

DIGITAL AGRICULTURE COUNTRY STUDY ANNEX: LESOTHO

Supplement to the Situational Analysis Report |
Assessment of Digitalization in the Agricultural Systems
of the SADC Region

Centre for Coordination of Agricultural Research and Development for
Southern Africa | World Bank Group



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SYSTEMS OF THE SADC REGION: SITUATIONAL ANALYSIS REPORT**

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ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
AIDI	Africa Infrastructure Development Index
APPSA	Agricultural Productivity Program for Southern Africa
AR4D	Agricultural Research for Development
AU	African Union
B2B	Business-to-Business
B2C	Business-to-Consumer
CCARDESA	The Centre for Coordination of Agricultural Research and Development for Southern Africa
COVID-19	Coronavirus pandemic
DACS	Digital Agricultural Country Study
DE4A	Digital Economy for Africa Initiative
DIAL	Digital Impact Alliance
EGDI	E-Government Development Index
FANR	Food, Agriculture and Natural Resources Directorate
FAO	Food and Agriculture Organization of the United Nations
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GII	Global Innovation Index
GIS	Geographic Information System
GNI	Gross National Income
GPS	Global Positioning System
GSMA	Global System for Mobile Communications
HDI	Human Development Index
ICDL	International Computer Driving License
ICKM	Information, Communication and Knowledge Management
ICT	Information Communication Technology
ICT4AG	ICT for Agriculture
IDIA	International Development Innovation Alliance

IOT	Internet of Things
IS	Information Society
IT	Information Technology
ITU	International Telecommunications Unit
KII	Key Informant Interview
MSMES	Micro, Small and Medium Enterprises
NGO	Non-Governmental Organization
NREN	National Research and Education Networks
OECD	Organization for Economic Co-operation and Development
OSI	Online Service Index
R&D	Research and Development
RCOL	Regional Centers of Leadership
RUFORUM	Regional Universities Forum
SAAS	Software as a Service
SADC	Southern African Development Community
SME	Small and Medium Enterprise
SMS	Short Message Service
SSA	Sub Saharan Africa
TOR	Terms of Reference
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
USSD	Unstructured Supplementary Service Data

1 INTRODUCTION

1.1 INTRODUCTION TO THE STUDY AND THE STRUCTURE OF THE DACS

The Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) is a sub-regional organization that was approved by the Council of Ministers of the Southern African Development Community (SADC) in 2010 and launched in 2011. CCARDESA promotes innovative research, technology generation and adoption of sustainable agricultural development through partnership and capacity development. CCARDESA also coordinates the Agricultural Productivity Program for Southern Africa (APPSA), a regional program supported by the World Bank to promote collaboration and to encourage technology generation and dissemination across national borders of participating countries of SADC. CCARDESA has appointed IMC Worldwide to carry out a situation analysis of the status of digitalization in the agricultural systems of SADC member states.

Aligned with the Terms of Reference, a separate report has been produced by the study team, the *Situational Analysis Report: Assessment of Digitalization in the SADC Region* which addresses the assignment objectives (Section 2.2 in the Situational Analysis Report).

This Digital Agricultural Country Study (DACS) for Lesotho is an annex to the *Situational Analysis Report* and provides a snapshot of the general digital ecosystem, the policy environment of digital and agricultural policies, relevant digital agricultural innovations, and an overview of digital agricultural skills and digital entrepreneurial skills development in universities, incubators, and accelerators within an ecosystem. This document is not intended to provide a full analysis of the ecosystem in this country but provides an early baseline in gathering data and information collected from voluntary respondents on these topics for possible further study.

The baseline data collected provides insights into the extent to which Lesotho has enabled and encouraged digital technology solutions, such as the use of digital data in agricultural research, education, extension, and market access. In specific terms and to the extent possible:

- The DACS identified available public national policies and legislation which provide a conducive environment for agricultural digital innovations to thrive. The study team also reviewed the context in which digitalization is linked to agriculture to enhance the agricultural innovation ecosystem.
- The DACS provides a catalogue of relevant agricultural digital innovations and where available, their availability, affordability, usability, and potential for scalability (adoption by smallholder farmers). These innovations were characterized in use cases according to a suitable framework and mapped to the roles they play in providing solutions within fragmented agriculture value chains.
- The DACS also maps syllabi at Agricultural Universities, Colleges, Incubators, and Accelerators which have embraced digital and entrepreneurial skills training to encourage and empower young people to become digital entrepreneurs in the future.

The study has assembled a wide array of evidence and research using qualitative and quantitative methods and approaches. Data collection on digital tools reflects the extent to which they have been embraced, but it

is important to note that this study is not exhaustive in identifying every digital tool available. The report has the following structure:

Chapter 1:	Introduction to Lesotho, including the general digital ecosystem, agriculture sector, digital infrastructure, and benchmark assessment results.
Chapter 2:	The Broader Policy Environment
Chapter 3:	Digital Agricultural Innovations
Chapter 4:	Digital Agricultural Skills and Entrepreneurship Training
Chapter 5:	Insights and Reflections

All the information compiled for Lesotho will be combined with data from the other 15 SADC member states and presented on a platform hosted by CCARDESA.

1.2 METHODOLOGY

IMC Worldwide, CCARDESA and the World Bank agreed to the framework, approach, and methodology for the assignment. CCARDESA facilitated the introduction to the Information, Communication and Knowledge Management (ICKM) Focal Points in Lesotho, Rethabile Nchee from the Department of Agricultural Research and Mamoholi Mphutlane of the Department of Agriculture and Food Security. The team spoke additionally with innovators of the e-Farmers, Lesotho Meteorological Services and Marakeng App and Marketing Information System innovations. The study team also worked with a National Consultant in Lesotho, Kanono Thabane.

Further information on the methodology for this assignment is provided in the *Situational Analysis Report*. Section 3) along with the data collection tools used, including the key informant guides and surveys (Annex 6-13 in the *Situational Analysis Report*).

GENERAL ECOSYSTEM

The study team collected key digital ecosystem figures for each country through a desk review of country reports and industry websites (World Bank, ITU, GSMA, etc.). These figures are presented in section 1.3 and 1.4 below.

BENCHMARK ASSESSMENT

The team completed a benchmark assessment across the 16 SADC member states. The assessment sought to provide a context to the findings of this study, and not to determine each SADC country's development of a digital economy. The approach was adapted from [Unlocking the Digital Economy in Africa: Benchmarking the Digital Transformation Journey](#) by SMART Africa and the Digital Impact Alliance (DIAL). SMART Africa's mandate is to encourage Africa's transformation into a knowledge economy through the usage of ICTs, and therefore this assessment would be most compatible to the SADC member states. Other frameworks and toolkits were reviewed in preparation for the benchmark with more information in the *Situational Analysis Report*. The assessment areas in the SMART Africa/ DIAL report are based on the five foundational pillars of the Kenyan [Digital Economy Blueprint](#), illustrated in figure 1, and are similar in nature to the African Union's [Digital Transformation Strategy](#) foundation pillars, illustrated in figure 5, (Enabling Environment; Policy and Regulation; Digital Infrastructure; Digital Skills and Human Capacity; Digital Innovation and Entrepreneurship).

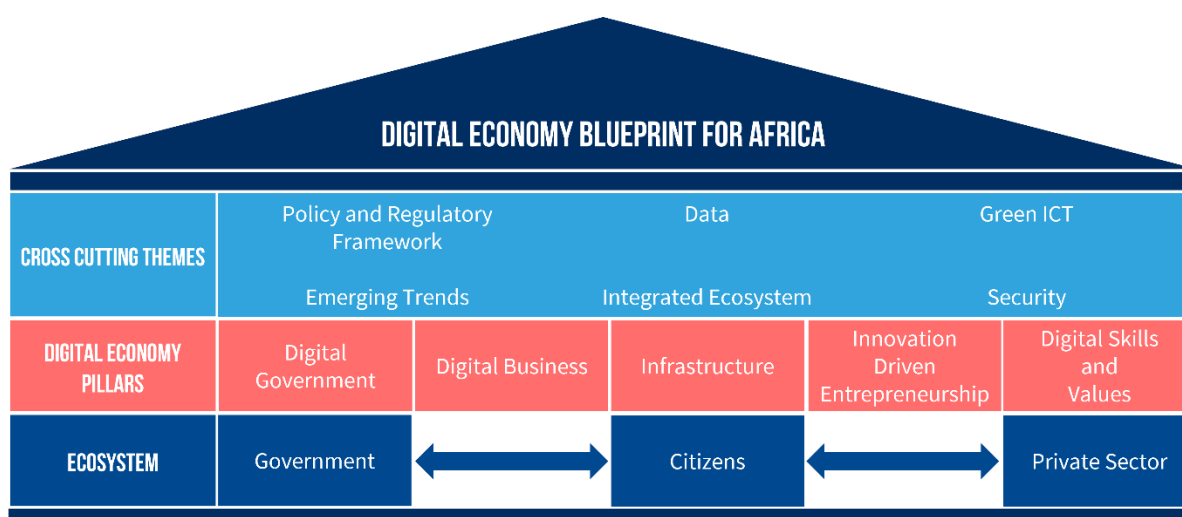


FIGURE 1 OVERVIEW OF KENYAN DIGITAL ECONOMY BLUEPRINT

A sixth pillar was added to the benchmark to include Policy and Regulatory Frameworks to align it with this study and as this was a regular cross-cutting area mentioned in other frameworks. These six pillars are presented in table 1.

TABLE 1 PILLARS FOR THE BENCHMARK ASSESSMENT

Digital Government	Digital Business	ICT Infrastructure	Innovation Driven Entrepreneurship	Digital Skills	Policy and Regulatory Frameworks
The presence and use of digital services and platforms to enable public service delivery.	The development of a robust marketplace for digital trade, digital financial services, and digital content.	The availability of affordable, accessible, resilient, and reliable infrastructure.	The presence of an ecosystem that supports homegrown firms to generate world-class products and services that help to widen and deepen digital economic transformation.	The development of a digitally skilled workforce that is grounded on sound ethical practices and socio-cultural values.	The presence of policies and regulations that are dynamic, flexible and promote the digital economy.

Assessing the pillars has provided a picture across all 16 countries and forms the basis of the specific indicators that were selected for the benchmark assessment. The indicators used were based on the SMART Africa/DIAL report. Changes were made to some of the indicators for this study to focus more specifically on the digital elements. For example, the ICT Infrastructure pillar uses the ICT Composite Index score, rather than the general Infrastructure indicator from the Africa Infrastructure Development Index (AIDI) that included elements such as roads. For the Digital Skills pillar, only the digital skills among active population score was used for this benchmark rather than the general Digital Skills score in the Global Competitiveness Index (GCI) which includes factors not related to digital. The indicators and data stream used and the maximum score available is illustrated in table 2.

TABLE 2 INDICES AND DATA STREAM USED FOR THE BENCHMARK ASSESSMENT AND MAXIMUM SCORE AVAILABLE

Benchmark Pillar	Index	Data Stream	Maximum Score
Digital Government	E-Government Development Index (EGDI) 2020	Online Service Index (OSI)	1

Digital Business	GCI 2019	Business Dynamism Component	100
ICT Infrastructure	AIDI 2020	ICT Composite Index	100
Innovation Driven Entrepreneurship	Global Innovation Index (GII) 2021	N/A	100
Digital Skills	GCI 2019	Digital skills among active population	100
Policy and Regulatory Frameworks	ITU G5 Benchmark 2021	N/A	100

Each SADC country received a total score based on the specific scores of each pillar, outlined above. These figures were then compiled into an index (this was done by dividing the scores by the maximum possible score). The benchmark is based on a mix of indicators from 2019-2021, outlined in table 2. Some data was not available for all the assessment areas for Lesotho. This was accounted for and adjusted when ranking the countries.

POLICIES

For the broader policy section, the study team identified available policies, strategies, and legislation around Information Communication Technologies (ICT), digitalization, data, cybersecurity and privacy, e-commerce and transactions and agricultural sector policies through desk-based research and discussions with in-country consultants. The team undertook key informant interviews (KIIs) with available CCARDESA ICKM focal points to identify additional policies, including draft versions that may be unavailable online and to understand practical challenges around the policy environment within ministries.

The team reviewed available public policies to understand their complexity, basic goals and strategies and the relationship with agriculture within the public sector. The team took stock of relevant digital laws, although the list included in this report is not exhaustive but focused on electronic transactions and electronic commerce, cyber security, data protection and open data. Findings from stakeholder interviews were then analyzed to provide a deeper understanding of the challenges faced within the public sector and to what extent digitalization is being prioritized by Government.

The approach sought to provide an audit of the policies in the public domain illustrating to what extent digitalization is embraced by government, and the relationship and implication for the agriculture sector. The report did not seek to analyze the content of policies or strategies or assess whether they are effective, enforceable or have achieved their objectives.

INNOVATIONS

Digital agricultural innovations were identified through a desk review of international reports, internet searches, local networks supplied by the CCARDESA ICKM focal point in the country and the national consultants. In some countries, innovations were identified that were also implemented in other countries (regional innovations), this is reflected in Chapter 3: Digital Agricultural Innovations. The national consultants validated all identified innovations available (national and regional innovations in that country) and identified contact information of the innovators which was then uploaded into a Google Form. Some regional innovations which claimed they were implemented in Lesotho could not be fully validated, but this was insufficient to suggest they did not exist and so are included in the lists.

Each identified innovator was sent a survey by email, requesting more detail on their innovations related to the maturity, numbers of users and scale as well as more detailed characterizations of their unique innovation.

Survey participants provided the survey responses voluntarily through Google Sheets which were converted into excel files. All innovators were pursued rigorously for some weeks, by email and by phone, to encourage them to fill out the survey.

Survey answers were self-reported and where there were outlier responses, follow-ups were made to ensure conformity of information. The survey results were cleaned by combining duplicate answers (when submitted from more countries), clustered (in cases of open answers, for example with “other”) and names between identified and survey results were aligned. In some cases, the answers were coded for better analysis of the data. An analysis spreadsheet was developed to analyze the data in more depth and to create the graphs. All innovations received a unique number and were uploaded to the database. The database forms the basis for the interactive web portal of CCARDESA, further information on the portal can be found in the *Situational Analysis Report*. Alongside the survey, several KIIS with innovators took place both with regional innovations and with national innovations that have reached a certain level of scale.

This DACS has characterized use cases based on a model and framework created by GSMA based on different use cases and sub use cases and is represented below in figure 2. These broadly fall into access to services, access to markets and access to assets.

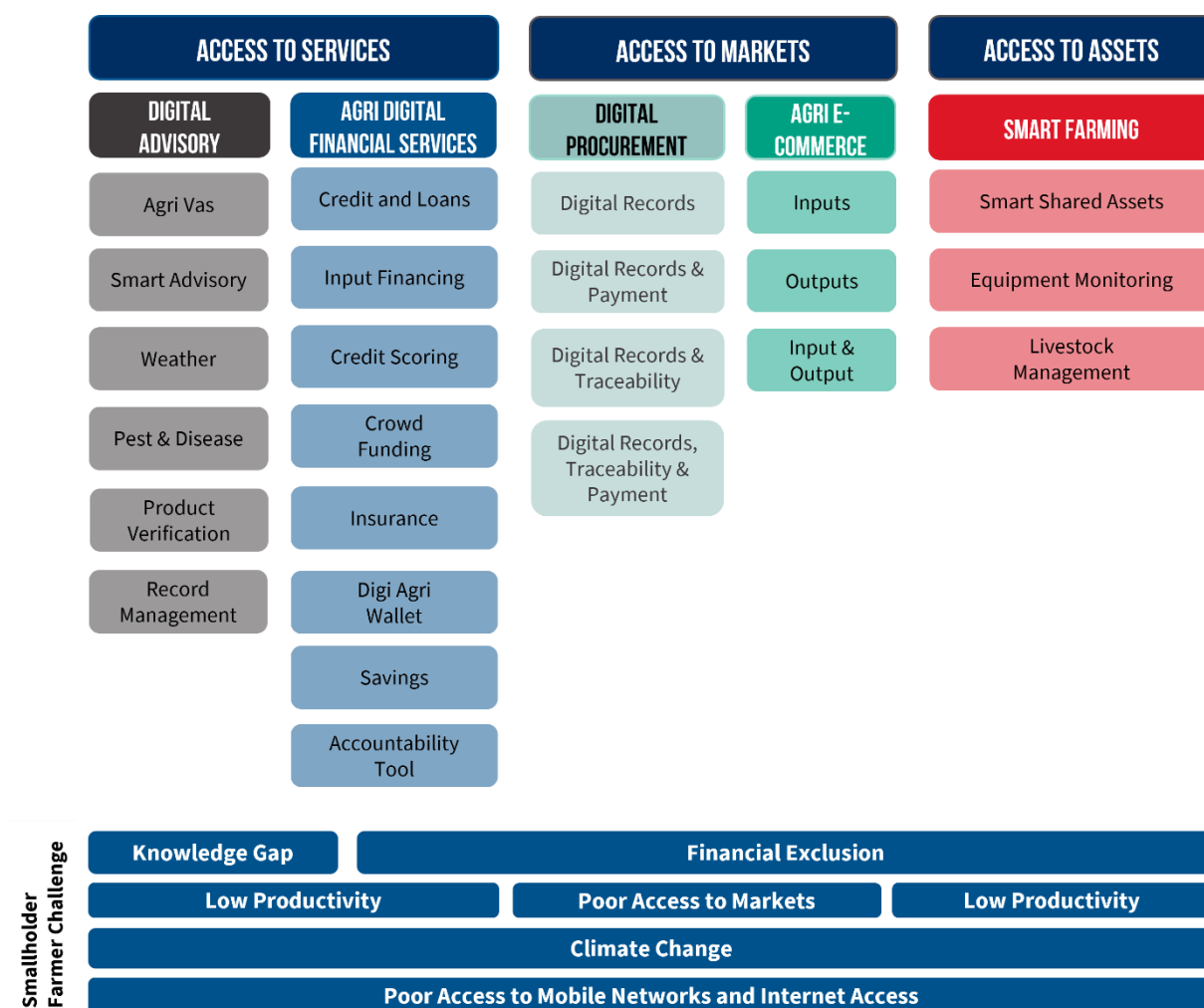


FIGURE 2 USE CASE MODEL BASED ON GSMA FRAMEWORK

In graphs and tables included in this DACS, the following color coding was used to illustrate the different use-cases:



DIGITAL SYLLABI

Digital and entrepreneurial skills training was assessed through a quantitative Survey Monkey tool sent to 54 Universities, the majority of these were Faculties of Agriculture that are part of the Regional Universities Forum (RUFORUM) network, but some institutions were contacted that were not strictly agricultural to try and provide a complete picture in the region (a total of 58 difference faculties were contacted). The names and addresses of these University contact points was facilitated via collaboration with the RUFORUM University membership in the SADC member states. The study team also carried out KIIs with representatives of faculties of agriculture at selected Universities and Incubators. The full list of universities and incubators approached, tools used, and stakeholders interviewed can be found in annexes 3-4 and 8-10 in the *Situational Analysis Report*.

LIMITATIONS TO THE METHODOLOGY

The planning, data collection, analysis and reporting of this study was completed between April to December 2021. Due to the Covid-19 pandemic much of the data collection and delivery of this assignment was completed remotely across the 16 SADC member states. The inability of some national consultants to conduct in-person meetings or interviews, and restrictions around national travel due to Covid-19 protocols limited the data collection and led to delays in some areas.

The data collection for this study was entirely voluntary and self-reported. Every effort was made by the study team to engage a representative sample of stakeholders under each theme and encourage completion of surveys and interviews, there are cases within some of the DACS where the data may be more limited than in others due to the maturity of the digital agricultural ecosystem. Therefore, while the data collected for each country provides a reasonable baseline of the current landscape, this overview is not exhaustive and must not be seen as such. The intention of the data collection was to address the assignment objectives which sought to understand regional trends, themes, and opportunities around digitalization in agricultural systems. The DACS are supplemental documents which present the country data collected, some of which was used in the *Situational Analysis Report*, but they should not be interpreted as providing a detailed analysis of the country ecosystem.

POLICIES

There were several challenges in obtaining policy documents and determining if they were accurate, final, or valid and implemented. The impact of the Covid-19 pandemic has affected the priorities of governments and implementation of their related policies. Furthermore, the pandemic has constrained open and full consultation of policies that have been drafted and may have delayed their finalization. Additionally, much of the documentation the team found is split between ministry websites and illustrates the siloed nature of policy formulation in this space. If documents were unavailable online then the ICKM focal points were asked for access where possible, national consultants also tried to source documents locally. Unverified versions of documents available online were also used for review.

INNOVATIONS

The current DACS is a snapshot in time as new digital innovations are in development in Lesotho and some may be declining because of the Covid-19 pandemic. Due to various Covid-19 restrictions, physical meetings could not always take place. People had to work from home which significantly affected their ability and willingness to participate in online interviews and survey instruments. The efforts of the national consultants to convince innovators to participate in the survey required significant energy and effort and, in some cases, took longer than expected. Many innovators are very busy and mentioned that participating in another survey or interview did not equate to new opportunities for their innovation. There was also suspicion and caution by innovators and public sector stakeholders to engage with consultants and share proprietary data.

DIGITAL SYLLABI

Across the region, the response rate of universities to the survey tool and interviews was 47% which was a reasonable response rate. However, the response rate is variable between countries and the number of participating universities in some countries was much lower than expected given their diversity and maturity and contrasted highly with much smaller nations in the region. This is believed to be due to the enormous additional workload on staff at Universities as a direct result of the pandemic forcing many to move all activities online and the time and pressures this entailed. As a result, University staff struggled to find available time for the survey.

The level of digital skills represented in the study is believed to be much lower than the reality for the region. In part, this can also be explained by the intentional targeting of Agricultural Faculties and Universities in the region rather than conducting a wider survey across Universities and Colleges more widely. During the KIs it was also established that some Universities and Faculties struggled to see their role as part of an ecosystem actor in providing for agricultural digital skills building specifically.

1.3 COUNTRY CONTEXT

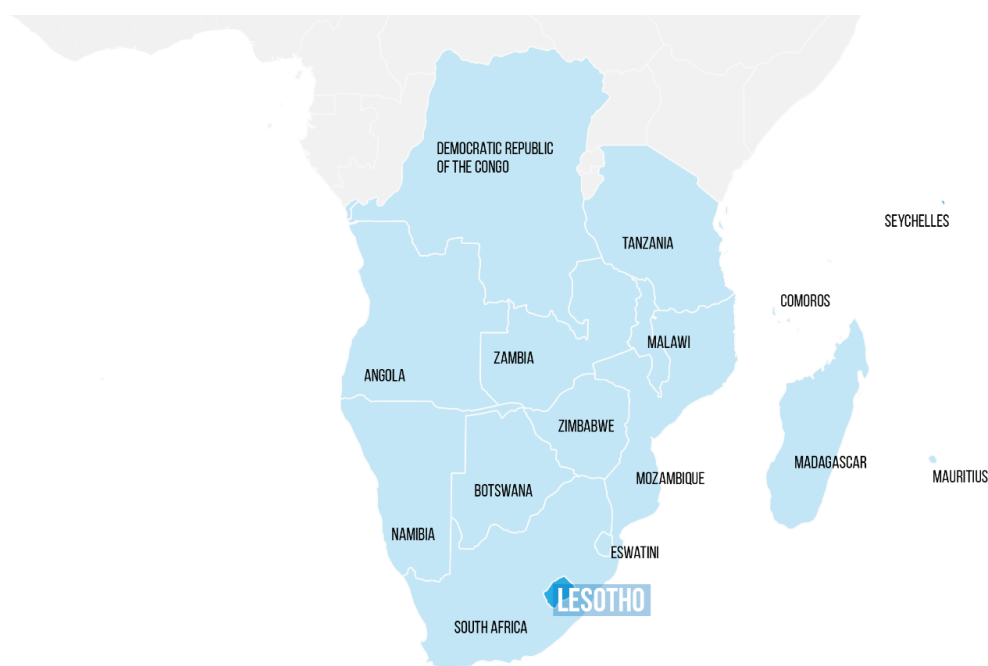


FIGURE 3 MAP OF LESOTHO IN SADC

Lesotho is a land-locked country, classified as lower-middle income, with a population of 2.1 million.¹ The UNDP’s Human Development Indicators² rank Lesotho as 165 out of 190 countries and 13 out of the 16 SADC countries. Lesotho scores highest in the region for gender equality with a Gender Development Index of 1.014.³ Lesotho is one of the poorest countries in the SADC region with a Gross National Income per capita of only \$ 3,190 (compared to an average of \$8,277 in the region).³ Although only 19.6% of the population falls under the UN Multidimensional Poverty Index,⁴ 58.9% lives below the poverty line according to the World Population Review⁵. This is above the average rate of the SADC region of 40.8%. The median age of Lesotho's population is slightly older than the average in SADC with 24 (versus 22.1 years).

AGRICULTURE ENVIRONMENT

Lesotho is one of the least urbanized countries in the region with only 28.6% living in urban areas. Although only 6.37% of the GDP is earned in agriculture, 44.3% of the population works in the agriculture sector (around the average of the SADC region).

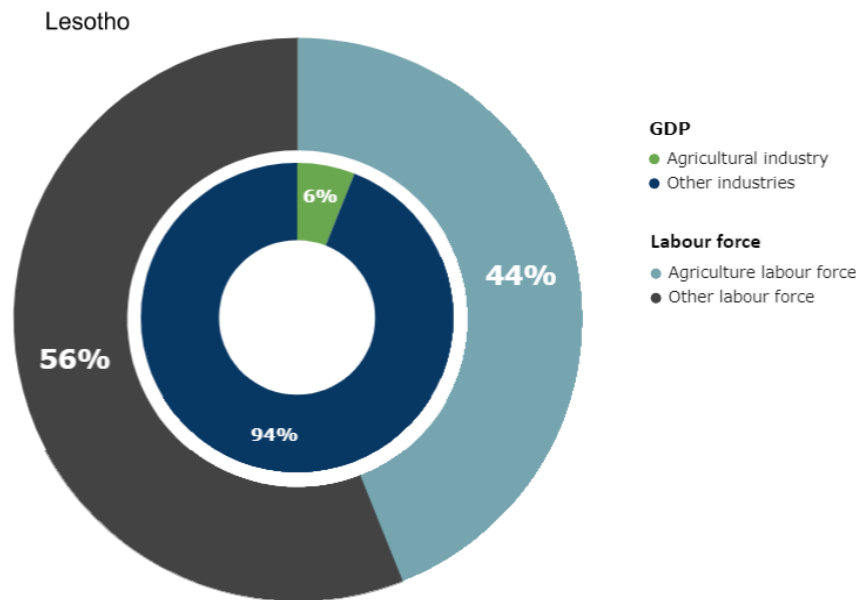


FIGURE 4 LESOTHO’S AGRICULTURAL INDUSTRY SHARE OF GDP AND THE SHARE OF THE AGRICULTURAL LABOR FORCE

1.4 THE GENERAL DIGITAL ECOSYSTEM

In 2020, the African Union (AU) adopted the [Digital Transformation Strategy for Africa \(2020-2030\)](#) which presents a vision of an integrated and inclusive digital society and economy in Africa. It recognizes the digital economy as a key factor in stimulating economic growth and jobs, reducing inequality, and promoting sustainable growth⁶. The Strategy, illustrated in figure 5, is based on foundational pillars, critical sectors to drive the digital transformation, and cross cutting themes to support the digital ecosystem.

The transition to, and importance of, a digital economy is illustrated in the prevalence of this agenda within regional institutions, donors, and multilateral organizations. Where agendas previously focused on ICTs,

¹ The Gender Development Index (GDI) measures gender inequalities in achievement in the three basic dimensions of human development.

providing hardware and universal access, the focus is now on enabling a digital economy with a more holistic view of digital and ICTs. The digital economy considers sectors beyond the IT industry and encourages a whole-of-government approach to have more emphasis on the overall ecosystem and economy⁷.

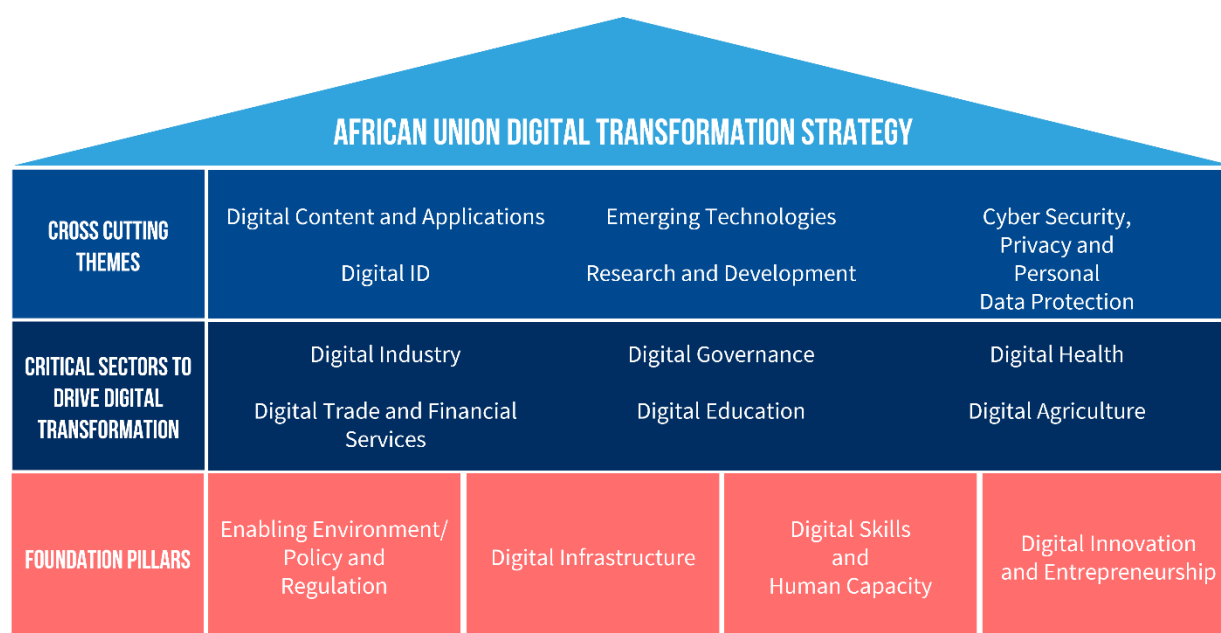


FIGURE 5 OVERVIEW OF THE AFRICAN UNION DIGITAL TRANSFORMATION STRATEGY

BENCHMARK ASSESSMENT FINDINGS

The purpose of the benchmark is to provide a context to the findings and identify where SADC countries are progressing, or where they may be behind or not developing in terms of a digital ecosystem. The benchmark assessment and the overall rankings illustrate some key front-runners in the region that are perceived to have better foundational pillars required for a digital economy. Most of these front-runners are less dependent on agriculture for economic growth, and to some extent employment. Further information on these groupings, the assessment results and regional trends can be found in the *Situational Analysis Report*.

The results for Lesotho are illustrated in table 3.

TABLE 3 BENCHMARK PILLAR SCORES: LESOTHO

Lesotho	Score	Maximum Score
Digital Government (OSI, 2020)	0.488	1
Digital Business (GCI, 2019)	36.720	100
ICT Infrastructure (AIDI, 2020)	9.934	100
Innovation Driven Entrepreneurship (GII, 2021)	15.000	100
Digital Skills (GCI, 2019)	24.094	100
Policy and Regulatory Frameworks (ITU, 2021)	44.500	100

The benchmark assessment identified four clusters of countries:

Group 1: South Africa, Mauritius, and the Seychelles.

Group 2: Eswatini, Tanzania and Botswana.

Group 3: Zimbabwe, Namibia, Lesotho, Zambia, Malawi, and Madagascar.

Group 4: Angola, Mozambique, the Democratic Republic of Congo (DR Congo), and Comoros.

TABLE 4 OVERALL BENCHMARK ASSESSMENT RESULTS AND RANK FOR ALL SADC MEMBER STATES

Country	Benchmark Index Score (Adjusted)	Overall Benchmark Ranking
South Africa	0.5891	1
Mauritius	0.5839	2
Seychelles	0.5155	3
Global Median	0.5064	
Eswatini	0.4222	4
Tanzania	0.4138	5
Botswana	0.4114	6
Zimbabwe	0.3895	7
Namibia	0.3809	8
Lesotho	0.3802	9
African Median	0.3595	
Zambia	0.3506	10
Malawi	0.3483	11
Madagascar	0.3005	12
Angola	0.2985	13
Mozambique	0.2919	14
Democratic Republic of the Congo	0.2782	15
Comoros	0.2497	16

BENCHMARK ASSESSMENT: LESOTHO

In the benchmark assessment Lesotho ranked ninth out of the 16 SADC member states. Figure 6 below illustrates the results of the benchmark in comparison to the Global and African medians. Lesotho is on par with the African median in all indicator areas. The benchmark suggests that Lesotho has some key foundational elements necessary for a robust digital economy.

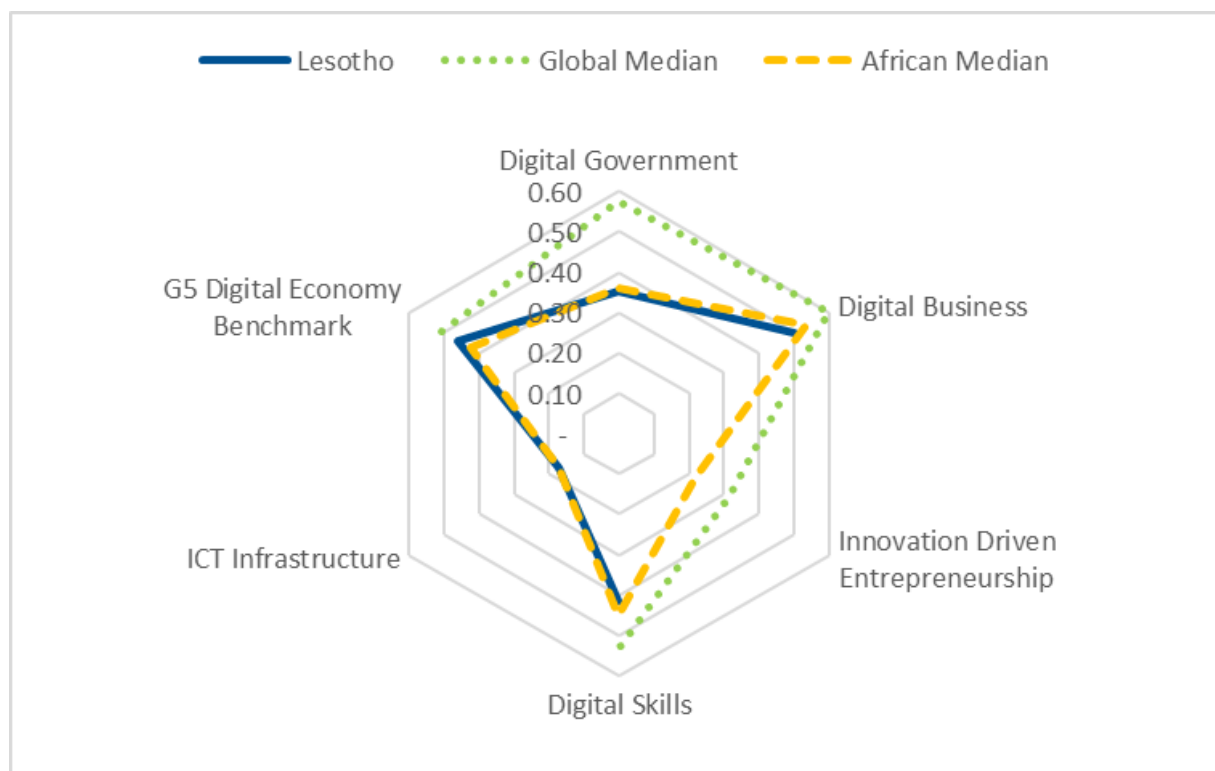


FIGURE 6 RESULTS FROM BENCHMARK ASSESSMENT FOR LESOTHO

Lesotho scored lowest in the Digital Government pillar, where it ranked twelfth. In all other pillars it scored in the top ten of the SADC members. Table 5 below, illustrates the ranking for each individual pillar for Lesotho.

TABLE 5 RANKING OF ALL SADC MEMBER STATES PER BENCHMARK ASSESSMENT PILLAR

Rank	Digital Government	Digital Business	Innovation Driven Entrepreneurship	Digital Skills	ICT Infrastructure	G5 Digital Economy Benchmark
1	South Africa	Mauritius	Mauritius	Seychelles	South Africa	South Africa
2	Mauritius	South Africa	South Africa	Mauritius	Mauritius	Mauritius
3	Seychelles	Seychelles	Tanzania	Zimbabwe	Seychelles	Botswana
4	Tanzania	Zambia	Namibia	Tanzania	Botswana	Malawi
5	Namibia	Botswana	Botswana	Botswana	Namibia	Eswatini
6	Zimbabwe	Tanzania	Malawi	Namibia	Zimbabwe	DR Congo
7	Mozambique	Madagascar	Madagascar	Zambia	Eswatini	Tanzania
8	Angola	Namibia	Zimbabwe	Lesotho	Zambia	Zambia
9	Eswatini	Eswatini	Zambia	Eswatini	Lesotho	Lesotho
10	Malawi	Lesotho	Mozambique	South Africa	Tanzania	Zimbabwe
11	Botswana	Malawi	Angola	Madagascar	Mozambique	Angola
12	Lesotho	Mozambique		Malawi	Angola	Madagascar
13	Madagascar	Zimbabwe		Mozambique	Comoros	Namibia
14	Zambia	DR Congo		Angola	Malawi	Comoros
15	DR Congo	Angola			DR Congo	Mozambique
16	Comoros				Madagascar	Seychelles

DIGITAL INFRASTRUCTURE

Lesotho ranked ninth out of 16 SADC member states in the ICT Infrastructure pillar, a key foundational element required for a digital economy. According to the UN, 29% of the total population is using the internet.⁸ This is around the regional average. The GSMA Mobile Connectivity Index shows a 100% access to the 3G network,⁹ which complements the HDI report of mobile cellular subscriptions at 113.8 per 100 people.¹⁰ Note that Lesotho does not appear on the Inclusive Internet Index¹¹ which details the accessibility, affordability, and relevancy of internet in 120 countries. However, according to the Mobile Connectivity Index,¹² Lesotho is ranked number 5 in terms of overall mobile connectivity in the SADC countries with an overall index of 40.6—which qualifies it as an emerging country (above 35). It scores above average for availability of infrastructure and for consumer readiness, but below average on affordability and on content and services.ⁱⁱ In terms of ICT adoption, Lesotho scores position 104 (out of 140). The Lesotho government is future oriented, based on the position 76 (out of 140), but it scores much lower on the innovation capability index as number 132 out of 140.¹³ However, it scores higher with 3.49 out of 7 points on the GCI 4.0 Digital Skills Among the Population Index,¹⁴ which is exactly the SADC average.

ⁱⁱ The enablers of mobile internet connectivity that inform the indicators: 1. Infrastructure, 2. Affordability, 3. Consumer readiness and 4. Content and Services.

2 THE BROADER POLICY ENVIRONMENT

In the benchmark assessment Lesotho ranked ninth out of 16 in the region, scoring in the middle in all but the digital government pillar. The average scores and ranking in the assessment pillars indicate that Lesotho is unlocking the digital economy to an extent, but it is unclear from these results whether there is a robust enabling environment. In the *Situational Analysis Report* the clusters of SADC countries identified from the benchmark are discussed in more detail, but Lesotho forms part of Group 3 which is made up of countries that are in digital transition and could benefit from learning from its regional neighbors.

The purpose of this section is as follows:

- Take stock of available public policies, strategies, and legislation to understand their scale and scope, and assess whether digitalization has been generally embraced by Governments.
- Understand the degree to which these policies provide an enabling environment for a digital economy that includes the agriculture sector.

It is important to recognize that the presence of policy, regulatory or legal frameworks may not always translate into awareness, effectiveness, or enforcement of these frameworks. Policies provide one part of the wider ecosystem needed for enabling innovations. The ability of an innovation to demonstrate value and a viable business model underpinning their innovation, progress towards investment readiness, sustainability and the level of scale that is achievable is likely to play a more important role in enabling innovations rather than policy frameworks¹⁵. Concurrently, a lack of policies or legislation does not inhibit the creation of digital innovations and technologies. The OECD highlights the common pacing problem, whereby digital technologies and innovations are advancing much faster than regulations and policies¹⁶. The inherent risks of rushing policies and regulations into effect must be weighed up against the benefits, as getting the pacing wrong could ultimately lead to greater barriers to innovation and risks creating regulations that could be outdated¹⁷.

2.1 GENERAL DIGITAL POLICIES

The benchmark assessment suggested that Lesotho's digital economy is developing but the stock take of available policies and strategies suggests that greater efforts should be made to prioritize the digital economy.

POLICIES, STRATEGIES AND PLANS

The **ICT Policy for Lesotho 2005** is the only document to provide a roadmap to achieve ICT-enabled development. The following objectives are identified in the Policy:

- Create awareness among all stakeholders; Government, the private sector, civil society, and the general public, about the importance of integrating ICTs in Lesotho's development process
- Facilitate the deployment of a national broadband backbone network to enable the delivery of ICT services and products to meet universal access goals
- Mobilize resources, attract investment, and establish innovative financing mechanisms needed to realize ICT policy goals
- Facilitate the broadest possible access to public domain information
- Promote the development and dissemination of local ICT products and services
- Promote usage of ICTs throughout all sectors of society including disadvantaged groups
- Strengthen the existing ICT institutional, legal, and regulatory framework

- Create a conducive and secure environment for producers and consumers of information over electronic networks
- Promote collaboration and coordination among all sectors of the economy and at regional and international levels.

All the key pillars are addressed in the ICT Policy: infrastructure and access, increasing and developing digital skills across all levels, ensuring competition within the infrastructure development to ensure affordability, strengthening legal and regulatory frameworks to create an enabling environment that encourages investment and stimulates local development and entrepreneurship, and promoting the use of technologies in public services. The Policy provides an ambitious attempt at integrating ICTs into the wider economy to achieve rapid growth. It also acknowledges that many challenges exist in implementing the Policy due to the low penetration of internet and mobile users but does have a forward looking approach, acknowledging the importance of cybersecurity, intellectual property rights, and privacy rights to support e-commerce growth. The definition of ICT in the Policy is broad to allow for future technologies that may become prevalent, but the document itself is outdated with key target dates including 2010 and 2015. Despite this, it is a useful guiding document for priorities nationally.

The **Lesotho Communications Policy 2008** established an updated institutional framework for the integrated regulation of the telecommunications broadcasting and postal sectors. It aimed to provide the basis for a new Communications Act and to lay the foundations for transformation and regulation of the postal sub-sector. The policy had the following goals:

- Regulatory reform: strengthening the regulatory capacity of the Lesotho Communications Authority
- Convergence: reflect and promote the convergence of services and networks based on the Internet
- Universal Service: foster universal access to a diverse range of high-quality communications services at affordable prices
- Competition: promote a competitive communications market through cooperative deployment and sharing of infrastructure.

This policy intended to establish a Universal Service Fund, to ensure access to services regardless of geographic location or economic status of citizens; promote a coordinated approach to the regulation of the sector and encourage private investment for infrastructure; and foster competition and transparency.

Beyond these two documents, there are no other directly relevant policies, strategies, or plans relevant to the sector. A Broadband Policy was drafted but was never adopted or published¹⁸. It included a focus on the importance of available and affordable broadband services to stimulate the economy, as well as the challenges presented in Lesotho's geographic climate to implement infrastructure¹⁹.

The **First National Strategic Development Plan 2012-2017**ⁱⁱⁱ identified ICTs as the backbone of the economy and focused on the following objectives:

- Improving ICT infrastructure and access
- Improving ICT literacy and increasing the extent of ICT use
- Promoting innovation and developing ICT sub-sectors
- Facilitating smooth migration from analogue to digital
- Enhancing e-Government services and institutions.

ⁱⁱⁱ The NSDP 2012-2017 was not available from the Government of Lesotho website so the content was derived from the following report The Lesotho Communications Authority (2016) [The State of ICT in Lesotho](#)

The **Second National Strategic Development Plan 2018-2023 (NSDP II)** is the closest document to a Digital Economy Strategy or Plan that Lesotho has. The NSDP II continues the emphasis on enabling digital infrastructure, access, and use but also identifies the following five areas:

- Improving ICT Access and Use
- Improving Sector Regulation
- Enhancing e-Government Services
- Improving Digital Economy Update
- Improving Governance of ICT Sector

The focus on infrastructure expansion, investment, human development, universal access and use is important for the foundational elements of achieving a digital economy and fostering an enabling environment for digital transformation, but what is also needed is the innovation and development of the entrepreneur climate.

In addition to the ICT section of the NSDP II, there is also a section on Technology and Innovation which notes that Lesotho has been unable to “reap digital dividends.” The suggestion in this section is for Government to champion a digital agenda to realize the success of digital more widely in the sector. In the benchmark assessment Lesotho did not have any data available for the indicator on Innovation Driven Entrepreneurship so the inclusion of this focus within the NSDP is particularly encouraging.

Small-scale innovations developed by local entrepreneurs are included in the NSDP (an online business training platform featuring a virtual chat with international mentors; an Uber-like platform linking local drivers to patients travelling to clinics; a digital app to improve school management; a web-based app to support clinics in stock management of drug supplies; and the use of drones for photo-mapping services for topics ranging from monitoring construction work to disaster management programs)^{iv}. To fully leverage the benefits of these solutions, and encourage further development, an adequate regulatory and legal framework needs to be in place with policies that support the use of emerging technologies and the risks that they present. Adequate protection of business and consumers data and information must also be addressed.

2.2 LEGISLATION

Lesotho has a few legislative items related to the wider telecommunications sector but below are the two main laws in place:

- The **Communications Act 2012** which provides the regulation of the telecommunications, broadcasting, and postal sectors. This Act set the path for infrastructure expansion and growing the digital services market.
- The **Data Protection Act 2013** which established the Data Protection Commission (DPA)^v, and provides for principles for the regulation of processing of personal information to protect and reconcile the fundamental and competing values of personal information privacy. However, the Act is not fully aligned with EU GDPR and OECD standards and guidelines and needs an update²⁰.

The two following items are Bills that have yet to be enacted into law:

^{iv} NSDP II, p.105

^v The DPA has not been established therefore the Act is not enforced. Lesotho Communications Authority (2016) [The State of ICT in Lesotho](#)

- The **Electronic Transactions and Electronic Commerce Bill 2013** is a Bill to: provide facilitation and regulation of electronic communications and transactions; provide protection of consumers and for the limitation of liability of service providers; and encourage the use of e-government services.
- The **Computer Crime and Cybercrime Bill 2013** is a Bill to: criminalize offences against computers and network related crime; provide for investigation and collection of evidence for computer and network related crime; and to provide for the admission of electronic evidence for such offences.

The strategies, policies, and legislation above provide a useful insight into how Lesotho is adapting to a digital economy. There seems to be prioritization of digitalization generally and the focus has shifted beyond focusing on infrastructure and access, to include better private sector engagement and services such as e-commerce.

2.3 DIGITALIZATION IN AGRICULTURE

There are no specific sectoral policies or strategies that relate to digitalization directly. Sourcing available documents was challenging as many are not available online through web portals. This section will review the references made to ICTs and digitalization in the general **Lesotho ICT Policy**, and the **National Strategic Development Plan II**. The Lesotho National Agricultural Investment Plan (NAIP) was unavailable online and was requested from a contact within the Ministry, but it is still under development and review, and was not shared with the research team.

The agriculture section in the Lesotho ICT Policy provides some clear objectives, strategies, and policy requirements for integrating ICTs better into the sector. It is also encouraging that reference is made to greater market access, as well as information flows, as a benefit of increased digitalization. While the strategies suggested are not overly detailed and could do with updating, they cover areas such as computerizing all records related to agricultural management, creating an online agricultural information system to provide information on technologies and techniques, as well as weather, pricing, and market information for all stakeholders. Identifying scalable and affordable ICTs to increase access to agricultural information for farmers and working with the private sector to find cost effective means for meeting the communication needs of agriculturalists is mentioned. These strategies are reliant on increased usage of ICTs by farmers, which requires them to be affordable and accessible. Affordability would need to be achieved through private sector partnerships and is outside the remit of the Ministry of Agriculture's role but requires the advocacy of the institutions. For accessibility, availability of adequate trainings to use digital solutions or technologies would be required, and this can be achieved through civil society or private sector partnerships.

The **NSDP II** highlights the importance of greater digitalization throughout. When referencing agriculture, it does not provide direct strategies or solutions with digital elements but highlights the challenges of fragmented and underdeveloped value chains, lack of harvesting and post-harvesting technology and infrastructure, limited access to agricultural finance and insurance, failure to meet international standards, and a lack of coordination of market information systems. Many of these challenges do have digital solutions or technologies that can be applied, some more advanced than others, but a clear strategy and budget for implementing them is required.

CHALLENGES

Sourcing documents for Lesotho has been a challenge as the majority of these are not available online through the Government portals. Common feedback when interviewing public sector stakeholders across the SADC

region within Agricultural Ministries has been the lack of awareness and accessibility to understand what policies and strategies are currently in place and how they relate to the sector.

A key barrier to embracing digitalization in agricultural systems is a lack of a guiding policy or strategy that integrates the use of technologies and services. Efforts have been made to integrate digital within the agriculture faculties but without any guiding policies to sustain them^{vi}. This must be Government-led but the agriculture sector does not receive prioritization for funding for digitalization. A clear policy or strategy for agriculture, which includes smallholder farmers and the private sector, could be used as an advocacy tool to push for greater funding and prioritization on this specific agenda. However, it is unusual for a sector specific digitalization strategy to be published before a general national plan is available.

Other enabling factors outside of the Ministry of Agriculture's control will also need to be considered for a full unlocking of digital transformation in agriculture, such as adequate infrastructure and access to networks, and connectivity that is affordable. It is unlikely that most of the pain points for enabling digitalization within agriculture is down to a lack of sector specific strategies but most of the challenges that are faced and mentioned such as low literacy levels, poor uptake of technologies and access to infrastructure are factors that need to be addressed on a higher level through other Ministries and Departments.

Greater digitalization could support these initiatives, such as increasing productivity of smallholders, but there needs to be a clear strategy involved in identifying suitable solutions that manage the risks involved. One barrier to implementing and adopting modern technologies and innovations is the lack of skills and knowledge of smart or modern technology in rural farmers who tend to be older. Intensifying agricultural extension services to smallholders is one strategy and can integrate digital into the agricultural systems, introducing the benefits of digitalization to farmers. However, digital skills of extension officers can also be low and will also need to be addressed. Preparing a strategy or policy that embeds the use of ICTs and training could lead to an increase in uptake.

Radio remains a popular tool to reach farmers, but innovative platforms have been used, such as Facebook and WhatsApp, although this typically by urban farmers^{vii}. Greater effort needs to be made to encourage younger populations to work within the sector, the inclusion of digital tools and solutions could be one way. This could lead to broader benefits for the sector such as increased innovation and development of technologies and solutions by local entrepreneurs and SMEs, and greater investment by the public sector both locally and internationally.

With greater digitalization, more focus should be placed on ensuring trust, privacy, and protection of consumers and businesses. Innovative digital technologies, and even modern technologies like smartphones, rely heavily on the collection, dissemination, and analysis of data. If the aim is to better integrate ICTs into agricultural value chains, then regulations and frameworks need to be developed or updated that address these digital issues directly. Access to credit is a key barrier for farmers which could be addressed through digital solutions but requires privacy and security assurances, as well as the uptake of technologies.

There is plenty of opportunity for Lesotho to embrace digitalization within the whole agriculture value chain for improved efficiency and productivity gains but many of the barriers that currently exist require cross-ministerial collaboration and a national prioritization to improve infrastructure.

^{vi} KII with public sector stakeholder.

^{vii} KII with public sector stakeholder.

3 DIGITAL AGRICULTURAL INNOVATIONS

This chapter provides a stocktaking analysis to assess the numbers, scope, trends, and characteristics of digital agricultural innovations in Lesotho.

3.1 MAPPING DIGITAL AGRICULTURAL INNOVATIONS

The DACS for Lesotho presents use cases according to a typology and framework developed by GSMA (see figure 2). The broad areas include access to services, access to markets and access to asset classes. The diagram below represents the type of GSMA use cases found in the identified innovations in Lesotho. A total of 10 innovations were identified that had a mix of use cases as illustrated in figure 7 below.

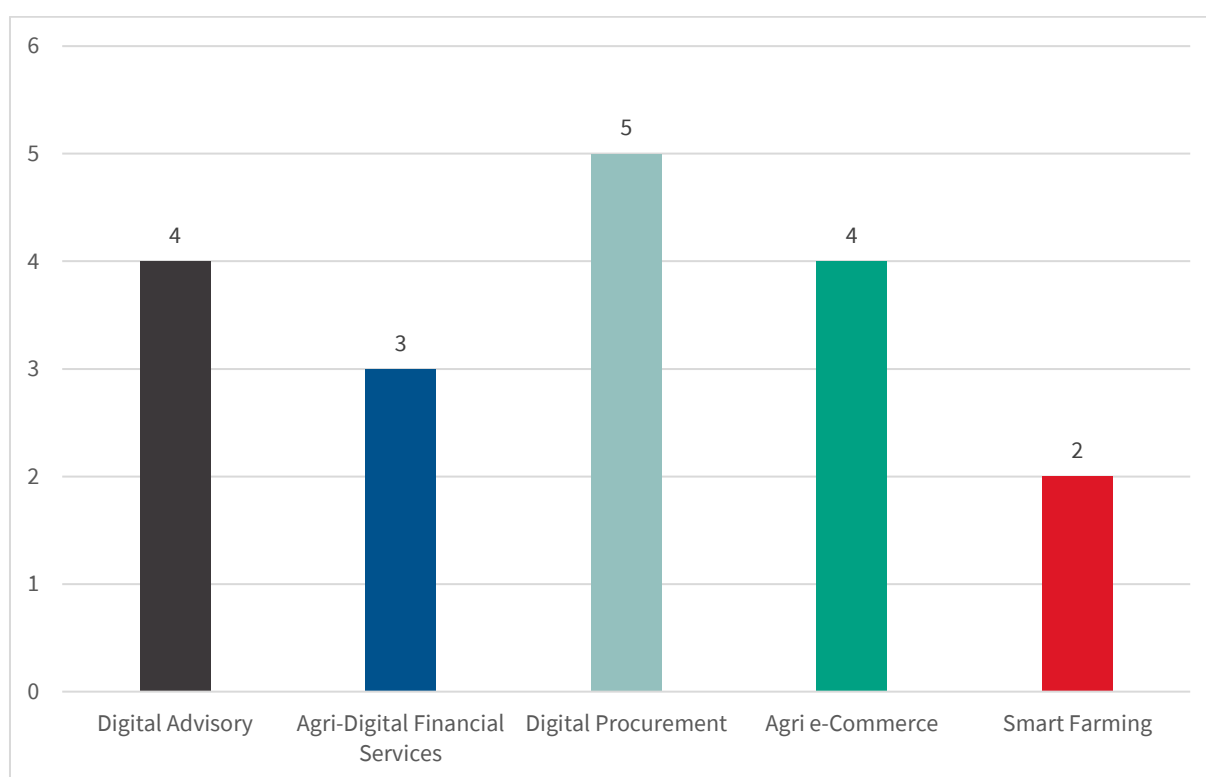


FIGURE 7 IDENTIFIED USE CASES FROM INNOVATIONS IN LESOTHO

The table below presents an overview of all identified innovations with their use cases, a brief description of the innovation and company, and where the innovation is operational in the SADC member states.

3.2 IDENTIFIED AGRICULTURAL INNOVATIONS OPERATIONAL IN LESOTHO

In the first four columns the following color coding is used for the different use-cases:

DIGITAL ADVISORY

AGRI-DIGITAL FINANCIAL SERVICES

DIGITAL PROCUREMENT

AGRI E-COMMERCE

SMART FARMING

TABLE 6 OVERVIEW OF IDENTIFIED AGRICULTURAL INNOVATIONS OPERATIONAL IN LESOTHO

					Name of innovation	Name of the company	Survey ✓/X	Description of innovation	Operational Countries in SADC
	■				AgriTask GIS	AgriTask	✓	Agritask GIS by Hollard is a digital innovation and digital insurance solution for Index/Parametric Insurance connected to the Meteosat satellite GIS platform and can remotely activate a smartphone to collect GPS data or points of agricultural plots and estimate the plot size. Using this innovation, Hollard remotely get information about the size of agricultural plot and use this information to assess farmer eligibility for agricultural credit or insurance access and can enroll farmers. It addresses farmers being able to plan effectively and ensure that they can produce efficiently and gain access to markets. The company Hollard operate in Botswana, Lesotho, Mozambique, Namibia, and South Africa and launched AgriTask in 2020. They have 10 active users so far and 34,000 registered users. The service enables access to insurance products and in doing so access to financial services. The digital innovation relies on GPS, Smartphones and GEO data. It uses spreadsheets, cloud-based SQL, third party SaaS software providers and IBM Watson AI platforms. The innovation is transitioning to scale and was developed using donor grants from government or foundations. It is still dependent on program support. Their recent feasibility study on livestock insurance in Namibia, Botswana and Mozambique looks at index-based insurance and agricultural loans and their bundling as part of a potential public sector program focused on areas prone to drought. Their technology is inclusive of disadvantaged groups.	Botswana, Lesotho, Mozambique, Namibia, South Africa

			■		e-Farmers	e-Farmers Consultancy	✓	e-Farmers (2018) from e-Farmers Consultancy (2018). The e-Farmers mobile platform seeks to address farmers' needs, foster productivity and performance of individual farmers, including members of the agro-value chain, through digital marketing, farmers profiling and advisory services. It operates in Lesotho only.	Lesotho
		■			Food Processing Software	Matrix Software	✓	Matrix Software is a meat and food matrix software solution for stock control, yield management, traceability, productivity, and cost margin management. Matrix Software is a service-led private company that provides software services predominantly to the livestock and meat industry and was established in 2019. These are digital, mobile, and tablet-based systems for yield and stock control and statistics leading to costings and profitability. Matrix software utilizes android mobile scanners and their associated applications, RFID integrated solutions, automated weighers, and third-party integration. This reduces the initial capital outlays and good implementation support for feedlots, abattoirs, deboning plants, and meat processing plants including others such as fish, poultry, butcheries, and retail outlets. Matrix Software has been located/incubated in the AgVentures Hub in South Africa. This regional solution is deployed in 10 SADC countries (Botswana, Eswatini, Lesotho, Mauritius, Namibia, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe), but also in counties such as Australia and New Zealand. Matrix Software solutions has reached a stage of replication and adaptation in other geographies and are in the Scaling stage of development.	Botswana, Eswatini, Lesotho, Mauritius, Namibia, Seychelles, South Africa, Tanzania, Zambia, Zimbabwe
■		■		■	GeoFarmer	GeoTerralma ge (Pty) Ltd	✓	GeoFarmer at GeoTerralma ge Ltd was established in 2017 and has combined innovations in smart farming and digital advisory and e-commerce and is regional in its deployment across the entire SADC region. Whilst GeoTerralma ge is a private sector company which provides actionable intelligence through monthly crop monitoring through the GeoFarmer-©-Crop monitoring platform to support precision farming and accurate information to map crop trends and statistics by using a dashboard in a cloud-based environment. The innovative solution provides - using computers, satellites and Earth Observation - visual maps and illustrations, statistics and trends for each field or farm being analyzed (crop type, crop growth stages, land suitability, crop irrigation) and guiding decision making around farm management and practices for more efficient and sustainable production. GeoTerralma ge have reached wide scale sustained adoption and operates in Angola, Botswana, Comoros, DRC, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, and Zimbabwe. Through specialized software, proprietary algorithms, and application,	Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia,

							GeoTerralimage uses remote sensed data to create spatial information. It combines advanced information and reporting to enable analysis, quantification, and monitoring to support key decision making. It charges business subscription fees for its fully commercial product and believe its technology is inclusive of underrepresented groups.	Seychelles, South Africa, Tanzania, Zambia, Zimbabwe	
					Lesotho Smallholder Agriculture Development Project	Ministry of Agriculture and Food Security Lesotho	X	Lesotho Smallholder Agriculture Development Project from the Ministry of Agriculture and Food Security Lesotho. The Project supports the increased adoption of climate smart agricultural technologies in Lesotho’s agriculture, enhanced commercialization, and improved dietary diversity among targeted beneficiaries. It operates in Lesotho only.	Lesotho
					Lesotho Soil Information System	Agricultural Research, Department of Soil Conservation, NUL and FAO	✓	Lesotho Soil Information System (LESIS) (2019) from the Department of Agricultural Research. LESIS provides soil maps and related information systems and constitutes the basis for assessing soil quality over time. LESIS further advocates for organized and systematic surveys and monitoring of soils in Lesotho with accurate and up-to-date soil information using state of the art methods and tools of digital soil mapping. It operates in Lesotho only.	Lesotho
					Marakeng App and Marketing Information system	The Department of Marketing within the Ministry of Agriculture and Food Security	✓	Marakeng App and Marketing Information System (2020) from the Department of Marketing within the Ministry of Agriculture and Food Security. It is designed to improve smallholder farmers linkages through sustainable e-commerce solutions. It operates in Lesotho only.	Lesotho
					Mukuru App	Mukuru Africa	✓	Mukuru Money Transfer Limited is a private sector company operating regionally (Botswana, DRC, Eswatini, Lesotho, Malawi, Mauritius, Mozambique, South Africa, Tanzania, and Zimbabwe). The application addresses a knowledge and access gap and provides access to markets and financial services. The Mukuru App was launched in 2019 and allows customers to create orders for remittances individually and initiate a payment for the transfer to happen. The	Botswana, Democratic Republic of Congo, Eswatini,

								app can also be used to self-register a customer on the platform and verification takes 24 hours. This enables efficient access to financial services through smartphones. The innovation uses SMS, USSD, a Smartphone App, Website, Dashboard, and Social Media Platforms (Facebook, Twitter, WhatsApp, and Messenger). The platform uses local and cloud-based databases (Excel, MS Access, SQL) and AI platforms (IBM Watson) for Machine learning. Regionally it has 500,000 users and 1M registered users. It also enables farmers to sell to consumers (B2C) and to enterprise customers (B2B) such as hotels, restaurants, and market retailers. Challenges include digital literacy, device sharing, lack of mobile coverage and financial sustainability of the business model in different locations. The application has reached sustainable scale and is focused on individual users. The business was supported by friends and family and development support and training grants. The revenue model is based on transaction fees and the in-house development of the App and platform which is believed to be inclusive of disadvantaged groups.	Lesotho, Malawi, Mauritius, Mozambique, South Africa, Tanzania, Zimbabwe
■					Seasonal Forecast	Lesotho Meteorological Services	✓	Seasonal Forecast (2012) from Lesotho Meteorological Services. The purpose of the Agrometeorology sub-section is to support and provide advisories to agricultural production and food security activities in the country. The sub-section assists stakeholders in the provision of meteorological and related services to the agricultural community to help develop sustainable and economically viable agricultural systems, improve production and quality, reduce losses and risks, labor and energy, and decrease costs. It operates in Lesotho only.	Lesotho
■	■	■	■	■	Smart Farmer	Riskflow DBS	✓	Smart Farmer of Riskflow DBS, a private sector company, launched in 2019. Smart Farmer is an agriculture value chain connector, linking agricultural communities to value adding services through networks with markets, suppliers, service providers, other farmers, and relevant government departments. It achieves this through the provision of user friendly, efficient, and flexible ICT-based services which cut across many functions and access channels. The value of Smart Farmer is in assisting farming communities and other stakeholders in doing things smarter, with transparency, accountability, and efficiency, while driving profitability. As a response to the problems faced by agricultural communities, Smart Farmer provides the following services: Peer-to-Peer communication for Farmer-to-Farmer Interaction, Funder-to-Farmer Communication, Government-to-Farmer Communication, Price tracking and reporting, Agricultural alert systems (sending and receiving), Commodities offer and bid facilitation,	Botswana, Lesotho, Malawi, Mozambique, South Africa, Tanzania, Zambia, Zimbabwe

							Location services for service providers, Production information systems e.g. best practices, planning and e-Extension services. The Agri VAS service assists farmers throughout the production cycle and livestock information and market prices – from planning to sale stages, whether locally, regionally, or globally. Smart Farmer offers a new way through which information systems in agriculture are vastly improved. Agri VAS are delivered via voice channels (IVR and helplines), text channels (SMS and USSD) and via apps. Smart advisory: enables data-driven advisory based on tailored, farm-level agro-climatic and crop specific information to support decision making, maximize productivity and reduce costs. Most of the services are accessible via mobile applications and require a farmer to upload a picture of the infected plant for diagnosis. Some services are also accessible via USSD. It also includes national and regional-level pest and disease early warning systems and record keeping: Digital tools that enable farmers to keep detailed records of livestock, including health and feeding data, to help mitigate diseases and avoid missed conceptions. Record keeping tools are also used to keep details of input usage, procurement, cost and revenue and sales records. The other product is the CashFlow Optimizer to deal with an open integrated and adaptive web based platform with details of dealers and counterparties, making use of Intelligent Financial Performance Monitoring components. a) The Primary Outcome of this innovation is improved access to Finance through providing each farmer an Income statement balance sheet and cashflow, to assist them in accessing loans as well as keeping their Bio Data digitally and open for appraisal to Financial Institutions. b) Improved Yields through use of 3rd Party software that they have partnered with on their Platform such as Skudu to provide fertilizer and Insuring Yields through an Area Yield Index based Insurance model from PULA; their insurance partner. The regional initiative is active in Botswana, Lesotho, Malawi, Mozambique, South Africa, Tanzania, Zambia, Zimbabwe with 15,000 active users and 300,000 registered users and is in the transition to scale stage.	
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3.3 RESULTS FROM INNOVATION SURVEY RESPONDENTS

All identified innovators received a survey and nine innovations implemented responded in Lesotho. The survey provided self-reported information. All identified innovators were reminded several times by email and by phone to complete the survey. The response rate of the survey for Lesotho was 90% (9 out of 10 identified innovations responded).

Most innovations were developed by private sector companies (6), and the rest were developed by the Government (3). All three led by the Government are only operational in Lesotho.

USE CASES AND SUB USE CASES

The division of GSMA use cases shows that in Lesotho single use cases are most common. Six out of nine respondents provided single use services only, and three provided multiple uses. One regional respondent provided all five use cases, and two regional respondents provided three services.

Figure 8 below provides the division of use cases. There is an even split between Digital Advisory, Digital Procurement and Agri e-commerce which were all mentioned four times. Agri-Digital Financial services was mentioned three times, and Smart Farming was mentioned twice. In terms of respondents that only operate in Lesotho, the two common use cases were Digital Advisory and e-Commerce. Figure 8 also illustrates a comparison of use cases to the rest of the identified innovations in the SADC region.

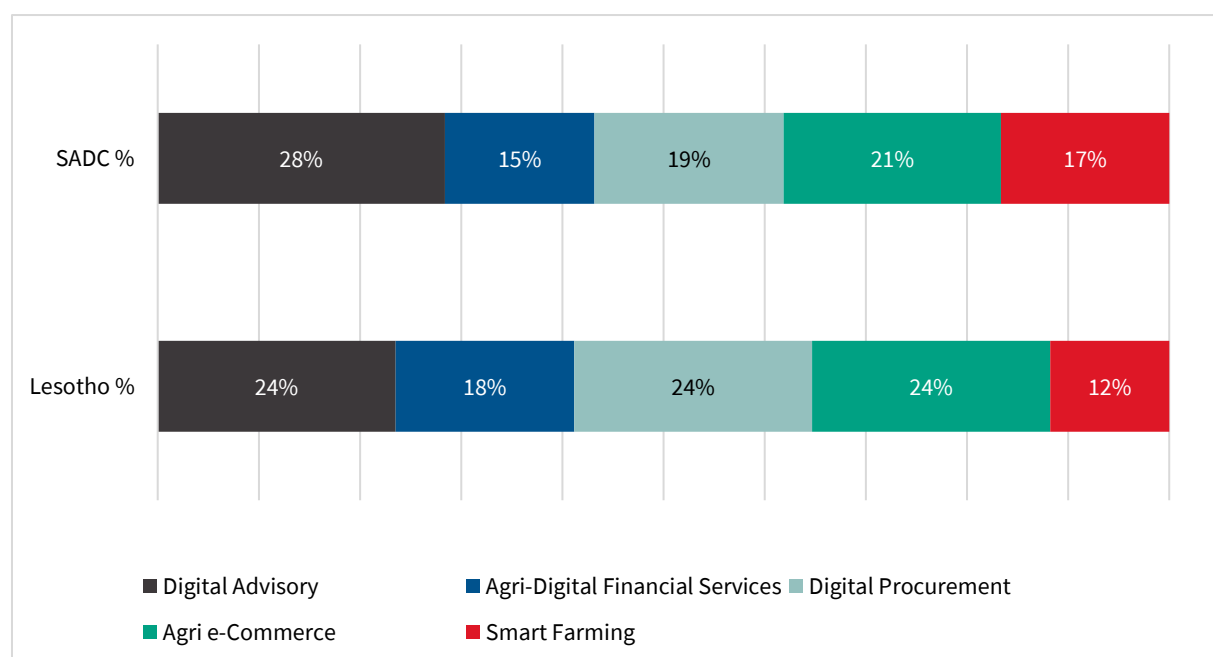


FIGURE 8 DIVISION OF USE CASES FOR SURVEY RESPONDENTS IN LESOTHO VS. IDENTIFIED INNOVATIONS IN SADC

Most innovations were launched in 2019 (3). Two innovations were launched in 2020, and none in 2021. Of the Lesotho-only innovations, one was launched in 2020, 2019, 2018, and the oldest; Seasonal Forecast by the governmental Lesotho Meteorological Services, in 2012.

The innovations present in Lesotho provide a large variety of sub use cases as presented in Figure 9 below. For Digital Advisory, agri VAS and smart advisory were the most common.

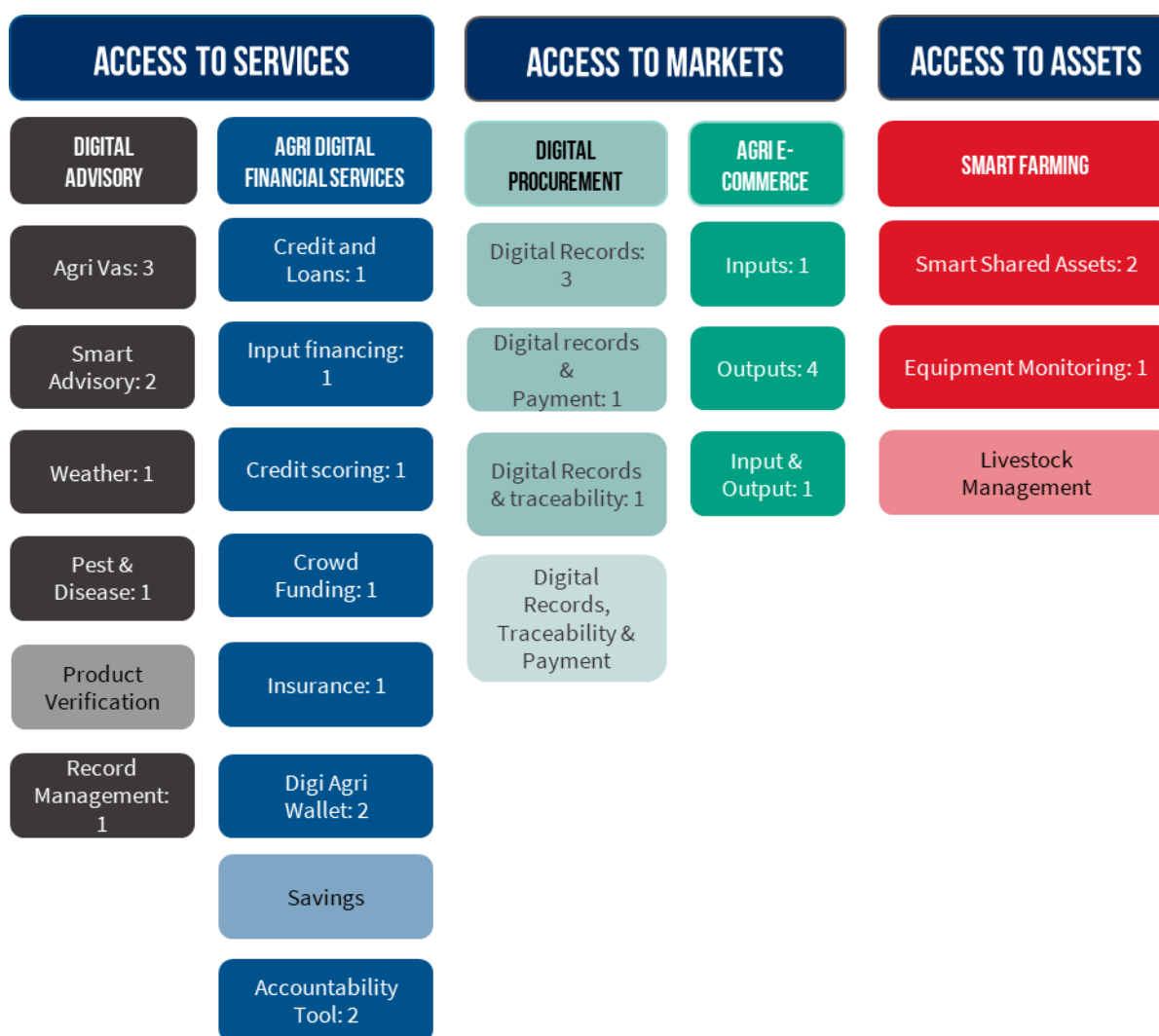


FIGURE 9 OVERVIEW OF SUB USE CASES PRESENT IN SURVEYED INNOVATIONS IN LESOTHO

CHALLENGES

The innovations targeted a wide range of anticipated outcomes including poor access to markets (6), knowledge gaps (4), low productivity (3) and climate change (3). In looking at the biggest challenges in the application of the technology, digital literacy was mentioned the most (6), followed by farmer uptake/use/behavior change (5) and access to devices (sharing with family and others) (5). In Lesotho-only focused innovations, the biggest challenges in the application of technology were farmer uptake/use/behavior change (3), digital literacy (3) and access to devices (3). When asked to elaborate further, the Lesotho-only innovations commented that the challenges they faced included funding for maintaining their websites, equipment, and further data collection; limited options for methods of transferring payments between the farmers and consumers; and government ministries working in silos.

TECHNOLOGY USE AND CHANNELS

A Website / Dashboard / Portal is the most common channel (7) being used by innovations, followed by Smartphone apps (3) and Geo Data (3). Interestingly, SMS, which is ordinarily one of the most used technologies in agricultural digital innovations, was only mentioned by two innovations. Three out of four innovations in Lesotho advised that the only digital channel / technology that they use to transmit or store

data/information is a Website / Dashboard / Portal. The fourth innovation: e-Farmers (and only private sector company) said that they use social media platforms (e.g., Facebook and Twitter) only. The often-popular smartphone apps and SMS were not mentioned at all for the Lesotho-only innovations. Spreadsheets were the most popular tool for analysis (9), followed by cloud-based databases (SQL) (5) and cloud-based software as a service (e.g., third-party service providers) (5). The Lesotho-only innovations reported the use of spreadsheets only.

VALUE CHAIN PHASES COVERED

Whilst innovations in Lesotho are spread throughout the value chain, except storage, they are more tailored for the earlier stages of the value chain as can be seen in Figure 10 below.

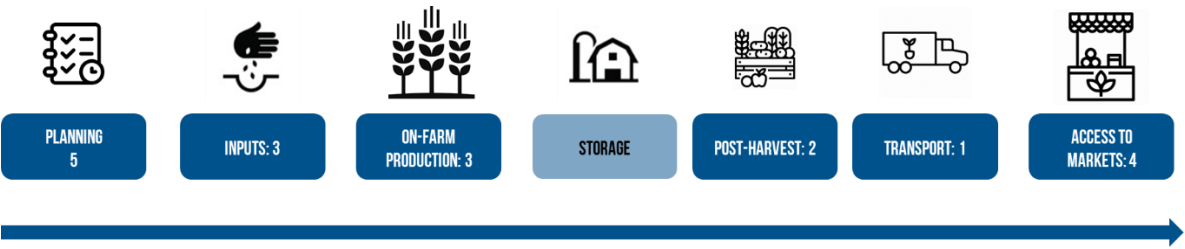


FIGURE 10 SURVEYED INNOVATIONS PRESENCE IN THE VALUE CHAIN IN LESOTHO

SCALING, DEVELOPMENT, FINANCING AND REVENUE

Digital innovations in Lesotho are split evenly between early and late stages based on the [Insights on Scaling Innovation](#) report²¹. 78% have reached a form of scale.

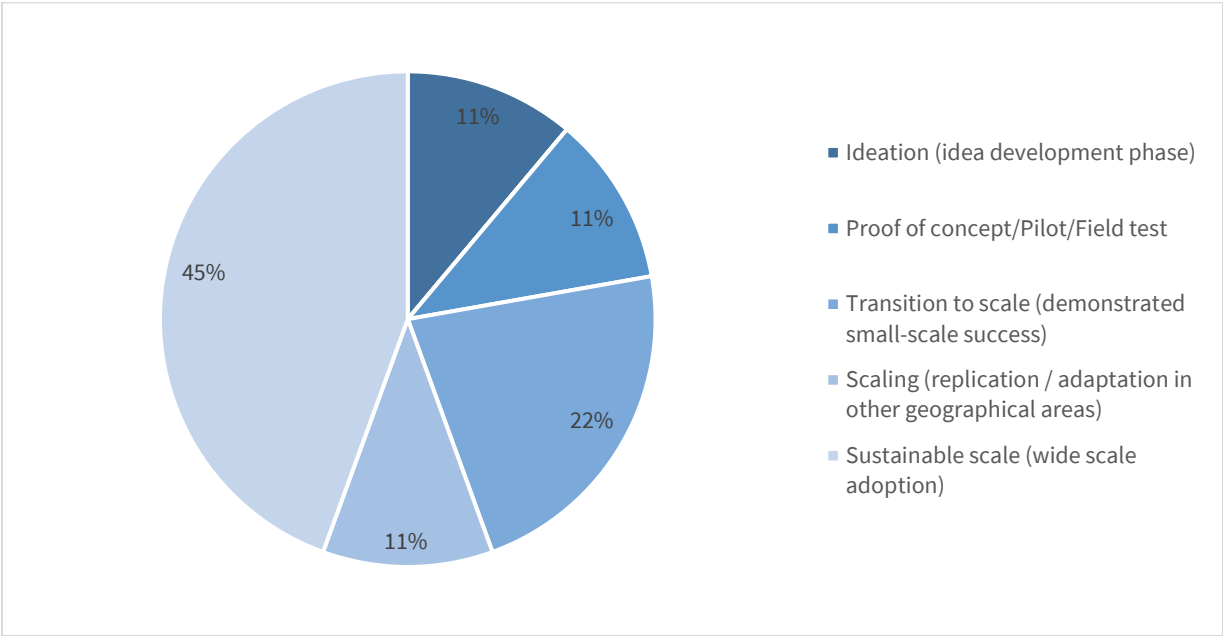


FIGURE 11 SCALING STAGES FROM SURVEYED INNOVATIONS IN LESOTHO

The stage at which an innovation describes itself as scaling, at sustainable scale or transitioning between scale and sustainability differs considerably. Four of the innovations reported that they are at a ‘sustainable scale (large scale adoption)’, albeit with various levels of active and registered users and needs for ongoing support to remain sustainable. This included the Mukuru App, launched in 2019, with 1,000,000 registered users, half

of which are active. It noted that it does not require any subsidies or donor support to sustain the innovation as funding is achieved through transaction fees. GeoFarmer mentioned that it has reached sustainable scale but requires donor funding to be sustainable. It did not answer the question about the number of registered users. Two Lesotho-only innovations reported that they are also at a sustainable scale; Lesotho Soil Information System (LESIS) by the Agricultural Research, Department of Soil Conservation, National University of Lesotho (NUL) and Food and Agriculture Organization of the United Nations (FAO) which launched in 2019, and the Seasonal Forecast from Lesotho Meteorological Services that launched in 2012. Neither of them reported their user numbers. Despite being at a sustainable scale, LESIS reported that it still requires subsidies or donor support to continue to sustain the innovation. They both rely on government funding, with LESIS also relying on donor subsidies.

The other two Lesotho-only innovations are reported to be at the proof of concept/pilot/field test phase (Marakeng App and Marketing Information System (2020)) and ideation (idea development phase) (e-Farmers (2018)). Neither reported user numbers and only the Marakeng App and Marketing Information System noted that they require subsidies or donor support to continue at a sustainable scale.

Looking at the regional innovations, SmartFarmer, with 351,000 registered users, sees themselves at 'transition level' to scale. Despite receiving funding from individual subscription fees, business subscription fees, advertising, data monetization and transaction fees, it still requires subsidies or donor support to continue at a sustainable scale. The Food Processing Software by Matrix Software; the oldest innovation noted (launched in 2002), still sees itself as scaling (replication / adaptation in other geographical areas), albeit with no need for subsidies or donor funding to be sustainable (150 registered and active users) - it received revenue from business subscription fees and premium services.

In looking at what sources of revenue/funding the innovations currently rely on, there was a spread of answers with the most common being business subscription fees (3), donor subsidies/program support (3) and host country government funding (3). Three out of four Lesotho-only innovations rely on host-country government funding (two of which also rely on donor subsidies/program support) - these are the three government-run innovations. Only one; e-Farmers (a private sector company), reported self-sustainable funding; and use of individual subscription fees and advertising. Most innovations used financial support from Donor Grants (government/foundations) (4), followed by friends and family (3) to establish the innovation. Three out of four Lesotho-only innovations used Donor Grants (government/foundations). The fourth respondent: E-Farmers, used funds from friends and family. Looking at the need for any subsidies or donor support to continue to sustain the innovation, five respondents said that they do not need any subsidy / donor support to continue to sustain their innovation, while four do.

INCLUSIVITY

Most innovations noted that their technology is already inclusive of people with disabilities (7), elderly (7), women (6), smallholder farmers (5), persons with limited literacy/illiterate (5). No innovation noted itself as not being fully inclusive of any of these groups.

4 DIGITAL AGRICULTURAL SYLLABI AND ENTREPRENEURSHIP TRAINING

4.1 AGRICULTURAL SYLLABI UNIVERSITIES

One University was approached in the country: the National University of Lesotho. The university did not respond to our survey and did not participate in a KII. These results should not be interpreted to suggest that there are no (Agricultural) Universities or Colleges in Lesotho teaching or providing digital agricultural trainings but based on the methodology of this study and the limitations noted in Chapter 1, no additional data can be provided on this and further study is recommended to better understand the ecosystem in Lesotho.

4.2 INCUBATORS AND INNOVATION HUBS

A total of seven business support organizations have been mapped in the country, out of which six are operating in the agricultural sector. The only general business support organization identified without any focus or activity in the agricultural sector is [The Hub](#). For this organization there was no evidence of trainings and incubation activities dedicated to agricultural entrepreneurs. Therefore, it was not targeted for KIIs.

The agriculture-related business support organizations that were identified and contacted are:

- [Vodacom Innovation Park](#)
- [NUL Innovation Hub](#)
- [Bacha Entrepreneurship Project](#)
- Kickstart Entrepreneurial Project
- [Basotho Enterprise Development Corporation - BEDCO](#)
- [MSME E-Learning program](#)

These organizations support entrepreneurs and youth in Lesotho to build their digital and entrepreneurial capacities and skills in the agricultural sector. **Only one** business support organization responded to our request and took part in a KII.

BASOTHO ENTERPRISE DEVELOPMENT CORPORATION – BEDCO

The new incubator project of BEDCO is a Government Agency of Lesotho's Ministry of Small Business Development, Cooperative and Marketing, and was established in 2021. BEDCO projects focus on the capacity building of MSMEs and the formalization of micro-businesses. They also have a youth development project which consists of two components: 1) access to finance and 2) business acceleration and incubation. BEDCO's hub offers holistic business development services including incubation, acceleration, training, and managerial support for businesses operating in all sectors, including agriculture. BEDCO has a virtual platform for incubation which is not yet functional. They provide physical spaces, administrative and legal services, support with intellectual property and the development of networking relationships (they help to connect entrepreneurs and buyers through the organization of seminars and events). They are currently starting to support fundraising and investment readiness. The target groups of their entrepreneurship trainings are graduate students, young and early-stage entrepreneurs, and aspiring entrepreneurs. BEDCO does not offer special ICT and digital agricultural trainings at the time of interview.

BEDCO's hub currently has two agricultural start-ups in its portfolio, both in the poultry sector. BEDCO collaborates with the National University of Lesotho for incubation in the textile sector and with the Limkokwing University of Creative Technology in the selection of business ideas among colleges and universities' students. Furthermore, it collaborates with researchers to give value to the results and solutions developed and turn them into potential entrepreneurship ideas. It also helps in making the labs/machines of the universities accessible for the youth incubated.

BEDCO is financed by the government of Lesotho and by corporations who finance MSMEs as part of their social responsibility projects.

TABLE 7 OVERVIEW OF RESPONSES FROM INTERVIEWED INCUBATORS IN LESOTHO

LESOTHO INCUBATORS	
BASOTHO ENTERPRISE DEVELOPMENT CORPORATION – BEDCO	
Year of Establishment	2021
Agri start-ups incubated	Not started yet
Target of Digital Agri trainings	N/A
Digital Skills trainings	N/A
Digital Agri Tools taught	N/A
Collaboration with Universities and Colleges	NUL (National University of Lesotho) Limkokwing University of Creative Technology
Supported by the Government?	Yes, they are a Government Agency

5 INSIGHTS AND REFLECTIONS

The following section outlines the key insights from the data collection of the DACS and towards the end of the report signposts some broader reflections relevant to this country from the *Situational Analysis Report*.

It is important to note that digitalization is a gradual process, which requires a broad and well understood internal rationale, adjustment of organizational culture, and adequate investments over time and of resources to align actors, processes, and capacity. This section acknowledges that the data collected is not exhaustive but has enabled some insights and reflections to be shared that are more country specific. To capitalize on these results, multi-stakeholder processes to define clear approaches based on agreed priorities will be necessary.

5.1 INSIGHTS

BENCHMARK RESULTS

Lesotho ranked ninth out of 16 in the benchmark assessment which suggests that it has some key foundational elements necessary for a robust digital economy. The benchmark assessment enabled the identification of countries within the SADC region that are unlocking positive pathways towards a digital economy and a vibrant ecosystem of different actors. Lesotho ranked in the middle of the SADC member states for all pillars except digital government (which identified the presence and use of digital services and platforms to enable public service delivery) where it ranked twelfth.

Four clusters of countries at different points in their progress were identified in applying the benchmark. The clusters formed through the benchmark help to identify the progress countries have made and where greater efforts may need to be directed. Lesotho makes up part of Group 3, which is made up of countries that are in transition and could benefit from learning from its regional neighbors.

POLICY ENVIRONMENT

The benchmark assessment suggested that Lesotho's digital economy is developing and when doing the stock take of available policies and strategies it was identified that digitalization is being prioritized but more needs to be done to incorporate emerging technologies and private sector engagement. Two key documents were available for review that focused on a general approach to integrating ICTs. Two national plans were reviewed that also prioritize the importance of digitalization across the economy.

No specific sectoral strategy or policy on digitalization within agriculture was identified. Sourcing available documents was challenging as many sector-specific documents are not available online through web portals. Based on the stock take, digitalization has not been embraced within the agricultural systems of Lesotho, from a public sector perspective. There is a risk that if the public sector is not pushing a clear agenda for digital agriculture, which will improve productivity and efficiency, this could lead to a lack of integration of digital solutions by farmers and stifle the adoption of technology by smallholder farmers.

The key challenges identified from research, stock take review and KIIs is the lack of a guiding policy or strategy specific to agriculture, and the level of digital literacy among farmers. Greater effort needs to be made to encourage younger populations to work within the sector and the inclusion of digital tools is one incentive.

Covid-19 has also highlighted the need for greater improvements in the sector, specifically the benefits of digital platforms and greater online financial transactions. Many of these challenges require greater stakeholder collaboration including the private sector and civil society as they fall outside the remit of the Ministry of Agriculture.

DIGITAL AGRICULTURE INNOVATIONS

A total of 10 innovations were identified in Lesotho and nine responded to the survey. The most popular use cases were digital advisory, digital procurement, and e-commerce. The innovations who responded to the survey were mainly from government-led innovations, with three out of four Lesotho-only innovations being government-led. The latter in particular shows the active involvement of the Government of Lesotho in this area and highlights the surprising lack of private sector engagement in an area that is typically led by private individuals and companies. It highlights a significant area that can be focused on to encourage the private sector to become more involved.

Innovations targeted a wide range of outcomes: addressing poor access to markets, knowledge gaps, low productivity, and climate change. Several major challenges experienced in the application of their technology were mentioned and included a lack of digital literacy in their target customers, farmer uptake, behavior change and access to a device. The Lesotho-only innovations noted the biggest challenge was the farmer update/use/behavior change and digital literacy. Both these challenges are a common theme across the SADC region and highlight the strong need to focus on these going forward.

Lesotho has a developing digital economy which is evidenced by a high number of innovations using websites / dashboards / portals to transmit or store data and information. Interestingly, SMS, which is ordinarily one of the most used technologies in agricultural digital innovations, was only mentioned by two innovations, with none of the Lesotho-only innovations mentioning the use of SMS or smartphone apps. Given the high number of mobile subscriptions (113.8 per 100 people, HDI, (2020)) the lack of SMS is surprising. Spreadsheets, followed by cloud-based databases and cloud-based software as a service were the most common answers for how the innovations perform their data analysis. The Lesotho-only innovations answered spreadsheets only. These findings show the importance in continuing to improve internet access across the country and digital literacy to enable farmers to really benefit from the existing and future digital innovations in this sector.

Looking at the need for any subsidies or donor support to continue to sustain the innovation, five innovations said that they do not need any subsidy / donor support to continue to sustain their innovation, whilst four do. Most innovations in Lesotho used financial assistance from donor grants (government/foundations), and friends and family, with all the government-led innovations in Lesotho reporting the former.

DIGITAL AGRICULTURAL SYLLABI AND ENTREPRENEURSHIP TRAINING

Lesotho's National Strategic Development Plan II targets the development of technology and innovation to create employment and economic growth. Incubators need better infrastructure to develop their full potential. It is recommended to prioritize the connection of the various business support organizations and government agencies working in the field, i.e., BEDCO and the Lesotho National Development Corporation (LNDC). Regarding the field of digital agriculture, it has been suggested during interviews to support the Lesotho National Farmers' Association and individual agricultural entrepreneurs to facilitate their access to the digital agricultural space, which is not yet fully developed.

For the incubator interviewed, CCARDESA and other international partners can better support the development of digital skills for agricultural youth entrepreneurship in the SADC region by making digital agriculture more known and more visible in Lesotho, promoting digitalization to attract youth to work in agriculture, support capacity building and financing of digital agriculture, and establish and support digital agriculture within existing incubators in the country.

The Lesotho National Research and Education Network requires support so that it effectively plays its role of providing all types of digital services for teaching digital agricultural training, digital agricultural entrepreneurship, and advanced research activities. CCARDESA could support the appeal to SADC Governments to prioritize the 'last mile' solutions in SADC members so that the rural areas have equal access to the internet as those in the urban areas.

5.2 REFLECTIONS FROM THE SITUATIONAL ANALYSIS REPORT

This document has presented the available data collected for Lesotho and provides detailed insights on the three main elements: policies, innovations, and digital skills. The country data collected is intended to be useful for a local context, however the *Situational Analysis Report* presents a much broader perspective which examines regional trends, provides analysis on the regional findings, and highlights potential areas for shared learnings across the SADC region.

This section briefly presents key regional reflections that are relevant for this country that are derived from the *Situational Analysis Report*. The intention is to direct the reader to the report where these points have been elaborated on and presented alongside other countries in the region to learn from.

The key reflections from the Situational Analysis Report relevant to Lesotho include:

- **It is important to boost the digital agriculture entrepreneurship sector through the acquisition of advanced skills and an alternative model of sustainability for incubators (especially those who are not supported by the government).** Involving the private sector will help a more entrepreneurship-oriented approach adapted to the current labor market where youth can innovate in a context where agriculture is still regarded as old fashioned (which may discourage youth to get into digital agriculture initiatives). Collaborations with private sector entities may also facilitate new forms of fundraising/investments such as open innovation experiences and the funding of specific training/incubation programs for youth.
- **Digital agriculture must be guided by local priorities, policies, and capacity development in an on-going manner and must be promoted among incubators and innovation hubs to prepare the local youth to invest in the sector and develop new services for the local farmers and agricultural stakeholders.** Government has a role in improving access to the digital communication channels for the population and farmers. Collaboration across government departments, the private sector, and the incubation ecosystem towards the telecom operators (public and/or private) to improve the internet connection and make it available for the innovators (the entrepreneurs) and the users (the farmers and local population) is also required to facilitate the access to these services and promote entrepreneurship.
- **A whole-of-government approach is necessary for a thriving digital economy that enables engagement of stakeholders in the policy process and can alleviate cross-sectoral challenges,**

such as connectivity and digital literacy skills. Furthermore, greater efforts are necessary to understand whether the legal and regulatory standards in place for digital commerce, privacy and data fulfil their objectives for all stakeholders.

- **A key barrier to embracing digitalization in agricultural systems is a lack of a guiding policy framework and regulatory support that integrates the use of technologies and services.** An agriculture sector specific digital strategy and roadmap is necessary with clear objectives, milestones, timelines, and funding requirements to tie in the sector performance with a digital economy advancement.
- **The training programs that are most needed are the foundational programs that enable people to use digital tools in their day-to-day activities.** Appropriate training programs that take into consideration the local languages and the local contexts will be a priority particularly for agriculture which demands relevant and local content.

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**DIGITAL AGRICULTURE
COUNTRY STUDY ANNEX TO
THE SITUATIONAL ANALYSIS
REPORT OF THE SADC REGION**

Centre for Coordination of Agricultural Research
and Development for Southern Africa

World Bank Group