

DIGITAL AGRICULTURE COUNTRY STUDY ANNEX: ZIMBABWE

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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**SUPPLEMENT TO THE ASSESSMENT OF DIGITALIZATION IN THE AGRICULTURAL
SYSTEMS OF THE SADC REGION: SITUATIONAL ANALYSIS REPORT**

Centre for Coordination of Agricultural Research and Development for
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2021/ 2022

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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 Zimbabwe 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 county 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 Zimbabwe 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 Zimbabwe, 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 Zimbabwe 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 Point in Zimbabwe, Mr. Lloyd Sodayi of the Ministry of Agriculture. The study team remotely met with Mr. Sodayi twice to discuss the current situation with regards to digital agricultural technologies in Zimbabwe. The study team also worked with a National Consultant in Zimbabwe, Mr. Josphat Chitombo. The National Consultant was also responsible for interviewing stakeholders in country, which included the innovators of Vaya Tractor, Riskflow DBS, Kurima Mari and Afrosoft to learn more of their innovations and the digital landscape within Zimbabwe for the agricultural sector.

Further information on the methodology for this assignment is provided in the *Situational Analysis Report* (Section 3) along with the data collection tool used, including 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).

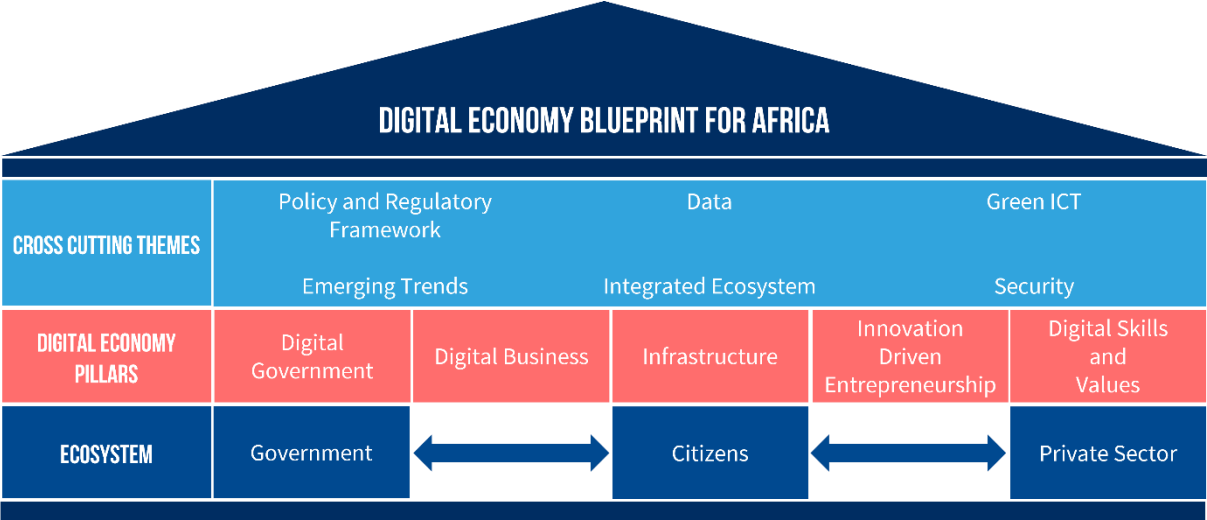


FIGURE 1 OVERVIEW OF KENYAN DIGITAL ECONOMY BLUEPRINT

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 all 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 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.

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 Zimbabwe 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 KILs 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.

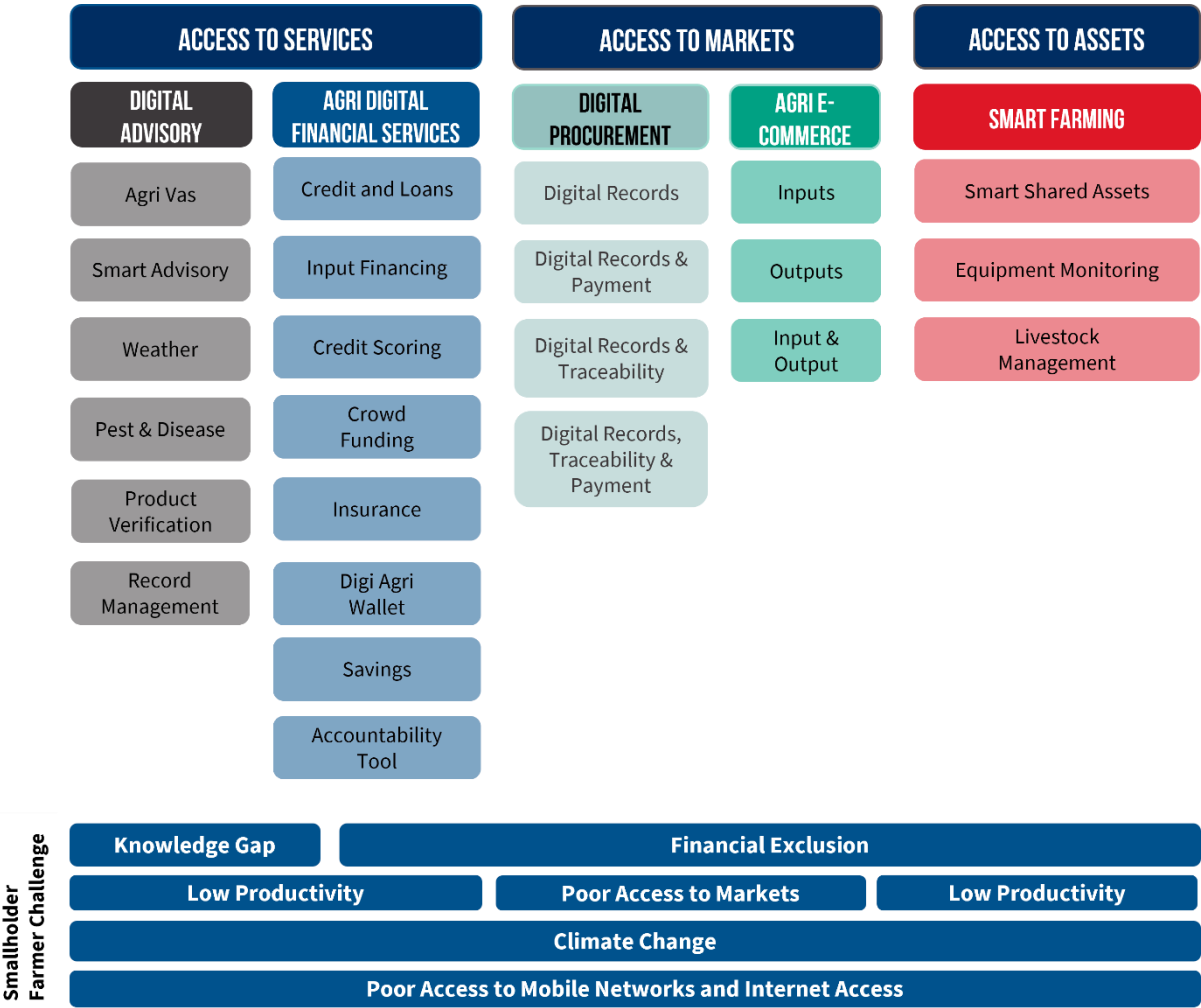


FIGURE 2 USE CASE MODEL BASED ON GSMA FRAMEWORK

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 different 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 annex 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 and 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 Zimbabwe 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 were 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 stakeholder 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 KIIs 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 THE COUNTRY CONTEXT

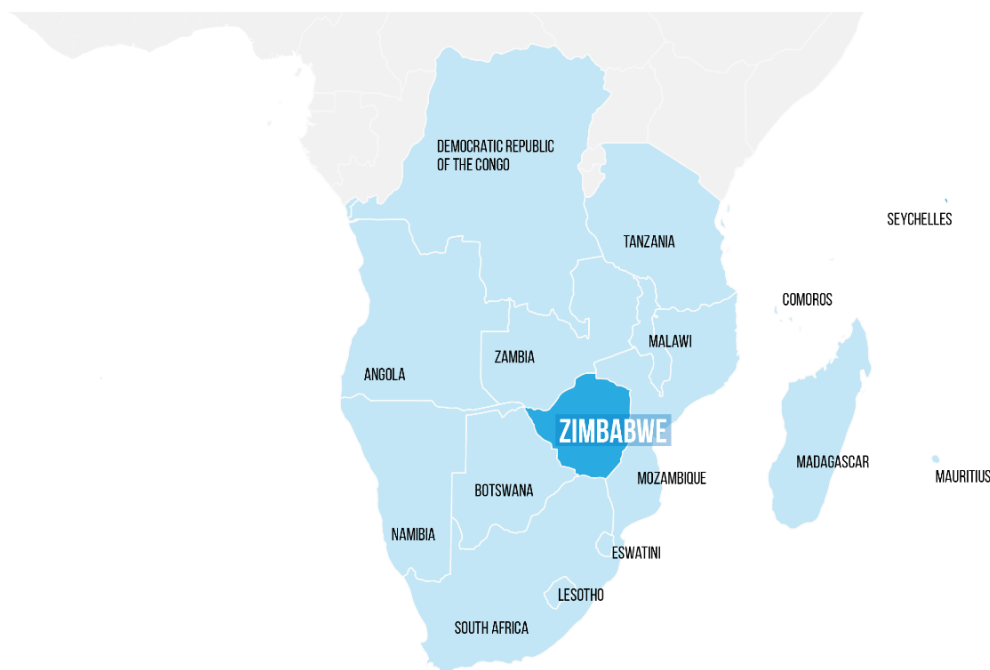


FIGURE 3 MAP OF ZIMBABWE IN SADC

Zimbabwe is a landlocked lower-middle income country with a population of 14.8 million.¹ The UNDP’s Human Development Indicators² rank Zimbabwe as 150th out of 190 countries and 9th out of the 16 SADC countries. For gender equality, Zimbabwe scores 0.931 on the Gender Development Index, which is slightly lower than the average of the region (0.954).³ The Gross National Income per capita for Zimbabwe is \$2,850 (compared to an average of \$8,050 in the region)⁴. It shows a steep decline with \$3,370 in 2018. Although 25.8% of the population falls under the UN Multidimensional Poverty Index,⁵ only 38.3% live below the poverty line according to the World Population Review.⁶ This is above the average rate of 40.8% for SADC member states. The median age of Zimbabwe's population is also significantly younger than the average in SADC with 18.7 years (versus 22.1 years).

AGRICULTURE ENVIRONMENT

Zimbabwe is one of the least urbanized countries in the region with only 32.2% living in urban areas. Agriculture is the backbone of Zimbabwe’s economy with 66.2% of the population working in the sector (much higher than the average of 43.5% in the SADC region) but it only contributes 5.07% to Zimbabwe’s GDP.

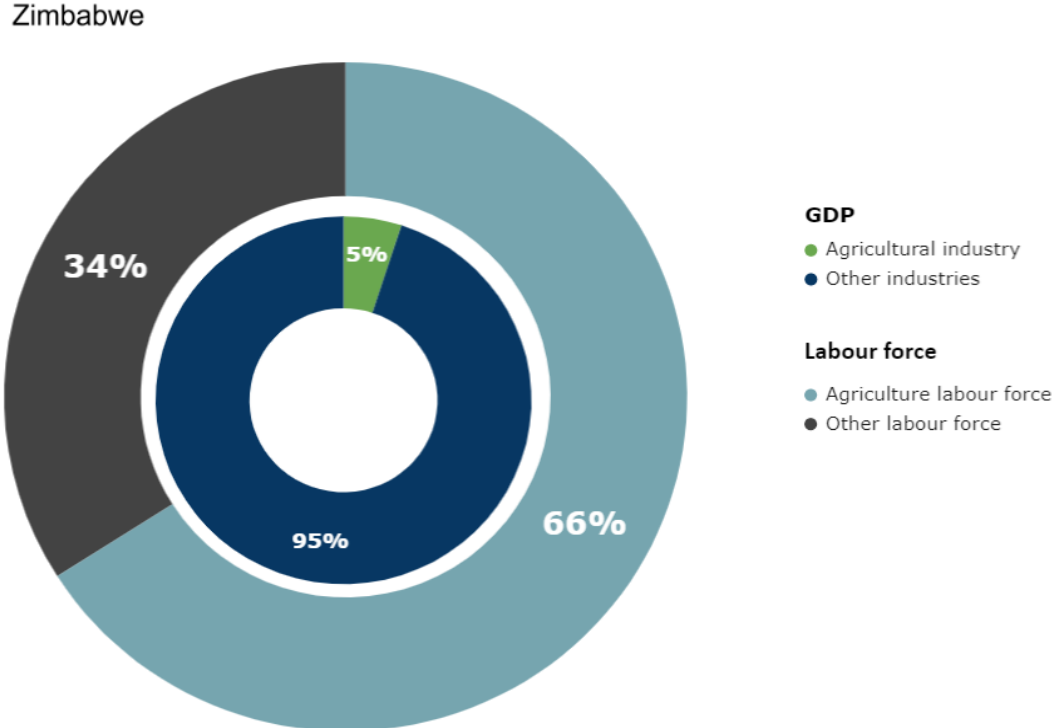


FIGURE 4 ZIMBABWE’S AGRICULTURAL INDUSTRY SHARE OF GDP AND THE SHARE OF THE AGRICULTURAL LABOR FORCE

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 growth⁷. The Strategy, illustrated in Figure 5, is based on foundational pillars, critical sectors to drive the digital transformation, and cross cutting themes to support a digital ecosystem.

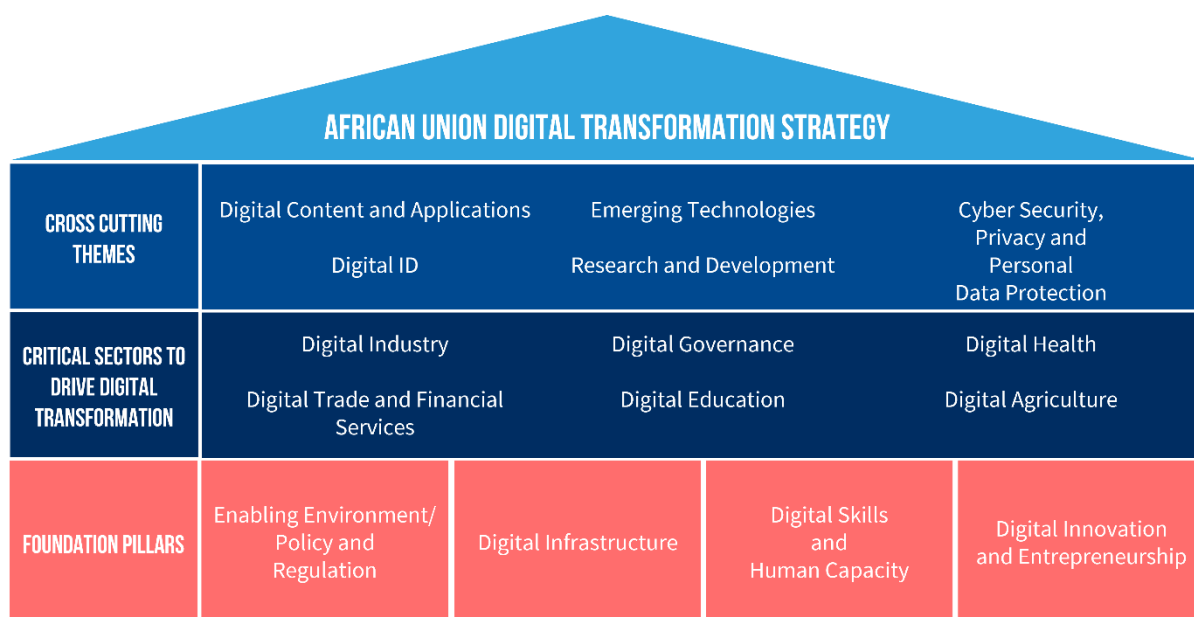


FIGURE 5 OVERVIEW OF THE AFRICAN UNION DIGITAL TRANSFORMATION STRATEGY

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, 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 ICT industry and encourages a whole-of-government approach to have more emphasis on the overall ecosystem and economy⁸.

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 Zimbabwe are illustrated in table 3.

TABLE 3 BENCHMARK PILLAR SCORES: ZIMBABWE

Zimbabwe	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 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
DR Congo	0.2782	15
Comoros	0.2497	16

BENCHMARK ASSESSMENT: ZIMBABWE

In the benchmark assessment Zimbabwe ranked seventh out of the 16 SADC member states. Figure 6 below illustrates the results of the benchmark in comparison to the global and African medians. Zimbabwe scores well in the benchmark, only lagging in digital business. It exceeds the African median for digital government. The benchmark suggests that Zimbabwe has some key foundational elements necessary for a robust digital economy.

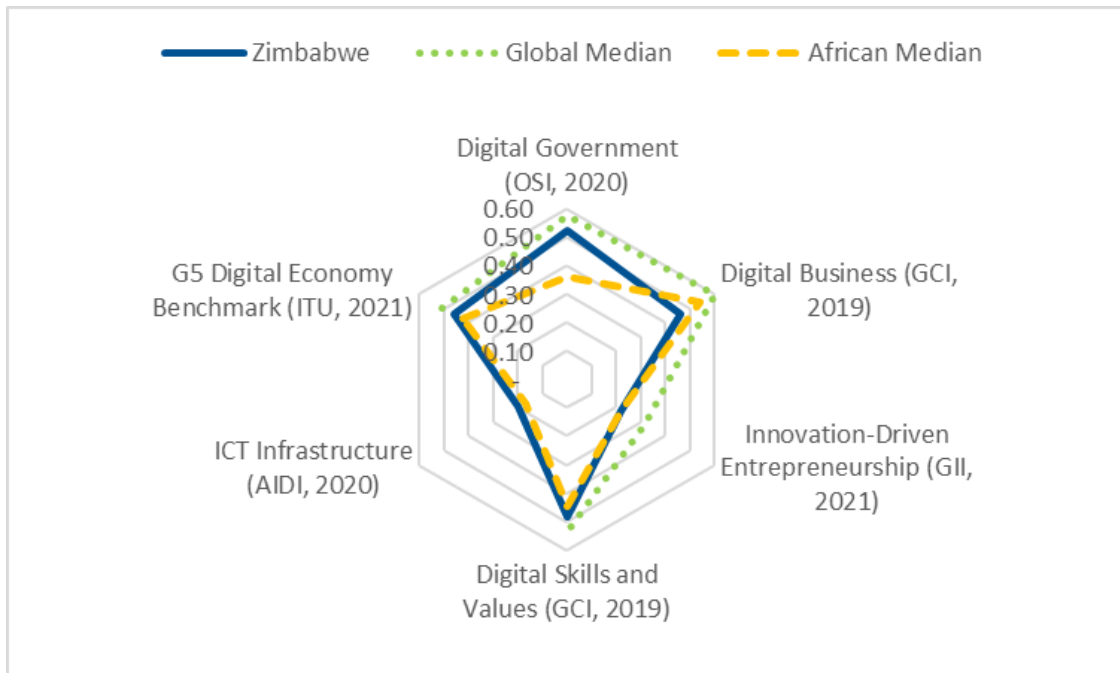


FIGURE 6 RESULTS FROM BENCHMARK ASSESSMENT FOR ZIMBABWE

The results of the benchmark for Zimbabwe are mixed. It scored in the top half for digital government, innovation driven entrepreneurship, digital skills, and ICT infrastructure. For digital skills it ranks in the top three of all SADC countries. However, it scored poorly in digital business ranking 13. Table 5 below illustrates the ranking for each individual pillar across the member states.

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

Zimbabwe ranked sixth out of 16 SADC member states for the ICT infrastructure pillar, however internet usage remains low among the population (27.1%).⁹ This is around the regional average. The GSMA Mobile Connectivity Index shows an 84% access to the 3G network,¹⁰ which complements the HDI report of mobile cellular subscriptions at 89.4 per 100 people.¹¹ Zimbabwe also ranks as 105th on the Inclusive Internet Index,¹² which details the accessibility, affordability, and relevancy of internet in 120 countries. However, according to the Mobile Connectivity Index,¹³ Zimbabwe is ranked number 9 in terms of overall mobile connectivity in the SADC countries with an overall index of 36.6—which qualifies it as an emerging country (above 35). It scores above average for consumer readiness and for content and services, but below average on affordability and availability of infrastructure.ⁱ In terms of ICT adoption, Zimbabwe scores position 110 (out of 140). The Zimbabwe government is on the lower scale of being future oriented, based on the position 132 (out of 140), but it scores a bit higher on the innovation capability index as number 128 out of 140.¹⁴ However, it does score high on the GCI 4.0 Digital Skills Among the Population Index with 3.9 out of 7 points,¹⁵ which surpasses the SADC average of 3.5.

ⁱ 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 Zimbabwe ranked seventh out of 16 in the region with mixed results across the indicators. These mixed scores and ranking in the assessment pillars indicate that Zimbabwe 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 Zimbabwe 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 frameworks¹⁶. 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 policies¹⁷. 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 outdated¹⁸.

2.1 GENERAL DIGITAL POLICIES

The benchmark assessment suggested that Zimbabwe's digital economy is in digital transition, and it seems that there are a lot of policies, strategies, and legislation in development. Zimbabwe has a small number of general policies and legislation relating to technology and digitalization, though the study team found these documents difficult to obtain.

POLICIES, STRATEGIES AND PLANS

The **National Policy for ICTs 2016-2020** (hereafter ICT Policy) is currently the only dedicated policy for ICTs or digitalizationⁱⁱ. It is a comprehensive document that is highly ambitious and sets out a clear goal for Zimbabwe to become a regional ICT hub and develop as a knowledge-based economy. There are five overall objectives of the policy:

- **Transformation:** Use ICT as an enabler to achieve national development goals and embed ICTs in development strategies and use them as a tool to enable.

ⁱⁱ Zimbabwe did have a previous National ICT Policy, finalized in 2005, but this version was not reviewed.

- **Growth:** Achieve a year-on-year ICT sector growth to stimulate the economy. To enable growth and access efficient management and utilization of radio frequency spectrum is required.
- **Inclusiveness:** Attain universal access to drive the domestic market for ICT products and to enforce the foundation for innovation and entrepreneurship growth.
- **Sustainability:** Build confidence and trust and increase cybercrime readiness.
- **Innovation and Partnership:** Build a conducive environment for innovation, entrepreneurship, investment, and partnership in the development of the local ICT software and application development sector.

The Policy places emphasis on: Universal access and service; infrastructure development and management; research, innovation, and industry development; policy streamlining, regulatory framework and institutional mechanisms; capacity building and content development, and national ICT development and the impact on regional integration. As with most initial national ICT policies, the Zimbabwe ICT Policy sets out targets and objectives to improve the infrastructure of ICTs, increase access for users, improve and implement ICT skills development plans, set up an e-government strategy and necessary legal and regulatory frameworks. However, there is also a specific focus on the ICT sector around stimulating innovation and encouraging entrepreneurship. Some of the key strategies of note are:

- The development of a National Data Centre
- Expanding access to credit for young ICT entrepreneurs and creating a culture of innovation
- Creating an ICT Growth Opportunities Fund to facilitate entrepreneurs
- Create strong policy support for patent and copyright protection
- Provide tax incentives for innovative ICT companies
- Develop legislation, regulations, policies, and programs for a host of e-services (health, agriculture, manufacturing, transport, tourism and mining)
- Implement cyber laws and ICT legislation including:
 - Data protection and privacy
 - Intellectual property protection and copyright
 - Consumer protection
 - Child online protection

Some of the goals set out in the ICT Policy are ambitious, but they present a clear focus. There is a case to focus and drive SME and entrepreneur development as this indicator was the lowest scoring on the benchmark. The framing of the ICT policy could also be conducive to greater private sector investment into the sector.

Vision 2030 which was published in 2018 sets out a strategy for Zimbabwe that is “focused on promoting innovation, entrepreneurship, equitable development and prosperity for all, under a market economy that leverages on Zimbabwe’s natural resources and abundant human skills”. In contrast to the ICT Policy that set out ambitious and clear strategies to embed ICTs within the economy, Vision 2030 has less emphasis on the specific detail of greater digital inclusion. However, there is a small section included under the Infrastructure Development pillar exclusively for ICT which mentions establishing Special Economic Zones to promote manufacturing and assembly, the importance of digital banking and how the increased use and access of ICTs enhanced financial inclusion, e-government, and a goal to have internet access at village level by 2030 through improvements and expansion of the fiber optic backbone and last mile connectivity. Further mention of ICT use, innovation and entrepreneurship can be found under Manufacturing, Investment in Services and Infrastructure. Vision 2030 reinforces the agenda set out in the ICT Policy of stimulating the private sector and encouraging innovation however it is not immediately obvious that ICTs are intended to be embedded within all sectors and activities of the Vision.

The **National Development Strategy 1: 2021-2025 (NDS1)** published in 2020 is the first 5-year plan set to operationalize the priorities set out in Vision 2030. The comprehensive plan analyses almost every part of the economy and social factors that have an impact on Zimbabwe reaching its goals for Vision 2030. While priority areas are set out in the document the key objective is to “modernize the economy through the use of ICT and digital technology” and supports the vision set out in the ICT Policy and Vision 2030. The inclusion of ICTs is evident throughout the NDS1 and is complemented with a specific chapter on *Infrastructure, Utilities and Digital Economy: The Economic Growth Enablers*. It is acknowledged within the Strategy that the impact of Covid-19 has continued structural changes in the economic activities in some sectors such as health services and ICTs, benefitting through increased demand and investment. The intention is to exploit these opportunities presented during the pandemic during the Strategy Period. Some key points of interest included in the Strategy:

- The formulation of SMART Zimbabwe 2030 which is a broad strategy that includes an e-Government program.
- Entrenchment of ICTs across all national development strategies to reach universal access by 2030 and unlock a digital economy.
- Addressing mobile money payment platforms and strengthening regulations around these that have been used for parallel market activities.
- Enhancing competitiveness by promoting SMEs and rural industrialization.
- Put in place measures to develop smart programs such as a smart Government system, smart agriculture, smart health, and smart transport.
- Expedite the implementation of the National ICT Device Factory, upgrade Government Internet Services Provider infrastructure to improve utilization of ICTs.
- Development of an e-Government cyber security system.
- Creation of a data collection standard.
- Establish digital database development, encourage innovation hubs to improve ICT usage.
- Mainstream ICT literacy skills into the national curriculum.
- Develop and implement a policy on adoption and adaptation of emerging technologies (Big Data, AI, etc.).
- Improve compliance with ICT policies and regulations and increase the number of enacted policies and regulations from 0 to 5 during the NDS1 period.

The NDS1 is an ambitious strategy but sets out a clear agenda of “levelling up” with a heavy reliance on ICTs and digital technologies. However, it is reliant on several strategies, policies, plans, regulations and legislation to be developed to add greater depth to these strategies and ensure protection for consumers, attractive investment environments and provide accountability. It is encouraging that there is an intentional desire and drive by leadership to incorporate digital transformation into the economy and that the general goals and objectives have been reiterated since the National ICT Policy up to the newly released NDS1.

2.2 LEGISLATION

From the review of available legislation, it seems that Zimbabwe’s legal frameworks are underdeveloped in terms of digitalization. Three items of legislation were sourced that are of some relevance to the study.

The **Postal and Telecommunications Act, 2000** unbundled the Postal and Telecommunications Corporations and created three separate entities to operate. The Act also established the Universal Service Fund which has the intention of providing funding to expand communication networks to rural areas and all operators are

required to contribute to the Fund. The Act also intended to promote fair tariffs for telecommunication services and maintain and promote healthy competition in the market.

The **Freedom of Information Act, 2020** which was enacted into law in 2020 is not directly related to digitalization but it does provide for rights of expression, freedom of media, and the right of access to information held by entities in the interest of public accountability or for the exercise or protection of a right. Whilst the Freedom of Information Act does not focus on data protection rights, certain provisions stated therein regulate the handling of personal information which directly affects data rights. The **Cyber Security and Data Protection Bill, 2019** has yet to be enacted but establishes a Cyber Security Centre and a Data Protection Authority, strengthens data protection, consolidates cyber related offences, and promotes a technology-driven business environment.

Sourcing available legislation was difficult. Likely the difficulty arose because the legal frameworks for these topics are still under development. The policies and strategies to date have been ambitious and clear in pushing ICTs into all sectors of the economy but to ensure investment and trust in potential new technologies, greater effort needs to be made in this space that strikes the right balance of any negative consequences from digital transformations.

2.3 DIGITALIZATION IN AGRICULTURE

DIGITAL IN AGRICULTURE POLICIES

It is possible that some documentation was not reviewed for this assessment because policies and strategies were not readily accessible from the Ministry websites. The documents mentioned in the section below were sourced from third party websites and were not verified as final and enacted documents.

There is little detailed information regarding the inclusion of ICTs in the agricultural system in the **Comprehensive Agricultural Policy Framework 2012-2032**ⁱⁱⁱ, which predates the National ICT Policy. Three references were found:

- Fund the production of extension materials and acquisition of ICT equipment
- Capacitate the provision of communication infrastructure and ICT at agricultural institutions
- Promote the use of ICT in agricultural marketing.

However, the **National Agriculture Policy Framework 2019-2030** acknowledges that ICTs are being used within the agricultural sector to overcome barriers. Examples of innovations include AGRITEX working on the development of an SMS platform that can deliver pre-planting, growing, harvesting, post-harvest and marketing information, and providing agricultural information, financial services, crop insurance and market linkages with ECONET Services through EcoFarmer; and e-Mkambo, Zimbabwe Farmers' Union bulk SMSs, and emails and newsletters. However, it is not without challenges as penetration of ICTs remains low and limited network access in rural areas is a particular hindrance. Encouragingly, the Policy promotes greater collaboration with the Ministry of ICT and Cyber Security to help digitize the entire agriculture sector to improve service delivery. Some additional initiatives mentioned include:

- Public and private investment in soft and hard market infrastructure (feeder roads, structured wholesale and retail markets, cold and dry storage, and ICT platforms)

ⁱⁱⁱ Only a document titled "Executive Summary" was available.

- Modernization of research facilities, agricultural equipment, and ICT equipment
- Institutionalizing in-service ICT literacy programs in all agricultural institutes
- Encourage extension workers and farmers to take part in the development of technologies and platforms
- Improve access to markets in agricultural value chains by smallholder farmers through the application of ICT
- Enhance the capacity of AGRITEX to translate climate information and make use of ICT platforms for farmers
- Oversee development of subsector strategies (e.g., ICT in Agriculture strategy)
- Build the capacity of government departments, farmer organizations and market players in data collection, analysis, storage and dissemination or exchange
- Utilize a digital platform to deliver subsidized inputs and set up a flexible electronic voucher system.

This Policy was produced shortly after the National ICT Policy and follows the vision of embedding ICTs within the agriculture sector. Much emphasis is made on agricultural extension services and the ability to digitize them, but the solutions provided lack detail.

CHALLENGES

The **NDS1** identifies agriculture as a key driver for economic growth. It follows closely to Vision 2030 and the ICT Policy in attempting to incorporate ICTs across the value chain. Throughout the Strategy there is appetite to upscale innovation and modernization of agriculture through ICT-based advisory services, automation of mechanization and irrigation, precision farming, smart greenhouses, and use of satellite technology to provide real time information on crops. Another key approach that the strategy includes is the establishment of an agricultural market information system that collects and disseminates information on local, national, and regional markets to enhance local production. Overall, there is a particular focus on agro-processing value chains, financing for agriculture, and the promotion of effective agriculture, knowledge technology and innovation systems. Strategies are included that are not directly linked to digitalization in the document but there is scope of applying new technologies for many of the challenges that are faced within the sector and outlined in the NDS1. The NDS1 provides a strong mandate and tool to advocate for better integration of digitalization within the agricultural sector and to prepare a sector specific strategy which identifies the solutions available for application in Zimbabwe.

While a Cyber Security and Data Protection Bill has been prepared it is still not enacted and creates some concerns within the sector. A public sector stakeholder informed us of innovations that are being used for information on weather and climate but claimed there were no policies to govern the technologies and the creation of data. As many agricultural related technologies are reliant on data this is a key concern, and the Data Bill should be prioritized.

3 DIGITAL AGRICULTURAL INNOVATIONS

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

3.1 MAPPING DIGITAL AGRICULTURAL INNOVATIONS

The DACS for Zimbabwe 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.

A total of 35 innovations were identified in Zimbabwe that had a mix of use cases as illustrated in Figure 7 below. These include 21 innovations that operate in Zimbabwe only and another 14 innovations that operate in two or more countries that include Zimbabwe.

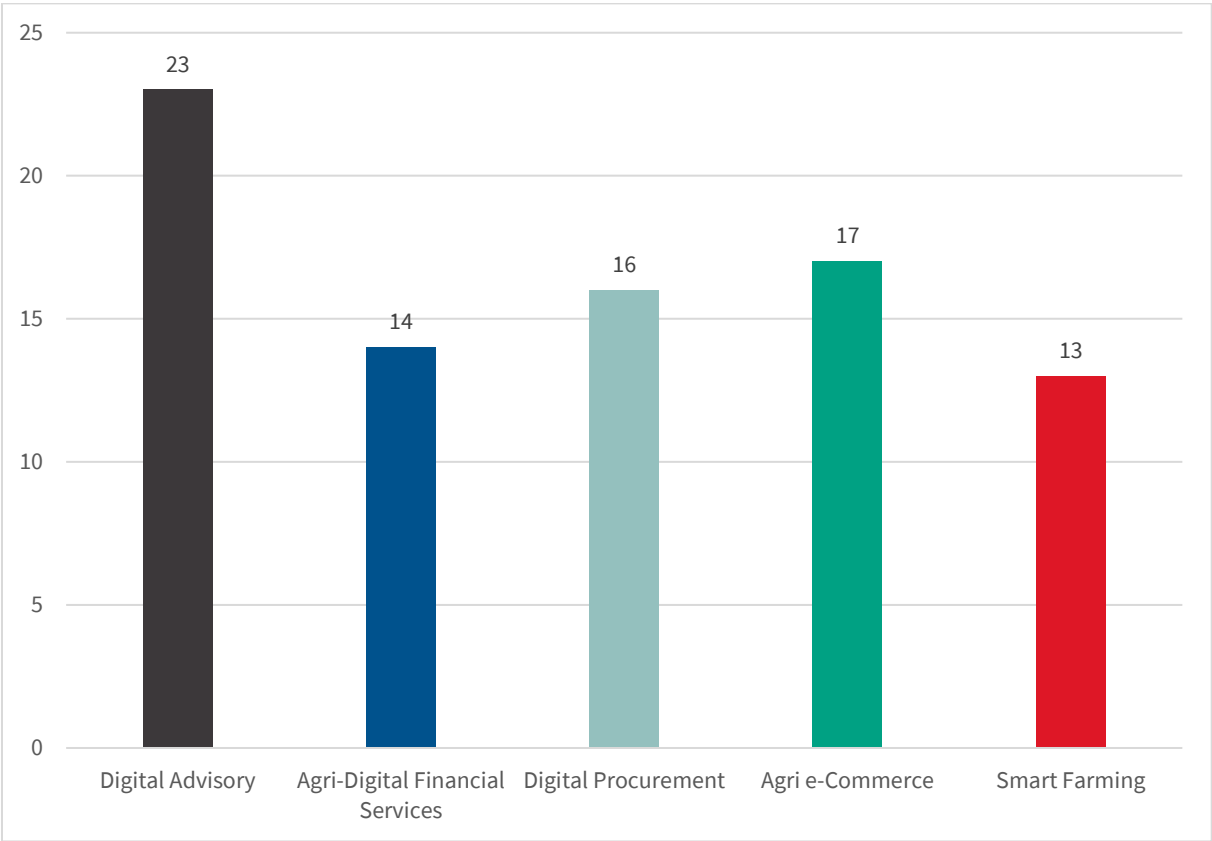


FIGURE 7 IDENTIFIED USE CASES FROM INNOVATIONS IN ZIMBABWE

From the identified innovations, 15 were identified as developed for a single use case and 20 for multiple use cases (three for 5 use cases, six for 4 use cases, seven for 3 use cases, and four for 2 use cases).

The table below presents an overview of all identified innovations with their use cases, if they filled in the survey or not, 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 ZIMBABWE

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



TABLE 6 OVERVIEW OF IDENTIFIED DIGITAL AGRICULTURAL INNOVATIONS OPERATIONAL IN ZIMBABWE

					Name of innovation	Name of the company	Survey ✓/X	Description of innovation	Operational Countries in SADC
	■				236-Mobile Banking Platform	Cassava SmartTech - Steward Bank	X	*236#Bank - Mobile Banking Platform from Cassava SmartTech - Steward Bank. It is a platform where Econet mobile network subscribers can open bank accounts via a mobile phone in minutes. It aims to grow financial inclusion using the mobile platform.	Zimbabwe
	■				AfriMoola	BoxFusion and Nedbank Uhkeshe Enterprise	X	BoxFusion and Nedbank Uhkeshe Enterprise have now partnered to create Afrimoola, a digital mobile money wallet to assist farmers with payment and e-wallet/ Voucher solutions. Afrimoola is a Fintech under the Nedbank Uhkeshe Enterprise program. It is a dynamic Fintech and digital ecosystem built on the ethos of financial inclusion. Afrimoola technology is managed by the digital transformation technology company Boxfusion that provides cutting edge software solutions, providing solutions to many government departments, companies, and enterprise clients. Boxfusion has a 12-year track record and is 100% public sector focused and a gold partner of Microsoft. The Afrimoola platform offers omnichannel solutions, wallets, eCommerce, digital money movement across networks, banks and borders, savings and stokvel solutions at the touch of a button for merchants and customers.	Namibia, South Africa, Zimbabwe

■		■	■	■	Agrimate	Box Fusion	X	Agrimate uses NDVI, sentinel 2 Infrared Satellite Images, Computer Vision and Artificial Intelligence to calculate Expected Yields and Credit Losses in Agriculture. This is also integrated into a Value Chain management system that manages the day to-day farming operations giving a 360 view of value chains in real time.	Namibia, South Africa, Zimbabwe
				■	Agrishare	Welthungerhilfe	✓	Agrishare app (2019) from Welthungerhilfe (WHH). Agrishare is a free-to-use shared services mobile solution for mechanized agriculture. It links owners of agricultural equipment like tractors, shellers and lorries, to farmers and other actors in the agricultural value chain. This is done through an Android mobile application. It has 53,000 registered users.	Zimbabwe
■		■	■		AgroMall	Afrosoft Holdings	✓	AgroMall (2016) from Afrosoft. Is an e-commerce platform whose origins were based on bringing together the agricultural ecosystem by way of interaction, information dissemination and buying and selling of all products and services within the value chain. The solution sits on an engine that is designed to allow versatility and adaptability of any ecosystem to meet the business requirements of any interested organization or industry. There are no registered users at present.	Zimbabwe
■	■	■	■	■	AgroMate/ AgriFusion	Chartered Systems Integration	X	AgroMate from AgroMate (Agri Fusion) is a unique platform that links farmers with off takers and financial institutions which provides the risk management of farmers to guarantee delivery of the product to the off takers. This is the first platform of its kind that addresses financing of farmers, aggregating orders from off takers and allocating them to farmers to plant the crop and applying Agri VAS with Artificial Intelligence for the ongoing monitoring and evaluation of the farming activities. This allows the financier to use this data to calculate expected credit losses for each offtake agreement in real-time. Banks are now able to offer purchase order factoring to finance farmers with a high degree of predictability of the risk and outcomes. This data can also be used for crop insurance to reduce the risk of non-performance of the crop. This innovation has not been validated on the ground and did not fill out the survey.	Eswatini, Mozambique, Namibia, South Africa, Zambia, Zimbabwe

			■	Alternative Exchange (trading platform) in Eastern and Southern Africa,	Escrow Group	X	Alternative Exchange (trading platform) in Eastern and Southern Africa from the Escrow Group is a registered alternative exchange (trading platform) in eastern and southern Africa. The platform enables members of the public to access financial markets using mobile phones / USSD platforms and apps to shop and choose what they want to invest in, including mobile retail bonds (Government and Corporate), securities and commodities (piloting).	Tanzania, Zambia, Zimbabwe
■				Dial a Mudhumeni/Advisory Helpdesk	Cassava Smartech (Vaya Digital Farmer/EcoFarmer)	✓	Dial a Mudhumeni/Advisory Helpdesk (2017) from Cassava Smartech (Vaya Digital Farmer/EcoFarmer). Through the Dial-a-Mudhumeni advisory call centers, customers with an Econet line can call 144 to talk to a farming specialist for FREE on any of the following helplines hosted by EcoFarmer's specialist partners for market prices and horticulture information, tobacco and livestock. It is key to note that this service is being reworked by the VDF Team, and they aim to relaunch it with more on offer for their farmers. It was accessible/available to all of their 1.4 million farmers.	Zimbabwe
			■	Diaspora Agriculture Finance Plan	Cassava Smartech (Vaya Digital Farmer/EcoFarmer)	✓	Diaspora Agriculture Finance Plan from Cassava (Vaya Digital Farmer/EcoFarmer). The Diaspora Agriculture Finance Plan allows Zimbabweans that are based in the diaspora to buy agricultural inputs and pay for tillage services for their loved ones back home. It is a one-stop-shop for agricultural inputs such as seeds, chemicals and fertilizers. The number of registered users is unknown as the team is reworking the service at present.	Zimbabwe
■		■	■	Drone Crop Spraying Services	Alley Capital Group	✓	Drone Crop Spraying Services (2018) from the Alley Capital Group. It provides pesticide management services using advanced drones for crop spraying. Its solution is climate friendly and more effective as a tool for protecting food systems compared to traditional methods. Unknown registered users.	Zimbabwe
				Drone Survey	Alley Capital Group	X	Drone Survey from the Alley Capital Group. The drone survey provides high resolution maps for aerial survey services applicable to agricultural surveys, general mapping, infrastructure inspections and project or site assessments.	Zimbabwe

					E- Licence application for Exporters of Agri-products and Agricultural ERP	Twenty Third Century System	✓	This is a private sector company operating in Malawi, Mozambique, Namibia, Tanzania, Zambia and Zimbabwe. They are a software solutions company providing services to businesses including agribusinesses and farmers for digital certificates. Their innovation is an e-Licence application for Exporters of Agri-products and Agricultural ERP where Farmers apply for export licenses online using a clean and friendly user interface was launched in 2020. They have 135 active users of which 85 are registered. These licenses enable access to export markets. They use smartphones and computers and have a website and use spreadsheets and cloud-based software. They address a knowledge gap and face challenges around understanding the market, user needs and accessibility by users, language and literacy levels, digital literacy, data collection and the inclusive nature of their application. They are in a scaling stage of their innovation and have used impact investors to develop the innovation but currently rely on donor subsidies and will continue to do so.	Malawi, Mozambique, Namibia, Tanzania, Zambia, Zimbabwe
					Ecocash mobile payment platform	Cassava SmartTech	X	Ecocash is a mobile payment platform from Cassava SmartTech. EcoCash is an innovative mobile payment solution that enables customers to complete financial transactions directly from their mobile phone.	Zimbabwe
					EcoFarmer Bulk SMS	Cassava Smartech (Vaya Digital Farmer/EcoFarmer)	✓	EcoFarmer Bulk SMS (2013) from Cassava Smartech (Vaya Digital Farmer/EcoFarmer). EcoFarmer's Advisory and Advertorial Bulk SMS service allows farmers to keep in touch with existing and potential suppliers and buyers. It is a service that allows agribusinesses to communicate with farmers producing specific commodities in specific regions, advising them on the best production practices and giving them offers via SMS. There are 1.4 million farmers on the platform.	Zimbabwe
					EcoFarmer SMS Advisory Tips	Cassava Smartech (Vaya Digital Farmer/EcoFarmer)	✓	EcoFarmer SMS Advisory Tips (2015) from Cassava Smartech (Vaya Digital Farmer/EcoFarmer). EcoFarmer SMS Advisory Tips is a subscription-based advisory service offering tips to farmers. Farmers have access to the following tips: Maize, Groundnuts, Tobacco, Cattle, Goats, Bees, Sorghum. Tips on each commodity are payable daily, weekly or monthly. It has 6,000 registered users.	Zimbabwe

■	■	■	■	eMKambo (eMarket)	Knowledge Transfer Africa Private Limited	✓	<p>eMKambo (eMarket) (2012) is from Knowledge Transfer Africa Private Limited. eMKambo is an interactive platform comprising a knowledge center situated at Mbare Market agriculture market for aggregation and coordination of knowledge and information for sharing. Also, a:</p> <ul style="list-style-type: none"> · Call center (with 16 lines of NetOne, Telecel and Econet) situated at Mbare Agriculture Market, Mbare Harare; · Bulk SMS system; · Mobile App; · social media – WhatsApp, Twitter and Facebook and a website (www.emkambo.co.zw) · Weekly Newsletter – eMKambo Vibe (https://emkambo.wordpress.com) · Local newspaper with weekly columns (Newsday and Herald) targeted at decision makers. · Radio program – National FM every Monday, Wednesday and Friday at 8:05am. <p>The wide range for physical, mobile phones and internet approaches ensures the interests of farmers and other value chain actors are met. 1.2 million registered users.</p>	Zimbabwe
		■		Food Processing Software	Matrix Software	✓	<p>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 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</p>	Botswana, Eswatini, Lesotho, Mauritius, Namibia, Seychelles, South Africa, Tanzania, Zambia, Zimbabwe

							Software solutions has reached a stage of replication and adaptation in other geographies and are in the Scaling stage of development.		
■		■		■	GeoFarmer	GeoTerralimage (Pty) Ltd	✓	<p>GeoFarmer at GeoTerralimage 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. GeoTerralimage 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 - through the use of 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. GeoTerralimage has 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, 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.</p>	Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, Zimbabwe
■	■		■	■	Global Farmers Connect	Global Farmers Connect	X	<p>Global Farmers Connect operates in South Africa, Zambia and Zimbabwe. Global Farmers Connect is an artificial intelligence tool used to provide farmers with a platform to reach and sell their agricultural products directly to end consumers. Farmers also have access to information about their daily requirements such as farm equipment, greenhouse needs, animal farming, fertilizers, feeds and qualified agronomists' advice.</p>	South Africa, Zambia, Zimbabwe

■	■			■	GreenFingers Mobile	GreenFingers Mobile	X	GreenFingers Mobile from GreenFingers Mobile in Tanzania, South Africa, Zambia and Zimbabwe. GreenFingers Mobile is a mobile-first Software-as-a-Service (SaaS) technology platform, to manage and finance large groups of smallholder farmers. Developed by a team of agricultural value chain experts, the platform easily adapts to different crop types and use cases.	South Africa, Zambia, Zimbabwe, Tanzania
■	■	■	■	■	iFarm App	iFarm	X	iFarm App by iFarm. iFarm is an agricultural ICT, logistical and tech services company based in Zimbabwe. The iFarm app has been developed to link farmers to markets and other key stakeholders, including the government of Zimbabwe, banking sector, outgrower schemes, agricultural boards and farmers' unions, seed houses and agricultural input suppliers, processors, research institutions and insurance companies in the agri-ecosystem.	Zimbabwe
■				■	In-Services training App	Welthungerhilfe Zimbabwe	X	In-Services training App from Welthungerhilfe. The "In -Training App" is focused on the Ministry of Agriculture extension officers with regards to training and knowledge transfer and thus enhancing the training and development.	Zimbabwe
■	■	■	■		Kurima Mari (LimaMali)	Welthungerhilfe	✓	Kurima Mari (LimaMali) (2016) app from Welthungerhilfe (WHH). Kurima Mari is an Android application that is designed to enable smallholder farmers access extension advisory and market linkages using a smartphone. It enables the smallholder farmer not to overly depend on extension officers and not to be stranded when seeking markets. It enables smallholder farmers to access the relevant information pre-production such that they can make informed choices about participating in agriculture value chains. The app, which includes Kurima Mari - Beef and Kurima Mari - Poultry, also provides digital support tools such as gross margin calculators and seasonal calendars that ensures farmers make the right choices with regards to input investments and production practices. Operational in Malawi and Zimbabwe, with 84,719 registered users.	Malawi, Zimbabwe
	■	■	■		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	Botswana, Democratic Republic of Congo,

							<p>launched in 2019 and allows customers to create orders for remittances individually and initiate a payment for the transfer to happen. The 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).</p> <p>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 financials 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.</p>	Eswatini, Lesotho, Malawi, Mauritius, Mozambique, South Africa, Tanzania, Zimbabwe	
■	■	■	■		Mutasa Auction Floor (MAF)	Farmers Intersection Pvt. Ltd	✓	Mutasa Auction Floor (2016) from Farmers Intersection Pvt. Ltd. The provision of centralized marketplaces to bring buyers and products to the one space in a competitive transparent environment and to facilitate the flow of market information to promote market responsive agricultural production via the mechanism of online `Dutch Clock` auctions. 355 users have used the service at some point. Many thousands have expressed an interest.	Zimbabwe
	■				One Money Mobile Wallet platform	Net One	X	One Money Mobile Wallet platform from Net One. OneMoney is a mobile payments solution service provided by NetOne to its subscribers. OneMoney provides a service ecosystem that entails the exchange of money between individuals (peer to peer), businesses (business to business), individuals paying businesses (consumer to business), and businesses paying individuals (business to individual). This	Zimbabwe

							service offering provided by OneMoney makes it possible for individuals and businesses to transact in a secure, cashless, and seamless manner.		
■		■			Online Import and Export License System	Ministry of Agriculture Lands and Rural Resettlement	X	Online Import and Export License System from the Ministry of Agriculture Lands and Rural Resettlement. The Import and Export License Management System automates the application and issuance of licenses to importers and exporters of agricultural products, thus replacing the manual paper-based system.	Zimbabwe
■			■	■	Seedco Mobile App	SeedCo Group	X	Seedco Mobile App from SeedCo Group. SeedCo has developed a digital platform to disseminate product descriptions for their seed products and related Good Agricultural Practice (GAP) information. The platform can be accessed through a basic feature phone (using USSD), or smartphone app. Farmers are on-boarded to the platform through radio, TV, newspapers and farmer field days. Information can be accessed offline and refreshed when farmers are able to connect, with free Wi-Fi services occasionally provided by Seed Co through mobile units used during their field engagement with farmers. Farmers are able to interact with the platform through sending SMS or photos to Seed Co for a response.	Zimbabwe
■		■			SHERPA	Blue North Sustainability	✓	SHERPA from Blue North Sustainability is a specialized consulting company supporting businesses in the agriculture and food sectors in proactive clarification, development and implementation of sustainability strategies. SHERPA was launched in 2019 and expertly guides and supports businesses on the challenging and complex journey to achieve true and lasting resilience, viability and sustainability. It is operating in Malawi, South Africa and Zimbabwe. Developed by Blue North Sustainability, SHERPA is an integrated on-line management system specifically designed to support and empower business owners, managers and management-teams within agricultural supply-chains, in the development and implementation of proactive, relevant and impactful sustainability strategies for their businesses. It has 52 active users and 305 registered users providing them with Smart advisory: Data-driven advisory based on tailored, farm-level agro-climatic and crop-specific information to support decision making, maximize productivity and reduce costs. Technologies such as sensors, satellites and drones, as well as big data analytics and AI, underpin many of these services. It also	Malawi, South Africa, Zimbabwe

							<p>enables 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. Information for farms is available to develop, manage, measure and report a sustainability strategy for their business. SHERPA is designed to enable farmers to take full ownership of the sustainability strategies for their farms, to be in a proactive position in relation to market access requirements and to be able to comprehensively report to their stakeholders. SHERPA is a bottom-up approach and an alternative to the prescriptive "top down" approaches most often used. It puts the control of the sustainability agenda in the hands of the farmer/business management. It covers all aspects of sustainability in a holistic and integrated way, allowing the business to "see", measure and improve the whole system towards greater resilience and viability. The innovation helps build greater resilience and viability and uses computers, landlines, a website, GeoData and cloud-based databases. The advisory addresses a knowledge gap and helps farmers through reporting on multiple prescriptive standards. It has been challenged by digital literacy limitations, access to devices, data collection and farmer uptake and behavior change as well as a lack of mobile coverage. They facilitate planning, on-farm production, post-harvest processing and access to markets. They are scaling towards replicating this in other countries, have funded themselves using their own resources and charge individual subscription fees, business subscription fees and an aggregated reporting service vis MS PowerBi over and above SHERPA licenses. They have not taken specific actions for inclusivity. They have worked with Hydrologic based in the Netherlands that also uses ICT solutions to ensure water systems are more weather resistant and climate adaptive. They have also worked with Pixofarm that have developed an App based system to monitor accurate yields on farms. They use noise resistant image processing, machine learning for forecasting and AI for enabling accurate fruit analysis.</p>	
■				Skudu Exact	Skudu.co.za	✓	<p>This is an innovation implemented in Malawi, Mozambique, Namibia, South Africa and Zimbabwe. Skudu Exact launched in 2019 and provides smart advisory: data-driven advisory based on tailored, farm-level agro-climatic and crop specific</p>	<p>Malawi, Mozambique, Namibia,</p>

							information to support decision making, maximize productivity and reduce costs. It addresses planning, inputs and on-farm production. Technologies such as sensors, satellites and drones, as well as big data analytics and AI, underpin many of these services. It enables farmers and agronomists to effortlessly automate and expedite plant nutrition guidelines for multiple blocks and fields and product guidelines are issued specific to crop growth state and ordering and application for soil correction. Skudu's algorithm generates the requirement for lime, gypsum, fertilizer and foliar feed specific to the crop, growth stage and region based on provided soil and leaf sample analyses. It has 400 registered users and 50 active users. Its challenges include bridging time and technical capacity to generate plant nutrition guidance (content). It has also had constraints on farmer uptake and technical usability of the platform. It is transitioning to scale, has been funded by technology investors and charge business subscription and transaction fees.	South Africa, Zimbabwe	
■	■	■	■	■	SmartFarmer	Riskflow DBS	✓	Smart Farmer of Riskflow DBS. Riskflow DBS is a private sector company, and this innovation was 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, 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	Botswana, Lesotho, Malawi, Mozambique, South Africa, Tanzania, Zambia, Zimbabwe

							<p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>	
■				Tsetse Control Mapping and Habitat Modelling	Scientific and Industrial Research	X	Tsetse Control Mapping and Habitat Modelling from Geo-Information and Remote Sensing Institute (GRSI) (part of the Scientific and Industrial Research and	Zimbabwe

						and Development Centre (SIRDC)		Development Centre (SIRDC)). This entailed modelling the Tsetse habitat for the Matusadona area based on mapped Tsetse trap-sites.	
				■	Vaya Tractor	Cassava Smartech (Vaya Digital Farmer/EcoFarmer)	✓	Vaya Tractor (2019) from Cassava Smartech (Vaya Digital Farmer/EcoFarmer). The Vaya Tractor platform allows farmers to hire, book and pay for farming equipment on their mobile phones by simply dialing *902#. Farming equipment available for hire on the platform includes tractors, rippers, sprayers, spreaders, planters and disc ploughs, harrows and combine harvesters. This service is accessible to the over 1.4 million subscribers on the Vaya Digital Farmer platform.	Zimbabwe
■	■		■		ZFU EcoFarmer Combo	Cassava Smartech (Vaya Digital Farmer/EcoFarmer)	✓	ZFU EcoFarmer Combo (2016) from Cassava Smartech (Vaya Digital Farmer/EcoFarmer). ZFU EcoFarmer Combo is a bundle of services, including EcoFarmer Maize or Cattle Tips and Weather Indexed Insurance, ZFU Membership, and EcoSure Funeral Cover, which farmers pay a subscription fee towards. They have 6,500 registered users.	Zimbabwe
■		■	■		ZimAgrihub knowledge portal	Welthungerhilfe	✓	ZimAgriHub from Welthungerhilfe (2020). An interactive platform that provides a one-stop knowledge portal whereby all agricultural literature, video and audio files can be accessed by all stakeholders of Zimbabwean agriculture. Such stakeholders involve academia, corporate entities, development institutions and government entities. 600 active users (no registration required to use the Hub, so no total of registered users is kept).	Zimbabwe

3.3 RESULTS FROM INNOVATION SURVEY RESPONDENTS

All identified innovators received a survey and 20 innovations implemented in Zimbabwe responded. The answers on the survey are self-reported. Of the innovations that responded, 12 were operational in Zimbabwe only and the remaining eight operated in several countries. All identified innovators were reminded several times by email and by phone to complete the survey. The response rate of the survey for Zimbabwe was 57% (20 out of 35 identified innovations responded).

USE CASES AND SUB USE CASES

The division of GSMA use cases shows that in Zimbabwe multiple use cases are most common. 12 out of 20 respondents provided multiple services and only eight respondents provided a single use case. One respondent provides all five use cases in their innovation, four provide four use cases, five provide three use cases and two provide two use cases.

Figure 8 below illustrates the division of use cases provided. Digital advisory was the most common use case cited by 14 survey respondents, followed by digital procurement (12), agri e-commerce (11), digital financial services (6) and smart farming (5). Figure 8 also illustrates a comparison of use cases to the rest of the identified innovations in the SADC region. Most innovations surveyed were developed by private sector companies (17), but innovations were also developed by NGOs (2), and one was developed through a public-private partnership.

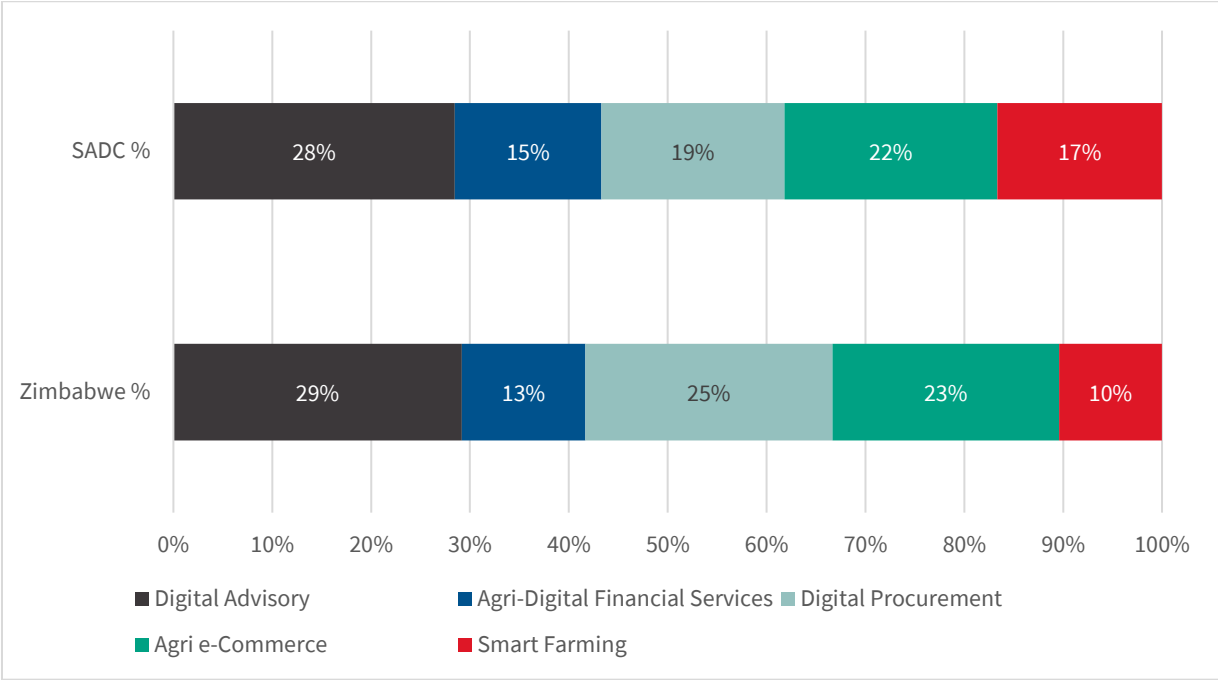


FIGURE 8 DIVISION OF USE CASES FOR SURVEY RESPONDENTS IN ZIMBABWE VS. IDENTIFIED INNOVATIONS IN SADC

Most innovations were launched in 2019 (7), followed by 2016 (4). Two innovations were launched in 2020 and 2017 respectively. Innovations were also launched in 2012, 2013, 2015, and 2018. The oldest innovation is a food processing application from Matrix Software launched in 2002.

The innovations in Zimbabwe cover almost all sub-use cases as illustrated in the figure below.

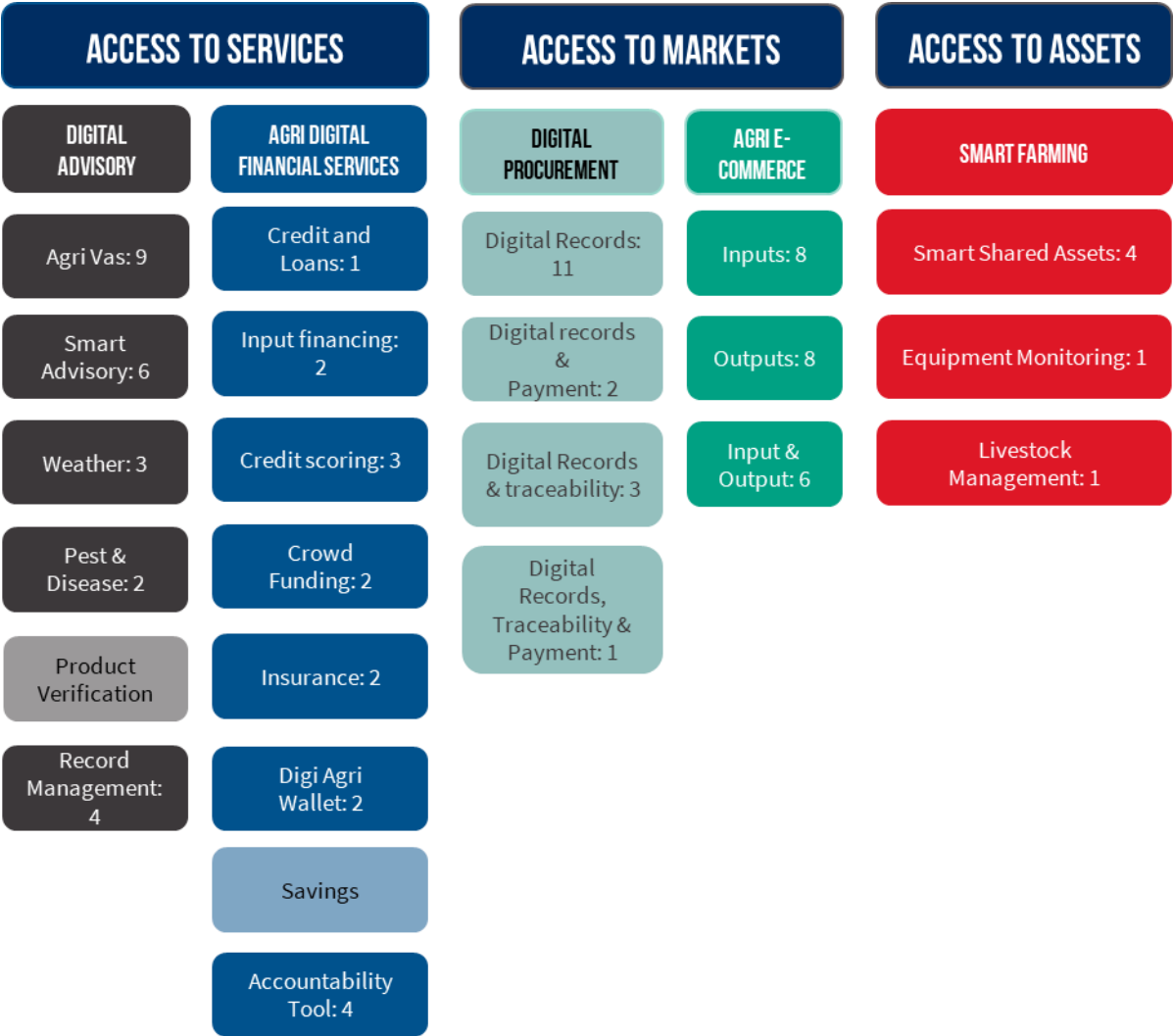


FIGURE 9 OVERVIEW OF SUB-USE CASES PRESENT IN SURVEYED INNOVATIONS IN ZIMBABWE

CHALLENGES

The innovations targeted a wide range of pain points / challenges. Addressing the existing knowledge gap was most mentioned (12), followed closely by poor access to markets (11) and low productivity (10). In looking at the biggest challenges in the application of technology, digital literacy (12) and farmer update/use/behavior change (10) were the top two most common answers. Access to a device (sharing with family and others) and operational constraints were also prominent issues (7, respectively). For the innovations only operational in Zimbabwe user affordability, systematic factors within the operational environment such as regulations, lack of trust, electricity, and mobile network coverage were also prominent issues.

TECHNOLOGY USE AND CHANNELS

A Website / Dashboard / Portal is the most common channel (14) followed by Smartphone apps (8) and SMS (7). Spreadsheets are the most popular tool for analysis (10) followed by cloud-based databases (e.g., SQL) (9). These findings are consistent with those in other SADC countries.

VALUE CHAIN PHASES COVERED

Innovations in Zimbabwe are generally spread throughout the value chain, albeit fewer for storage (3), as can be seen in figure 10.

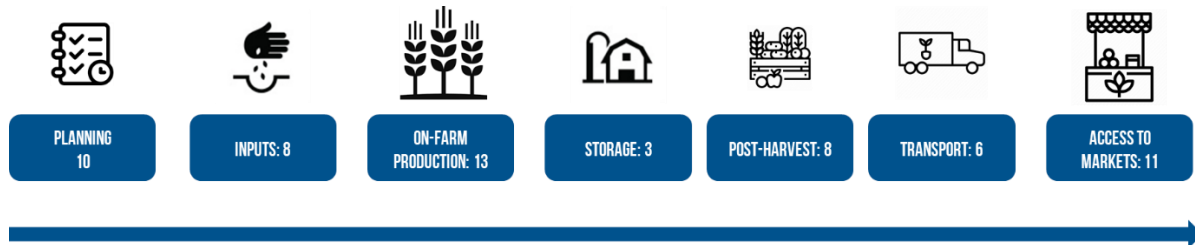


FIGURE 10 SURVEYED INNOVATIONS PRESENCE IN THE VALUE CHAIN IN ZIMBABWE

SCALING, FUNDING AND REVENUE

Most digital innovations in Zimbabwe are in the later stages of scale based on the Insights on Scaling Innovation report, which is accessible [here¹⁹](#). Three innovations had reached wide scale adoption, five were at replication stage, and another five had demonstrated small scale success. Three innovations made up the ideation, R&D and Pilot phase and were all local innovations operational only in Zimbabwe.

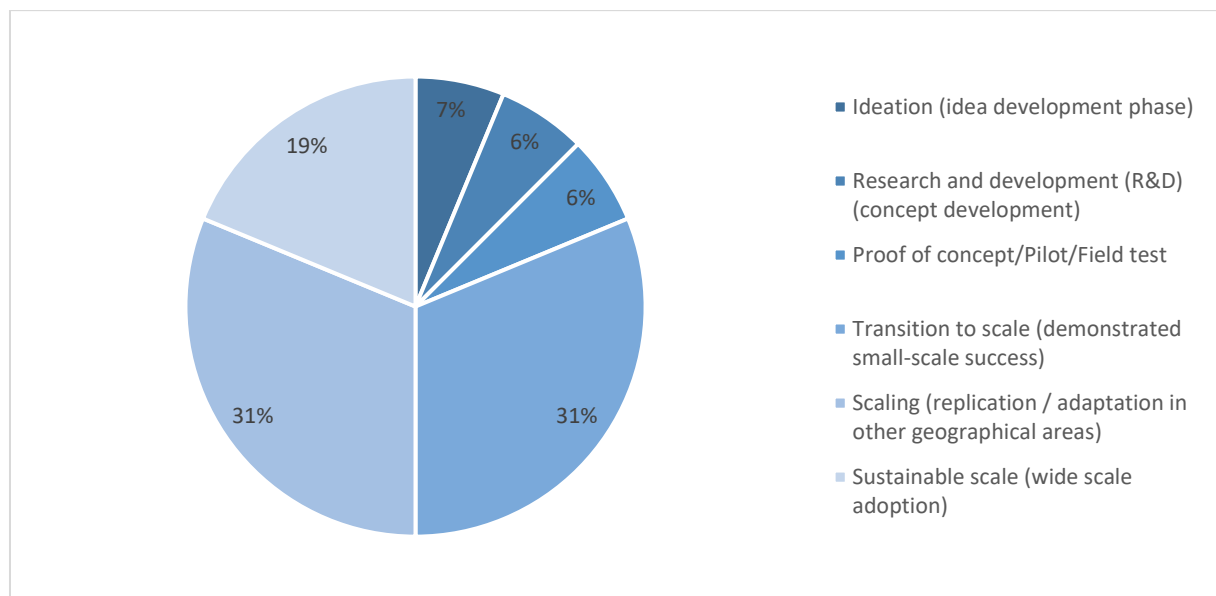


FIGURE 11 SCALING STAGES FROM SURVEYED INNOVATIONS IN ZIMBABWE

Innovators have different definitions of what it means to have achieved a sustainable scale. The International Development Innovation Alliance (IDIA) says that reaching sustainable scale means having “the wide-scale adoption or operation of an innovation at the desired level of scale / exponential growth, sustained by an ecosystem of actors”. Yet not all innovations who see themselves as sustainable meet this definition.

The Mukuru App (launched in 2019) is reported to be at a sustainable scale, with 1,000,000 registered users, half of which are active. They do not require any subsidies or donor support to sustain the innovation as funding is achieved through transaction fees. Yet, eMKambo (launched in 2012) has 1.8 million subscribers, with over 800,000 active users and still describes itself as scaling (replication / adaptation in other

geographical areas). They are unsure as to whether they require subsidies or donor support to continue to sustain the innovation and mentioned that their sources of revenue to support the innovation are individual subscription fees, business subscription fees, advertising, data monetization and premium services.

Interestingly, Vaya Tractor is noted as being at a sustainable scale (wide scale adoption), despite only having 140 registered users (100 active). They are unsure if they require any subsidies or donor support to sustain the innovation.

For innovations in Zimbabwe only, GeoFarmer mentioned that they reached a sustainable scale and do not require donor funding, but they did not answer the question about the number of registered users. 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, they still require subsidies or donor support to continue at a sustainable scale.

The Food Processing Software by Matrix Software, the oldest innovation noted (launched in 2002), 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).

Zimbabwean companies rely heavily on business subscription fees (10), followed by transaction fees (6) and individual subscription fees (6). Agrishare also noted that they receive a commission of 10% of transaction fees that constitute the app's revenue. The heavy reliance on subscription fees is in contrast with the high number of primary end-users being farmers (12).

Most innovations used financial support from business development support (9), training opportunities (8) and friends and family (5). Donor grants (governments/foundations) were also mentioned as financial support received (5). Looking at the need for any subsidies or donor support to continue to sustain the innovation, four innovations did not need any further subsidy or grant, while eight others were unsure. Four still require additional funding.

INCLUSIVITY

Not all innovations focused on inclusiveness. A few innovations took explicit action to reach women (3), persons with limited literacy (3), the elderly (3) and smallholder farmers (2). Nine innovations mentioned that their technology is already inclusive of women and poor farmers, with eight reporting the same for the elderly. No specific action was taken for people with disabilities by nine innovations, followed by those with limited literacy (6). Finally, the technology is generally accessible for most minorities, with only one, respectively, mentioning their technology may not be fully inclusive of people with disabilities, women, the elderly, poor farmers, and those with limited literacy.

4 DIGITAL AGRICULTURAL SYLLABI AND ENTREPRENEURSHIP TRAINING

The World Bank’s latest diagnosis of [Zimbabwe's digital economy](#) concluded that Zimbabwe faces a critical digital skills gap despite the solid foundation for digital skills development. Zimbabwe is among the top ten most literate countries in Africa. Over [88% of adult women and men](#) can read and write. The 2016 National ICT Policy declared that the number of personnel with ICT qualifications is not adequate for the country, and there is no standardized national ICT training certification. The policy highlights the need to integrate ICTs in the education curricula starting from early childhood education level as well as promote ICT uptake within communities. In particular, the policy strategies for digital skills development include:

- Work with relevant institutions and Government departments to develop programs that increase ICT human resource capacities and skills.
- Facilitate the deployment and exploitation of ICTs in the educational system from primary school upwards. Work with the relevant Ministries to include ICT training and education in schools, colleges, and universities.
- Provide equitable access to ICT enabled education and training in all parts of the country, including disadvantaged communities (promote e-learning and use of e-learning materials throughout Zimbabwe).
- Make use of the Universal Services Fund (USF) to boost connectivity for remotely located schools, to facilitate the e-Learning Program.
- Encourage, promote, and apply research and development of ICTs in society.

The Zimbabwe National Research and Education Network (NREN) is represented by ZARNet (Zimbabwe Academic Research Network) and ZIMREN (Zimbabwe Research and Education Network). ZARNet and ZIMREN are the internet service providers for academia, government, schools, universities, colleges, and other research or training institutions. ZARNet is involved in a 1,300 schools connectivity project, whilst ZIMREN is prioritizing the establishment of communication network services including broadband inter-connectivity between participating institutions, and to other networks in Africa and globally. NRENs are fundamental for the building of internet connectivity infrastructure to support the digital agricultural economy.

4.1 AGRICULTURAL SYLLABI UNIVERSITIES

The study team approached seven Agriculture Universities and requested them to complete the survey or participate in KIIs:

- Africa University
- Bindura University of Science Education
- Lupane State University
- Midlands State University
- University of Zimbabwe
- Great Zimbabwe University
- Women’s University in Africa (WUA)

The Africa University and the Women’s University in Africa (WUA) responded to the survey and participated in KIIs. Midlands State University and Lupane State University both responded to the survey but noted that they did not teach digital skills.

AFRICA UNIVERSITY - DEPARTMENT OF AGRICULTURAL SCIENCES

The Department of Agricultural Sciences of the Africa University in Zimbabwe offers various onsite and online trainings since 1999. Regarding the levels of these digital trainings' implementation, all of them are delivered at B.Sc. level. As for digital agriculture, the University declared to teach just digital entrepreneurship in agriculture. The digital entrepreneurship training courses focus on e-extension and ICT-enabled advisory services. Students are equipped with skills to launch an enterprise and work in advancing research (PhD, research institutions, others, etc.). Africa University considers equipping young people in Data Collection and Digital Advisory to be important in facilitating their absorption into Zimbabwe's current agricultural labor market sector. Experimental farms and ICT Laboratories are considered the most important facilities for digital training.

COMPLEMENTARY INFORMATION FROM THE KII - AFRICA UNIVERSITY

The Africa University of Zimbabwe moved courses online before Covid-19, but the pandemic accelerated the process. The Faculty of Agriculture operates a farm which supports practical education where farm records are digitized, and the department is moving to establish an online store for the Africa University farm products.

During the January - June 2020 semester, the Department of Agricultural Sciences administered online exams. For the August – December 2020 semester, the department has been teaching fully online up to January 2021. The University has a functional intranet and Wi-Fi is campus-wide, covering the main campus buildings. Student dormitories are covered by Wi-Fi to enable them to have access to the internet. Students in different time zones could access the Moodle learning management system during the pandemic. However, students needed to shift mindset as they are used to face-to-face teaching and there are limitations in replicating the practical aspects of agriculture online. High data costs are also one challenge that the University is facing in the digital transformation.

All students take an Introduction to Information Technology course, and it covers general IT skills including Microsoft Office programs and computer essentials. Data Collection and Data Science is taught through the Research Methods course. Students are taught to use data analysis programs like minitab, GenStat and SAS. During the 4th year, students take a course called Farm Management. They are taught how to handle farm records in addition to advanced Microsoft Excel Skills. The department is also providing digital advisory support to farmers through WhatsApp where farmers can send images of infested crops as a query. Digital agriculture is integrated into several courses taught by the department such as entrepreneurship and farm management courses.

There is a specific course on entrepreneurship and the students learn how to write business plans among others. The university has set up the piggery initiative to support student projects, enabling them and other participants to buy inputs for their piggery projects. The department is planning to establish a fund to support a diverse range of innovative agricultural student projects and ideas.

WOMEN'S UNIVERSITY IN AFRICA (WUA)

The Faculty of Agricultural Sciences of the WUA offers various onsite and online digital trainings. Regarding the levels of these digital training's implementation, all of them are delivered at B.Sc. level. WUA is yet to offer advanced digital skills training. As for digital agriculture, the faculty declared that they did not teach any of these courses currently, but they teach General IT skills and Data Intelligence and they plan to work with the ICT department to record videos e.g., a video demonstrating Artificial Insemination. The digital entrepreneurship training courses focus on Digital Content Creation and are yet to offer the advanced digital

skills training such as digital advisory, smart farming, and others, where students are equipped for launching an enterprise and working in advancing research (PhD, research institutions, others, etc.). According to WUA, young people equipped in Data Collection will be easily absorbed into Zimbabwe's current agricultural labor market sector. WUA declared that during the second year all students follow the Entrepreneurship and Small Business Development course. The course emphasizes that farming must be treated as a business. Students are guided on how to start their own Agri Entrepreneurial projects. WUA has an incubation center/innovation hub that serves as a farm to help students pilot their projects. WUA is planning to build an agro-industrial park.

COMPLEMENTARY INFORMATION FROM THE KII - WUA

Established in 2002 and located in Marondera, WUA multi-campus are connected to each other and have access to the intranet. Computer labs are available for students and the staff members are provided with data bundles to be able to do their work from anywhere.

All first-year students do a basic computer literacy course. WUA has a farm that acts like an innovation hub to mentor students in the selection of their entrepreneurial ideas, provide access to machines (e.g., milking parlor, processors for milk products, etc.) and space to implement students' research activities.

The e-learning platform is covering WUA's total program portfolio despite a perceived gap in teaching courses like conservation farming.

TABLE 7 OVERVIEW OF RESPONSES FROM SURVEYED UNIVERSITIES IN ZIMBABWE

ZIMBABWE UNIVERSITIES	
Africa University of Zimbabwe	
Digital Agri Skills	Digital entrepreneurship in agriculture
Digital training courses updated	Yes
Digital entrepreneurship trainings	E-extension ICT-enabled advisory services
Type of Skills building	Launching an enterprise Working in advancing research (PhD, research institutions, others, etc.)
Most important digital Agri skills	Data Collection Digital Advisory
Most important facility for digital trainings	Experimental Farms ICT Laboratories
Aligned with institutional strategy	Yes, with the AU ICT Policy
Women's University in Africa (WUA)	
Digital Agri Skills	Digital entrepreneurship in agriculture (Entrepreneurship and Small Business Development course)
Digital training courses updated	Unsure
Digital entrepreneurship trainings	Digital Content Creation
Type of Skills building	Launching an enterprise Working in advancing research (PhD, research institutions, others, etc.)
Most important digital Agri skills	Data collection
Most important facility for digital trainings	None
Aligned with institutional strategy	Unsure

4.2 INCUBATORS AND INNOVATION HUBS

The study team mapped eight business support organizations in Zimbabwe, out of which five operate in the agricultural sector.

The general business support organizations without focus or activity in the agricultural sector that have been identified are [Stimulus Africa](#), [B2C Coworking](#) and [Muzinda Hub](#). For these organizations no evidence of trainings and incubation activities dedicated to agricultural entrepreneurs was found and therefore they were not targeted for the KIIs.

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

- [Impact Hub Harare](#)
- [Tech Hub Harare](#)
- [TechVillage Innovation Hub](#)
- [Farm Export Incubation and Training Hub \(FEITH\)](#)
- [Green Innovation Hub \(GiHUB\)](#)

A total of **four** business support organizations responded to a request to take part in a KII.

TECHVILLAGE INNOVATION HUB

Established in 2016, TechVillage is an innovation hub and collaborative working space designed to provide resources, a community, and the optimal working environment for entrepreneurs. The hub is self-funded and runs an incubation program, trains startups in investment readiness and has supported four agricultural startups (Farm Hut, Infarma, Farm Box, Eden Research) in Zimbabwe to date. The digital skills training within the TechVillage Innovation Hub program portfolio includes e-commerce, cloud technologies, marketing, social media management, digital payments, digital systems for invoices, records, online processes, legal contracts (general management) and content management (WordPress). The trainings are designed for students, graduates, and aspiring entrepreneurs. Access to market data for farmers, exploring e-commerce solutions for value chain and aquaponics (smart farming with sensors) are some of the digital agricultural topics discussed during the incubation program. TechVillage Innovation Hub collaborates with the National University of Science and Technology to incubate and train students.

THE GREEN INNOVATION HUB

The Green Innovation Hub (GIH) is a non-profit project embedded within the Development Reality Institute, a not-for-profit organization focused on climate change, sustainable development, energy, and other areas. The incubator produces innovative ideas to solve major issues related to sustainable energy and climate change since 2015. The best innovators and entrepreneurs selected through competitions receive grants to upscale their projects during a bootcamp.

GIH provides basic digital trainings to students, graduates, early stage/young and aspiring entrepreneurs. GIH also links farmers with markets and with existing digital applications. To date, three agricultural startups have been supported by the GIH (such as *Agri Marine Solution*; a solution that uses digital processes for fish farming/aquaponics). To promote digital entrepreneurship in Zimbabwe, GIH designed training courses on coding, mobile application design and monetization of digital content. Regarding digital agriculture, they refer to some technologies such as Digital Advisory, Agri-e-commerce, and Smart Farming, but they do not teach them directly. The youth are encouraged to pursue access to this knowledge on their own. GIH works closely

with the Zimbabwean Ministry of Environment and collaborates with the University of Zimbabwe, Great Zimbabwe University, Chinhoyi University of Technology and Midlands State University.

TECH HUB HARARE

Tech Hub Harare is an organization operating as an incubator since 2020 and as a coworking space since 2018. The Hub provides support to startups through masterclasses (artificial intelligence, machine learning, etc.), mentorship and partnerships facilitation. They provide digital agricultural trainings to graduates, young agricultural entrepreneurs and aspiring agricultural entrepreneurs. They have incubated three projects in the agricultural field to date and these are: Umojaland (digital platform for renting and leasing of land for farming), Wanamai (platform to buy and sell farm products) and Lancreek (IoT device for farmers to measure water, soil contents and yields). General digital trainings for youth are provided at the beginning of the incubation phase, such as basics in accounting, financing, sales and marketing, intellectual property, the use of AI/machine learning, team creation, hiring, SEO trainings and how to grow business and market strategies in the digital space. Regarding digital agriculture they include trainings on Digital Advisory, Agri Digital Financial services, Agri e-commerce, and Smart Farming. These trainings are delivered by the incubator, but they also collaborate with external individuals for the masterclasses. They currently do not collaborate with colleges nor Universities.

FARM EXPORT INCUBATION AND TRAINING HUB (FEITH)

The Farm Export Incubation and Training Hub (FEITH) nurtures, equips, and links smallholder farmers and agricultural startups with high value markets. It focuses on the export of flowers, peas, avocado, groundnuts, and chili by linking farmers and buyers. These exports go to South Africa, the Netherlands, and United Kingdom. FEITH focuses on helping farmers to find markets and it has supported 230 agricultural enterprises to date. Most of the enterprises are still informal since FEITH’s establishment in 2019 (having been set up during the pandemic). The general digital trainings provided for the target beneficiaries are market analyses through digital tools. Online platforms are available for agricultural entrepreneurs to use to analyze the market, get in contact with buyers, learn about exports, know which country is importing crops and review prices and trends. Social Media is being used to sell the products. The digital trainings are designed for graduates and aspiring agricultural entrepreneurs. In the area of digital agriculture, FEITH teaches Digital Advisory (such as soil testing, pest control management, post-harvest management and others) and e-commerce. FEITH is about to launch the FARMIO platform, where farmers can express an interest to supply a particular demand. The targets of these trainings are graduates and aspiring agricultural entrepreneurs (mostly farmers). FEITH collaborates with the University of Zimbabwe and the Department of Research and Specialist Services of the Ministry of Agriculture.

TABLE 8 OVERVIEW OF RESPONSES FROM INTERVIEWED INCUBATORS IN ZIMBABWE

ZIMBABWE INCUBATORS	
Tech Hub Harare	
Year of Establishment	2018
Agri start-ups incubated	3
Target of Digital Agri trainings	Graduate Young agricultural entrepreneurs Aspiring agricultural entrepreneur
Digital Skills trainings	AI/machine learning SEO trainings Business and market strategies in the digital space

Digital Agri Tools taught	Digital Advisory; Agri Digital Financial Services; Agri-e-commerce; Smart Farming
Collaboration with Universities and Colleges	None
Supported by the Government?	No
The Green Innovation Hub	
Year of Establishment	2015-2016
Agri start-ups incubated	3
Target of Digital Agri trainings	Students, Graduate; Early stage/Young agricultural entrepreneur
Digital Skills trainings	Coding, mobile app design and monetization of digital content.
Digital Agri Tools taught	Digital Advisory; Agri-e-commerce; Smart Farming
Collaboration with Universities and Colleges	University of Zimbabwe; Great Zimbabwe University; Chinhoyi University of Technology; Midlands State University
Supported by the Government?	No
TechVillage Innovation Hub	
Year of Establishment	2016
Agri start-ups incubated	4
Target of Digital Agri trainings	Student; Graduate; Young g agricultural entrepreneur
Digital Skills trainings	E-commerce cloud; technologies marketing; social media management; digital payments; digital systems for invoices records; online processes, legal contracts; Content management (WordPress)
Digital Agri Tools taught	Digital Advisory; Digital Procurement; Agri-e-commerce; Smart Farming
Collaboration with Universities and Colleges	National University of Science and Technology
Supported by the Government?	No
Farm Export Incubation and Training Hub (FEIT)	
Year of Establishment	2019
Agri start-ups incubated	230
Target of Digital Agri trainings	Graduate Aspiring agricultural entrepreneurs
Digital Skills trainings	Digital market analysis social media
Digital Agri Tools taught	Digital Advisory. Agri-e-commerce
Collaboration with Universities and Colleges	University of Zimbabwe
Supported by the Government?	No

5 INSIGHTS AND REFLECTIONS

The following section outlines the key insights from the data collection of this 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

Zimbabwe ranked seventh 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. Zimbabwe ranked in a range of positions for most pillars but ranked highest, third, for digital skills (which identifies 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). Zimbabwe ranked lowest, thirteenth, for digital business (which identifies the development of a robust marketplace for digital trade, digital financial services, and digital content).

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. Zimbabwe makes up part of Group 3, these countries ranked in the middle of the benchmark and tend to be more reliant on agriculture for employment and economic growth.

POLICY ENVIRONMENT

The benchmark assessment suggested that Zimbabwe's digital economy is in transition, and it seems that there is a lot in the pipeline in terms of development of policies, strategies, and legislation. Zimbabwe has a small number of general policies and legislation relating to technology and digitalization that have been difficult to obtain.

There is a low number of policies, strategies and legislation governing the innovation space with regards to digital technologies that can be applied to the agriculture sector. This is not too concerning as policies tend to lag innovations and it seems that the Government of Zimbabwe is preparing several master plans, strategies, and legislation to fill the gaps that currently exist. Care should be taken to ensure that priority is placed on frameworks that provide protections for businesses and citizens. Digitalization has been actively embraced in Zimbabwe's general strategies, but effort should be made to provide a clearer mandate on how technologies are best incorporated into the agriculture sector and balance the trade-offs involved in greater digitalization.

The possibility for Zimbabwe to incorporate digitalization within the agricultural sector and value chain is plentiful. There is desire and drive from leadership to prioritize and stimulate the agricultural economy and to actively embed digital technologies within the economy. Challenges remain though in the sector, affected by lack of access to capital, shortage of ICT skills and low investment in Research and Development (R&D). For smallholder farmers the challenges and poor penetration of innovation and technologies is down to limited infrastructure, high access costs and low digital literacy levels.

DIGITAL AGRICULTURE INNOVATIONS

There were 35 innovations identified in Zimbabwe during this study. The most popular use cases in Zimbabwe were digital advisory, followed by agri e-commerce and digital procurement. Innovations targeted a wide range of outcomes predominantly addressing knowledge gaps, poor access to markets and low productivity. The major challenges they experienced in the application of their technology was the lack of digital literacy in their target customers and encouraging farmer uptake and behavior change. There were also factors such as lack of access to devices, operational constraints, and data collection issues. A lack of digital literacy is a common theme across the SADC region and highlights the strong need to focus on this going forward.

Zimbabwe's moderately developed digital economy is evident by a high number of innovations saying they use websites / dashboards / portals to transmit or store data and information, followed by Smartphone apps (and SMS). For data analysis these same innovations use spreadsheets as the most popular tool, followed by cloud-based databases. These findings show the importance in improving internet access across the country, accessibility to devices and digital literacy to enable farmers to really benefit from the existing and future digital innovations in this sector.

Most innovations in Zimbabwe used financial assistance from business development support, training opportunities and friends and family to support the innovation. Donor grants were also mentioned as financial support. No support from Angel investors, challenge prizes and incubator or accelerators suggest an undeveloped market in this area and something to be considered for future capacity building and funding opportunities.

DIGITAL AGRICULTURAL SYLLABI AND ENTREPRENEURSHIP TRAINING

According to the World Bank ([Digital Economy for Zimbabwe: Country Diagnostic Report](#), 2021), digital entrepreneurship is a nascent but growing area in Zimbabwe. Limited access to market data, onerous regulations, limited access to startup capital, and a complex tax regime for entrepreneurs are some of the challenges facing Zimbabwean digital entrepreneurs. Policies to support the role of digitalization in agriculture need to be promoted so that they can promote digital entrepreneurship development within the country and support the business service providers who declared that they did not receive any support from the government. While the incubator and innovation hub space seem to have integrated digital agriculture trainings in their curricula, Universities still lack adequate preparation and funds to prepare students to acquire new skills in digital agriculture and create new business opportunities in the current labor market. For this purpose, Universities declared the need to be supported in the following areas:

- Equipment support such as computers and data collection equipment (e.g., soil analysis equipment, toxicological equipment, weather analysis equipment and drones).
- Deployment of e-advisory platforms to support agricultural extension services.
- Development of trainings to champion the development of digital agricultural skills for students.

- Access to seed funding to nurture innovation hubs in agricultural departments, colleges, and universities.

For the incubators interviewed, CCARDESA and other international partners could better support the development of digital skills for agricultural youth entrepreneurship in the SADC region in the following ways:

- Support in identifying the opportunities in the digital agriculture sector by developing training manuals for these skills and improving the technical skills of trainers within the local context.
- Help farmers to integrate the digital tools to promote best practices in terms of farming techniques and new crops (e.g., tobacco is a crop in Zimbabwe that is destroying the soil, while spices or cashew nut crops would need to be encouraged).
- Develop the access to new digital channels for farmers, since the USSD (unstructured supplementary service data) seems to be the most common tool used by the farmers.
- Equip the incubators and innovation hubs with appropriate equipment and address the students' lack of advanced equipment for learning and research.
- Bring together the stakeholders for discussions and make them aware about these needs so that a common solution can be agreed upon.
- The Zimbabwe NREN, represented by ZARNet and ZIMREN require continued support from the Government of Zimbabwe to build internet connectivity infrastructure and services that will promote agricultural digital entrepreneurship and advanced agricultural digital literacy.

5.2 REFLECTIONS FROM THE SITUATIONAL ANALYSIS

This document has presented the available data collected for Zimbabwe 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 Zimbabwe include:

- **The most common challenge that survey respondents encountered was digital illiteracy levels of their users.** If farmers have limited access to digital solutions or are unable to use them, because they lack digital skills, further uptake is likely to be significantly impeded. Low digital literacy hinders the adoption of new technologies, especially in an aging rural population. Innovators should be encouraged to take deliberate actions to ensure innovations are inclusive of those with lower digital literacy and lower literacy levels to enable both a raised awareness of the benefits of digital agricultural innovations but also to enable their use.
- **The development of strong campus networks and the strengthening of National Research and Education Networks are key to fostering higher education institutions and innovation hubs to effectively provide all types of digital services for teaching, digital agricultural training, digital agricultural entrepreneurship, and advanced research activities.** In the field of digital agriculture,

mutual learning will be significantly enhanced by providing complementary expertise where it is lacking and sharing IoT/precision agriculture equipment for students and entrepreneurs.

- **It is important to boost the digital agriculture entrepreneurship sector through the acquisition of advanced skills in the space and an alternative model of sustainability for the incubators (especially those who are not supported by the government).** Involving the private sector through regional or local agriculture/digital agriculture companies might offer internships for students and help aspiring entrepreneurs to acquire new skills. Additionally, it 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).
- **Government has a role in improving access to the digital communication channels for the population and farmers.** This will go some distance in preparing the market demand for new solutions and enable farmers to exploit the opportunities. 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 access to these services and promote entrepreneurship.

REFERENCES

- ¹ World Bank (2020) [Population, total | Data](#)
- ² UNDP (2020) [Human Development Indicators | Zimbabwe](#)
- ³ Ibid.
- ⁴ World Bank (2020) [GNI Per Capita, PPP \(current international\\$\) - Zimbabwe](#)
- ⁵ UNDP (2020) [Human Development Indicators | Zimbabwe](#)
- ⁶ World Population Review (2021) [Poverty Rate by Country](#)
- ⁷ African Union (2020) [Digital Transformation Strategy for Africa](#)
- ⁸ OECD (2019) [Going Digital: Shaping Policies, Improving Lives](#)
- ⁹ UNDP (2020) [Human Development Indicators | Zimbabwe](#)
- ¹⁰ GSMA (2021) [Mobile Connectivity Index | Zimbabwe](#)
- ¹¹ UNDP (2020) [Human Development Indicators | Zimbabwe](#)
- ¹² The Inclusive Internet Index (2021) [Overall rankings](#)
- ¹³ GSMA (2021) [Mobile Connectivity Index | Zimbabwe](#)
- ¹⁴ World Economic Forum (2018) [GCI Profile | Zimbabwe](#)
- ¹⁵ World Bank (2019) [GCI 4.0: Digital Skills Among the Population Index](#)
- ¹⁶ ReSAKSS Annual Trends and Outlook Report (2020) [The Enabling Environments for the Digitalization of African Agriculture](#)
- ¹⁷ OECD (2019), [Regulatory effectiveness in the era of digitalization](#)
- ¹⁸ Forbes (2018) [Law is Lagging Digital Transformation – Why It Matters](#)
- ¹⁹ International Development Innovation Alliance (2017) [Insights of Scaling](#)



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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