolment while female students account for 14%.

Female enrolment in agriculture and animal husbandry faculties is low. On average male students make up 86% of enrolment while female students account for 14%. There is little variation in the gender balance between the first year and fourth year, suggesting that there is not a significant phenomenon of women abandoning the field over the course of their four years.

The labor market's current absorption capacity for agriculture and animal science graduates is far lower than the number of graduates these universities are currently producing. For example, the federal and FMS ministries of agriculture and irrigation, which are the largest employers of agriculture specialists in the country, are unable to employ graduating students due to security constraints and budget limitations. The private sector, NGOs and development organizations are also unable to employ sufficient numbers of graduating students due to lack of investment, poor infrastructure and an agriculture and animal husbandry skills mismatch.

**Table 3: Student enrolment at agriculture/animal science faculties (2019/2020)**

University	Number of students enrolled								Total
	1st year		2nd year		3rd year		4th year		
	M	F	M	F	M	F	M	F	
Upper Juba University	11	2	11	1	13	0	8	0	46
Baidoa International University (BIU)	23	4	17	5	12	1	0	0	62
Lower Shabelle University (LSU)	7	0	11	8	29	18	47	8	128

Plasma University (Mogadishu)	55	3	57	5	67	3	56	4	250
Banadir University	25	0	23	5	27	8	33	5	126
City University of Mogadishu	10	4	7	1	16	1	4	2	45
Somali National University (SNU)	72	28	60	13	53	19	35	7	287
Zamzam University	65	0	155	0	94	0	64	0	378
Somali International University	20	5	14	8	17	3	17	2	86
Plasma University	0	0	21	1	13	0	0	0	35
Job Key University	0	0	15	0	19	1	0	0	35
Puntland State University	17	2	0	0	0	0	0	0	19
East African University	0	0	0	0	12	2	0	0	14
Abrar University	12	0	15	0	17	0	15	0	59
Hiran University	9	9	93	4	89	5	49	2	350
Red Sea University	0	0	16	16	14	1	7	3	57
Zamzam University (Jowhar)	19	0	21	0	0	0	0	0	40
	<b>345</b>	<b>57</b>	<b>536</b>	<b>67</b>	<b>492</b>	<b>62</b>	<b>335</b>	<b>33</b>	<b>1927</b>

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*the universities reported deficits in agriculture engineering, crop protection, crop improvement, soil analysis, farm management, horticultural crop production, beekeeping, agribusiness management and market enterprise, greenhouse installation and management and seed quality control.*

All surveyed universities reported that a high school certificate is a prerequisite for university enrolment. Seventy-five percent of the universities reported English proficiency (reading and writing) as an entry requirement while some universities required fulfilment of core courses. Fifty percent of universities reported requiring an entrance exam for admission.

When asked about skill gaps, the universities reported deficits in agriculture engineering, crop protection, crop improvement, soil analysis, farm management, horticultural crop production, beekeeping, agribusiness management and market enterprise, greenhouse installation and management and seed quality control. As for livestock graduates, the skills gap is mostly in livestock production and marketing and animal fattening and vaccination. Most universities (62%) reported that they can fill skills gaps in the market. Seventy-five percent of universities reported that they have a recruitment policy for women, minorities and disabled groups.

### 4.3 Partnerships with local and international schools

Some universities reported that they have signed memoranda of understanding with universities in the East African region while others reported that they had partnership agreements with universities in the United States and Europe. It was highlighted that despite agreements with foreign universities, it is difficult to directly implement collaborative projects in Somalia due to security concerns. Ten of the 16 universities interviewed (63%) reported that they share faculty and staff with other local universities; nine (56%) reported that they participate in distance learning with partners; and 12 (75%) shared technologies with their partners (Table 4).

**Table 4: Partnerships with local and international schools**

Type of partnership/cooperation	Universities	Percent age (%)
Sharing technology	12	75
Sharing resources and materials	11	69
Sharing faculty and staff	10	63
Distance learning	9	56
Sharing research	8	50
Mutual support for school management	3	19
Total	16	-

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## 4.4 Key findings from student interviews

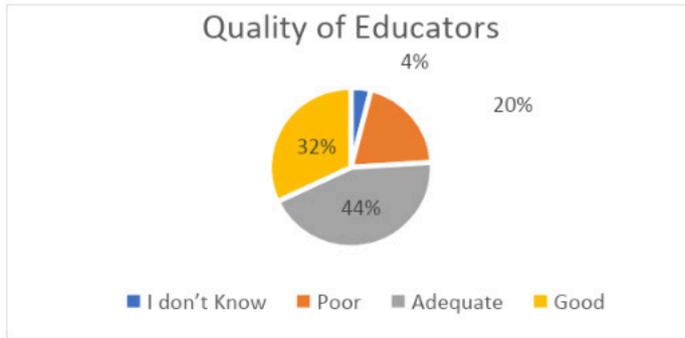
A total of 78 students from 18 universities were interviewed, including 48 graduates and 30 students currently enrolled in undergraduate programs. Fifteen female students (19%) took part in the focus group discussion. When students were asked about their decision to pursue higher education and what motivated them to enrol in agriculture and livestock courses, they ranked interest in, and passion for, the agriculture and livestock profession as their top motivation followed by accessibility to education and interest in helping farmers in need of technical support (Table 5). Family influence also played an important role in some students' decision to go to university.

**Table 5: Driving forces for agriculture/livestock university enrolment**

<b>Criteria</b>	<b>Number of respondents</b>	<b>Percent age</b>
Interest in and passion for the profession	36	27
Accessibility	29	22
Interest in helping people in need	26	20
Family influence	22	17
Affordability (fees)	11	8
Attractive compensation	8	6
<b>Total</b>	<b>132</b>	<b>100</b>

When students were asked about the quality of the educators who taught them, 44% considered them adequate, 32% good and 20% poor (Figure 1). Students from universities based in Mogadishu were more likely to report good quality educators while students at universities based in the member states were more likely to report poor quality.

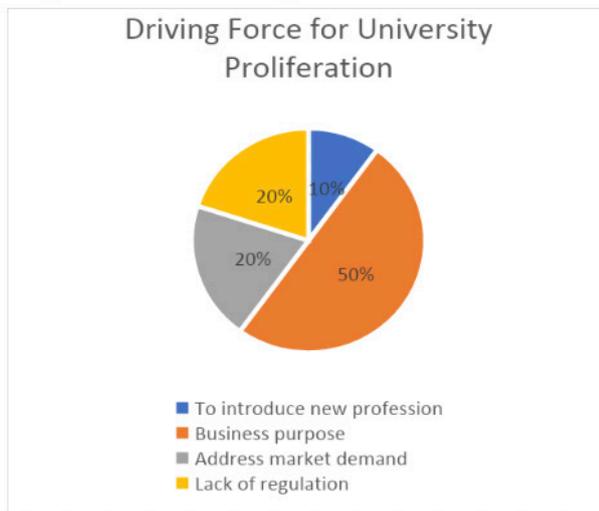
**Figure 1: Teaching quality at universities**



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Seventy-five percent of the interviewed students reported that the proliferation of universities does not add any value in terms of quality and specialization. Half of the students interviewed reported that business opportunities and profit-making are the main driving force for opening new universities

Except for SNU, most of the universities are privately owned and their enrolment numbers have increased significantly in the past five years. Nine of the universities were registered in Somalia between 2013 and 2014, mostly in Mogadishu. Seventy-five percent of the interviewed students reported that the proliferation of universities does not add any value in terms of quality and specialization. Half of the students interviewed reported that business opportunities and profit-making are the main driving force for opening new universities, while only 10% reported that the motive is to introduce new professions and relevant technologies (Figure 2).

**Figure 2: Driving forces for university proliferation**



Sixty percent of student respondents reported that their university has a foundational program for students to complete during their first year of university. Apart from the theoretical courses offered in most universities, 53% of the students reported that there are opportunities to gain practical (laboratory and field) experience in physics, biochemistry, entomology, microbiology, livestock marketing, vaccination services, crop husbandry and greenhouse activities.

#### 4.4.1 Employment options after graduation

Table 6 below shows that there are limited opportunities for students graduating from university to be employed by government institutions or by the private sector. Consequently, there is less opportunity for students to engage in agricultural activities such as research, extension services or supporting the private sector in farm management and farm mechanization. The largest proportion of the graduating students opt for self-employment (39%), mostly in other fields. The private sector employs the least (13%), which could be attributed to graduates' lack of technical skills, a lack of employment-generating private sector investment in agriculture and the high security risk involved in such investment in agriculture-producing areas.

In most countries, the ministries of agriculture and livestock are major employers as they are heavily engaged in a wide range of activities such as research, extension services, quality control laboratory services, policy and regulation, field inspections and enforcement of regulations and laws. At present, neither the Ministry of Agriculture nor its sister Ministry of Livestock are able to implement these essential services. Both ministries will be able to absorb more graduating students only when these services are in place.

**Table 6: Employment options after graduation**

<b>Employment opportunity</b>	<b>Number of respondents</b>	<b>Percentage</b>
Self-employment	37	39
International/local NGOs	22	23
Federal and state ministries of agriculture and irrigation	16	17
Private sector	13	13
Further studies	8	8
<b>Total</b>	<b>96</b>	<b>100</b>

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About 44% of students reported that their universities offer internships to learn from local farms and private sector organizations. Seventy-six percent said that internship programs enhance students' abilities and understanding of the agriculture and livestock sectors. This experience can lead to employment opportunities.



*Greenhouse construction coupled with drip irrigation technology can ease the high demand for vegetable crops such as tomatoes, swiss chard, green and hot peppers, onions, cucumbers and coriander in major cities like Mogadishu.*



*Most of the poultry (meat and eggs) consumed in major cities in Somalia is imported from Brazil. Chicken slices are generally imported in a frozen form.*

#### 4.4.2 Skills gaps in the market

The interviewed students recognized that skills gaps exist in the marketplace, yet most universities are unable to fill them. While some universities tailor their curricula to address skills gaps, others are not equipped or prepared to meet market demand due to a lack of technical skills among university lecturers, most of whom are graduates with B.Sc. or M.Sc. degrees who lack adequate hands-on experience.

The skills gaps most often identified by students included the following:

**Farm management.** Farms, particularly commercially-oriented farms, require proper management skills from land preparation to crop harvest and post-harvest handling such as storing and marketing farm produce. Farm managers are entrusted with the task of looking after farm operations including using machinery, properly preparing the farm layout for crop rotation, irrigation using river or well water, field monitoring and protecting the crop from insects, diseases, animals and theft. Farm managers are also tasked with the responsibility of procuring farm inputs, bookkeeping and managing laborers.

**Greenhouse skills.** Urban agriculture has become popular in recent years. Greenhouse construction coupled with drip irrigation technology can ease the high demand for vegetable crops such as tomatoes, swiss chard, green and hot peppers, onions, cucumbers and coriander in major cities like Mogadishu. The advantage of drip irrigation is that it requires a relatively small amount of water. As this technology is just emerging, there are few companies that engage in setting up drip irrigation greenhouses. As demand increases so do potential opportunities to engage in this business.

**Poultry farming.** Most of the poultry (meat and eggs) consumed in major cities in Somalia is imported. Chicken slices are generally imported in a frozen form. Few poultry farms have emerged in recent years because many are unable to compete with imported meat due to a lack of necessary technical skills and knowledge, high production costs caused by imported feed and high transportation costs. Poultry farming provides a great business opportunity for graduating students in veterinary sciences.

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*Somalia’s rich indigenous vegetation makes it uniquely placed for high-quality honey production. Beekeeping requires only a small investment to start production and income generation.*

**Beekeeping.** Beekeeping is generally neglected in classroom studies. Somalia’s rich indigenous vegetation makes it uniquely placed for high-quality honey production. Beekeeping requires only a small investment to start production and income generation.

**Post-harvest technologies.** Students reported that over 20% of cereal and legumes stored in underground pits are destroyed by pests, a big loss for farmers who harvest far below their potential yield. Most fruit and vegetable crops perish due to a lack of proper storage and food processing facilities. Introducing small-scale and affordable aboveground storage, food processing and packaging technologies could be a good business opportunity for graduating students.

**Fodder production and processing.** Fodder is an important commodity for livestock, the backbone of the Somali economy. Animals are generally fed with natural pasture and with maize and sorghum straw. There is no system in place to grow fodder crops and process them for long-term storage. Fodder crop production, animal feed mill processing and haymaking has the potential to be a lucrative business in Somalia.

The students were also asked to list major challenges they face before and after graduation. The challenges they highlighted included a lack of internship and job opportunities in the agriculture and livestock fields due to poor investment by companies. Students also discussed widespread corruption and unfair distribution of jobs in government institutions, as well as NGO employment opportunities based not on merit but on personal and/or family connections. They noted a lack of support from development organizations and financial institutions in encouraging youth to start agriculture businesses; a poor-quality university education system with poor instructors that do not prepare them for the work force; and poor educational curricula and inadequate facilities such as laboratories and research centers. Graduates also lack confidence and language skills, making it difficult for the UN and NGOs to hire them as they cannot compete with graduates from neighboring countries.

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*Graduates also lack confidence and language skills, making it difficult for the UN and NGOs to hire them as they cannot compete with graduates from neighboring countries.*

**Table 7: Challenges to graduating students**

<b>Challenge</b>	<b>Number of respondents</b>	<b>Percentage</b>
Unemployment and lack of job opportunities	37.0	47
Skills gap	29.0	37
Lack of government support	13.0	17
<b>Total</b>	<b>78.0</b>	<b>100</b>

## 4.5 Public and private sectors

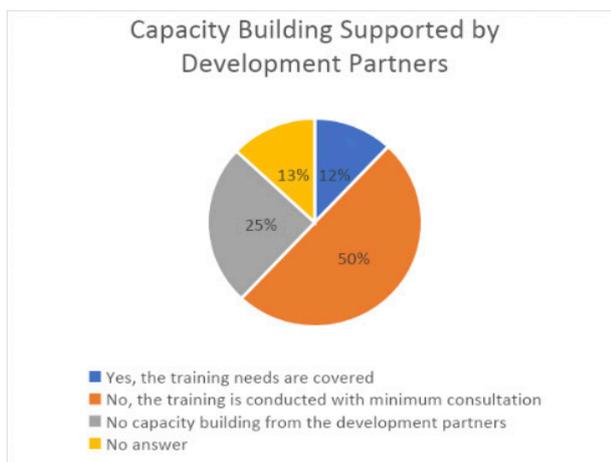
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Out of 176 interviewed employees in the fields of agriculture and livestock working for federal or FMS ministries, 157 (89%) were male and 11% were female.

Government institutions and the private sector are the major end users of university graduates' technical skills and knowledge. A set of qualitative and quantitative tools was developed to assess the technical skills required by both the public and private sector. Out of 176 interviewed employees in the fields of agriculture and livestock working for federal or FMS ministries, 157 (89%) were male and 11% were female. This is far higher than the proportion of female lecturers (3.8%) hired by the universities. Federal and state ministries of agriculture and irrigation reported that 50% of potential employees graduating from local universities are unskilled and not in a position to deliver national development plan targets.

Capacity building training is sometimes offered by development partners and international NGOs to strengthen the capacity of the ministries. Half of interviewed federal and FMS ministry officials strongly believed that training is conducted with minimal consultation with their institutions. Twenty-five percent reported that development partners provide no capacity building.

**Figure 3: Capacity building training offered by development partners**



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To improve the employability of university graduates, the ministries recommended improving university curricula, creating more self-employment opportunities for graduating students and supporting the private sector.

The absence of an enabling environment is a major limiting factor for agriculture and livestock production. Both federal and FMS ministries reported a lack of proper investment, knowledge and skills. Seventy-five percent of interviewees from the federal and state ministries of agriculture and livestock reported that they would not be able to meet NDP-9 goals, mainly due to a lack of technical staff and limited operational budgets. To improve the employability of university graduates, the ministries recommended improving university curricula, creating more self-employment opportunities for graduating students and supporting the private sector. The ministries claimed that they cover skills gaps by providing fresh graduates on-the-job training and by hiring external consultants and advisors (paid and unpaid) with a high level of technical skills.

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## 4.6 Private sector skills gap

While the universities generate human capital for agriculture and livestock, most lack the technical skills to undertake technology-related activities. Private sector interviewees including producers, processors and exporters of agricultural commodities (mainly sesame) were asked about technical, managerial and financial skills gaps. They reported serious gaps in all skills related to the sciences, but that managerial and financial skills gaps are minimal. The science and technology education sector is poorly equipped to produce high quality graduates that meet market demands.

For example, the Filsan Company engaged in technology adaptation reported that, due to a shortage of technical skills in Somalia, they recruited a molecular biologist from Kenya to work in their tissue culture laboratory. SomGrain has acquired most of their technical staff from Uganda. There are technical colleges run by private sector companies like Hormud that provide sufficient training in electrical and mechanical engineering for their graduates to provide services in the field of technology. Though locally generated skills are lower in quality than skills sourced from outside the country, local graduates are more prepared to undertake jobs in rural areas and poorly secured locations. Very few private sector companies offer internships to new graduates. This low absorption rate is attributed to security concerns in production areas and substandard practical skills required for agriculture and livestock.

## 4.7 Improving agriculture and livestock education

Researchers consulted five key informants with a high level of professional skills and experience in the fields of agriculture and livestock to provide their expert opinions on how to improve agriculture and livestock education. They included independent consultants and professionals working with different organizations including academic institutions, development organizations, the Ministry of Agriculture and the private sector.

Most of the informants reported that there is no accreditation system to evaluate the quality of education offered by universities. With few exceptions, most universities are business-driven with a greater emphasis on attracting and enrolling high numbers of students than on providing high-quality education and addressing market demands. They recommended that academic institutions be accredited by an independent body in order to ensure that they meet high quality standards in providing the education Somalia requires.

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*An independent  
third party should  
provide rigorous  
monitoring of  
the university  
admission system*

**Recommendations that emerged from these KIIs included the following:**

- An independent third party should provide rigorous monitoring of the university admission system
- Academic institutions should conduct periodic assessments of students to evaluate their education level and preparedness
- All graduating students should be required to obtain a standard certification approved by the Ministry of Higher Education
- Graduates should pass a formal test allowing them to practice their profession
- The overall quality assurance system should be improved.

The KIIs also recommended reviving agriculture and livestock education institutions with support from government and donor agencies. One success story they raised was the IGAD Sheikh Veterinary Technical School and Reference Center (ISTVS), established in 2002 with funding from the European Union, the Danish government and the Italian Agency for Development Cooperation. This technical school operates with modern academic facilities in a state-of-the-art socially interactive environment. ISTVS has built strong institutional and academic links with peer institutions of higher learning both within the region and further abroad. The school was recently adopted by the Inter-Governmental Authority on Development (IGAD) as one of its specialized regional institutions.

## AGRICULTURE AND LIVESTOCK SECTOR STRATEGIC FRAMEWORK

Table 8 identifies sector constraints and proposed strategic interventions or activities to mitigate them.

**Table 8: Human Capital Development Strategy for the Agriculture Sector**

Strategy	Constraints	Potential stakeholders	Interventions
<p><b>Develop demand driven technical and vocational education and training (TVET) schools and capacity building programs for the agriculture and livestock sector</b></p>	<p>Young graduates seeking employment are poorly equipped to apply even basic technical skills in the agriculture and livestock sectors. Severe shortages were found in the baseline study underscoring a lack of knowledge to apply modern agriculture research, extension, climate smart agriculture, farm management and agriculture input technologies. Those involved in academic coursework lack hands on applied skills development in the form of apprenticeships or internships.</p> <p>Though agricultural technology is evolving at a fast pace, without qualified technicians who understand and apply these technologies, Somalia cannot improve its outcomes or competitiveness in the region and around the world</p>	FGS, FMS, MoAG,	Develop technical and vocational education and training (TVET) schools and capacity building programs for the agriculture and livestock sector. The TVET schools must target skills required in the market since this is a necessity for job creation and economic growth
		FGS, FMS, MoEHE and MoAG	Establish formal internships or apprenticeships for students studying at universities to provide applied experience critical to meet the needs of the industry.
		the private education sector, higher education institutions	Develop curricula for the agricultural and livestock technical schools relevant to the Somali context and responsive to the market needs. Training should be hands-on, make use of the latest agricultural technologies and cover entrepreneurship and farm management

Strategy	Constraints	Potential stakeholders	Interventions
		<p data-bbox="874 819 1070 864">FGS, FMS, MoEHE and MoAG</p> <p data-bbox="874 898 1042 920">Fisheries cooperatives</p>	<p data-bbox="1098 439 1445 528">Recruit qualified teachers or professionals specialized in agriculture and veterinary sciences, including laboratory activities, to provide capacity development programs</p> <p data-bbox="1098 607 1445 786">Support English language training centers as part of, or adjunct to, the academic institution in order to increase the student's competitiveness. Require all local universities to provide - during the first year of the study - an advanced, standardized and internationally accepted English language proficiency (TOEFL, IELTS) test</p> <p data-bbox="1098 819 1445 931">Establish partnerships between universities and employers, private and public, to offer internships in agriculture /veterinary research, technology testing and transfer and introduction of innovative technologies</p>

Strategy	Constraints	Potential stakeholders	Interventions
<p><b>Develop and enhance practical and technology-enabled higher education in agriculture and animal husbandry, supported by an appropriate curriculum and policies and regulations, in order to produce qualified graduates</b></p>	<p>The study found chronic and pervasive deficiencies in applied, technology-enabled agriculture and animal husbandry in higher education</p>	<p>FGS, FMS, MoE and MoAG</p>	<p>Since the NDP-9 prioritizes productive sector capacity development, the FGS and FMS should invest in technology-enabled, practical education as well as reforming the policy regulatory framework</p>
	<p>Institutes of higher learning lack appropriate laboratory facilities, qualified instructors, experimental farms and a relevant curriculum</p>	<p>FGS, FMS, MoE and MoAG, HEIs, TVET schools</p>	<p>Transition agriculture and animal husbandry teaching institutions from theory only to include applied training complete with laboratories and experimental farms so as to equip students with marketable skills</p>
			<p>Establish entrepreneurship and farm management and animal husbandry programs to train/provide agro-entrepreneurs who are competent in technology and agro-business</p>
			<p>Agriculture and veterinary science institutions must adopt and adhere to standardized quality control measures. The FGS Higher Education Commission should oversee and accredit higher educational institutions to ensure the quality of education.</p>
			<p>To address capacity gaps, the FGS should give highest priority to the agriculture (farming, livestock and, and fisheries) departments of the Somali National University along with sufficient funding to recruit qualified staff and establish adequate facilities. These departments could be made accessible to students from other universities accredited by the Ministry of Higher Education</p>
<p>Encourage institutions of higher learning to establish undergraduate degree courses in four progressive levels of education (i.e. certificate, diploma, associate degree and full degree) in order to enhance student employability and job prospects, and to alleviate the problem of practical skills shortages in the sector</p>			

Strategy	Constraints	Potential stakeholders	Interventions
<b>Prioritize investment in infrastructure to achieve food security</b>	Somalia suffers from chronic food insecurity despite the abundance of fertile farmlands and rivers which flow into the ocean, and abundant livestock. Cyclical droughts and floods condemn close to 80% of the Somali people to life below the poverty line where half of the population survive on humanitarian aid and the rest remain import-dependent for food	FGS, FMS, MoE and MoAG	Initiate a national program for building small dams and water catchments in rangelands
			The FGS and FMS should introduce policies to incentivize (i.e. tax exemptions) staple food production
			Re-introduce the Jowhar basin rice fields for food security, import reduction and employment opportunities
			Prevent aid agencies from dumping food staples into the local markets which depresses local production
			Governments should prioritize the training of irrigation and water conservation engineers and technicians
		MOECHE and MOF, MPTT	Introduce the wide-scale adoption of water conservation technologies including drip irrigation and other advanced agricultural technologies
			MOF and MOCI
		Facilitate small grants and loans to encourage local production	
		Invest in the utilization of renewable energy (solar and wind) to offset the high cost of electricity production and usage	

Strategy	Constraints	Potential stakeholders	Interventions
<b>Invest in and develop livestock production, export, infrastructure and the value chain for economic growth and job creation</b>	<p>With an estimated 50 million livestock, Somalia produces enough meat for local consumption. Livestock exports account for the largest source of hard currency for the country. That said, the study found that the sector is still highly underdeveloped and requires significant attention to animal health, critical infrastructure for optimal animal husbandry, value chain development and market expansion</p>	Ministry of Livestock, Forestry and Range	Improve availability of high quality livestock feeds and water by constructing and rehabilitating water dams to store and utilize water during the dry season
		Livestock cooperatives	Establish animal pest and disease control systems by developing animal disease surveillance and vaccinations
		Investment Agency under the Ministry of Planning, Investment and Economic Development (MOPIED)	Train livestock producers on forage and pasture conservation and on farm feed formulation
			Develop programs and projects for investment by public and private sector to enhance investment in the livestock sector
		MOF and FGS, FMS, MoAG	Conduct local, regional and international livestock investment promotion campaigns
		Ministry of Information, MoAG	Promote livestock entrepreneurship incubation models in order to create reservoirs and generate momentum for fully participating in livestock enterprises
		MPTT, MoAG	Promote partnerships with ICT companies to develop innovations for livestock marketing, information sharing and other services including financial transfers, disease reporting and extension
		Ministry of Information, MoAG	
		FGS, FMS, MoE, MoAG, Ministry of Veterinary	Promoting attitude/mind-set change to catalyze the commercialization of traditional livestock systems. The media can be employed to disseminate messages that encourage the adoption of a more commercialized system of livestock production
			Establish or reorganize Institutional arrangement to enhance efficiency and effectiveness of livestock sector

Strategy	Constraints	Potential stakeholders	Interventions
<p><b>Institute rigorous and aggressively enforced environmental protection policies</b></p>	<p>Poor environmental management practices have led to natural resource degradation in many areas of the country. There are a lack of protections/ restrictions to the use of the resources, ineffective law enforcement, deteriorating role of traditional institutions, poor soil and water conservation practices and inappropriate use of chemical fertilizers and pesticides on some farms. Natural shocks including climate change, drought and flooding have a significant impact on the process of agricultural and livestock development</p>	<p>Directorate of Environment, OPM</p>	<p>Complete, harmonize and enforce existing draft of national environment policy to safeguard environment against degradation and deforestation</p>
		<p>Ministry of Humanitarian and Disaster Preparedness</p>	<p>Establish a National Environmental Agency. The agency should be the lead environmental and climate agency responsible for the development of early warning and disaster preparedness and response mechanisms for drought, floods and other emergencies</p>
		<p>Ministry of Water and Energy</p>	<p>Promote environmental awareness among all stakeholders, particularly agricultural and livestock communities, stressing the importance of environment, and of the necessity for rational resource use</p>
		<p>International partners/donors</p>	<p>Develop national and regional centers and programs designed for the conservation of soil and rangelands for livestock sustainability</p>
		<p>Environmental NGOs</p>	<p>Prioritize and invest in water conservation programs and projects including the construction of water catchments and water management systems along the Shabelle and Jubba Rivers.</p>

Strategy	Constraints	Potential stakeholders	Interventions
<p><b>Create jobs, stimulate the economy, contribute to food security, and prioritize quality local production to discourage imports through improved policies, protections, expanded markets, investments and innovation</b></p>	<p>Employment in the agriculture and livestock sectors, particularly among graduating students as well individual farmers, is hampered by insecurity, lack of investment, relevant practical training and local food production protection policies</p>	<p>FGS and FMS, MoAG, MoL, agriculture cooperatives, private sector, investment banks</p>	<p>Support newly graduating students with micro-grants or with a credit scheme to help them establish self-employment in the agriculture/livestock sector. Businesses can be established in areas such as agri-vet shops, animal vaccination, greenhouse operations, drip irrigation kits and providing extension services to identify and control outbreak of diseases and insects</p>
		<p>MoAG, Ministry of Commerce and Industry, Ministry of Water and Energy, Ministry of Veterinary</p>	<p>Support continuing education schemes to enhance agriculture and animal husbandry skills for students and individual farmers</p>
			<p>Encourage the establishment of urban agriculture such as a drip irrigation program for vegetable production and ornamental plants to generate employment for recent graduates with limited access to rural agriculture</p>
			<p>Develop better product development and packaging as well as quality control skills to increase marketability</p>
			<p>Develop sophisticated branding and diversify agricultural and livestock international markets</p>
			<p>Provide water catchments to preserve rain water for the dry season.</p>
			<p>Revitalize rangelands for reserves and grazing management</p>
			<p>Coordinate with relevant ministries to incentivize new business development in areas of national strategic interest/need such as establishing animal health clinics, agrovet shops, water conserving, irrigation promotion, greenhouse operations, development of qualified extension services to encourage better crop practices and to identify and control outbreaks of diseases and insects</p>

Strategy	Constraints	Potential stakeholders	Interventions
<p><b>Promote awareness, capability and commitment to gathering reliable agriculture and animal husbandry data</b></p>	<p>This study found a lack of reliable agriculture and animal husbandry data. Timely, accurate and accessible data is critical for sound policymaking. Without reliable data, it is difficult to accurately plan and direct resources to agriculture and livestock development</p>	<p>MoAG, agriculture cooperatives</p> <p>Statistics department under MOPIED</p>	<p>Develop data collection mechanisms and monitoring of information by placing adequate statisticians in every district with necessary basic facilities including a radio call system, linked computer system, telephone and faxes</p> <p>Ensure the data collected is analyzed and disseminated regularly through radio programs, report and bulletins to interested parties or stakeholders</p> <p>Carry out market surveys to identify agricultural products with export and food security potential</p>

