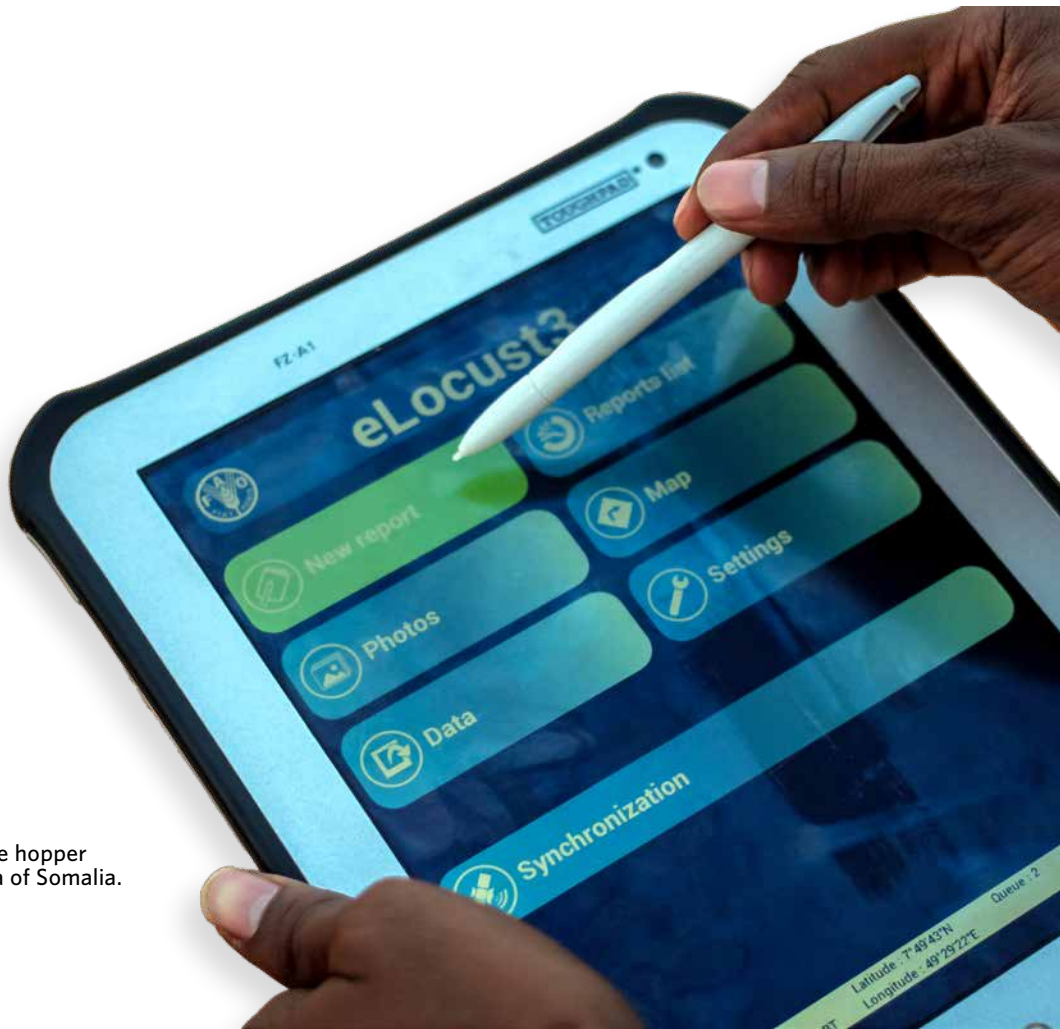
Food and Agriculture Organization of the United Nations

Digital innovation strategy

for agrifood systems in Africa

Abridged version

2021–2025



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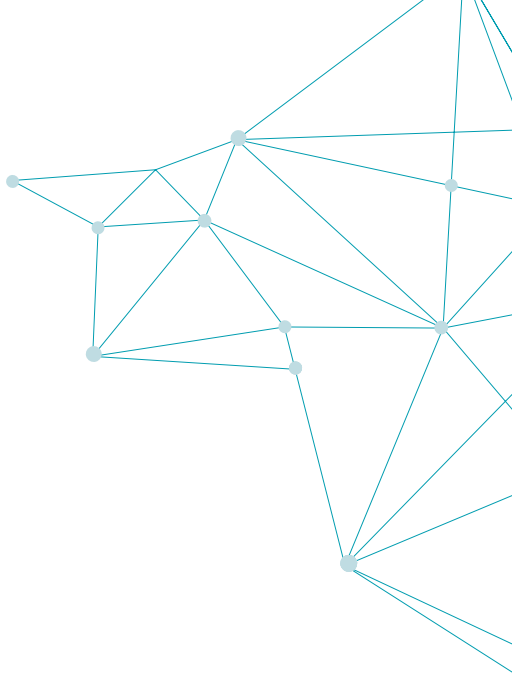
The eLocust3 app is used to trace hopper bands of locusts in a remote area of Somalia.



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Executive summary

Achieving Zero Hunger, defeating poverty and accelerating sustainable inclusive growth are key objectives pursued by the African continent, particularly in the framework of the UN Agenda 2030 and the African Union Agenda 2063. However, the region has been facing persistent challenges resulting in high levels of food and nutrition insecurity, rampant poverty, environmental threats, underperformance of the agrifood sector, unemployment and under-employment for young (male and female) people, especially in rural areas. Addressing the challenges and seizing the available opportunities require news skills, capabilities and product development, which notably involves strongly anchoring digital technologies in all business processes.

Falling costs of digital technologies and their popularisation are driving innovations to develop solutions to improve the productivity, incomes and resilience of farmers and food systems. This includes the building of more adaptive and agile value chains through use of data, leveraging the power of satellite observation and geodata to address pest and disease threats; the development of novel solutions for supporting farmers' social protection; and the enhancement of traceability systems applied to food products from farm to fork. The COVID-19 impacts have demonstrated even more the need to mainstream digital solutions in agrifood business, policy and development programme implementation processes.

To harness the opportunities of digitalization for agriculture and related sectors and increase benefits for the value chain actors, the FAO Regional Office for Africa (RAF) has developed a Digital Innovation in Agrifood Systems Strategy (Digital Innovation Strategy). It proposes interventions to support the RAF's **Programme Priority Areas.** The programme areas support the three **African Regional Initiatives** (Africa's Commitment to End Hunger by 2025; Sustainable Production Intensification and Value Chain Development in Africa; and Building Resilience in Africa's Drylands).

These priorities and initiatives are in line with the *Four Betters* established in the new FAO Strategy Framework: Better Production, Better Nutrition, a Better Environment and a Better Life.

The Digital Innovation Strategy ambitions to foster improved use of sustainable and inclusive digital solutions to deliver agriculture and food systems transformation in Africa.

Three strategic pillars are proposed:

- **INSIGHT** – Promote better informed development through insights from quality data, and encourage governments to use improved data and analysis as evidence for agricultural and food system development planning and SDG reporting.
- **INTERACT** – Enhance RAF's internal digital interventions for programming food systems transformation and improving interactions with development stakeholders.
- **IMPACT** – Develop local digital innovation ecosystems, enabling environments and capacity, to deliver scalable inclusive solutions for SDG impacts.

To accelerate the needed digital transformation, FAO intends through this framework to support the development process at country level, using digital and data platforms to inform and assess agricultural and rural development interventions; deliver development outcomes drawing on existing and new digital solutions; and work with governments and partners to develop a local digital ecosystem, enabling environment (for example through digital agriculture or e-agriculture strategies) and partnerships. Upskilling digital capabilities in RAF will be a critical springboard for achieving these objectives.

Digitalization in agriculture is not without its challenges, since less than 25 percent of individuals in sub-Saharan Africa use the internet (World Bank, 2019). According to the International Telecommunication Union (ITU), across Africa, there is a penetration rate of 33.8 percent for men and 22.6 percent for women. The gender gap has grown from 20.7 percent in 2013 to 33 percent in 2019. It is therefore important to ensure digital access to the rural poor, particularly women, through adequate use of the internet and mobile infrastructure as well as rural digital literacy.

This Digital Innovation Strategy will provide increased opportunities for young farmers and entrepreneurs to use and offer sustainable digital solutions for agriculture. The implementation of the Strategy will involve key FAO corporate programmes such as the **Digital Villages Initiative** as well as the **Hand-In-Hand Initiative.**

FAO will promote effective digital agriculture partnerships, linking entrepreneurs with investors and value chain actors, establishing strategic and operational partnerships with international organizations, including the African Development Bank (AfDB), the European Union, the International Fund for Agriculture Development (IFAD), ITU, the United States Agency for International Development (USAID), the World Bank, as well as bilateral partner organizations (AFD, ENABEL, GIZ, JICA, etc.). Collaboration will also be nurtured with key local ecosystem actors, such as large agribusinesses, agricultural cooperatives, digital centres of excellence and local innovation hubs.

There is already a significant level of resources invested in digital solutions across FAO, but more technical and financial support will be required for the implementation of activities in the strategy.

This document is a result of a consultative process in-house and with key partners as well as a detailed literature review.

1 BACKGROUND

1.1 Overview of the development context

The onset of the COVID-19 pandemic and the negative impacts of the related containment measures have worsen the economic and food security situations in Africa. While the continent had been recording positive growth rates for the last three decades, it recorded a negative growth rate in 2020 (about -2,4 percent decline on average, according to the World Bank and the AfDB) as it was hard hit by the consequences of the health crisis. Food security and malnutrition have deteriorated as well: globally, an average of 118 million more people were facing hunger in 2020 than in 2019, a large share of them residing in sub-Saharan Africa (FAO, 2021).

Climatic shocks and natural hazards severely affected many countries on the continent these recent years. The desert locust invasion has affected agricultural production, particularly in the Eastern African subregion. In countries in Southern Africa such as Zimbabwe, cyclones Idai and Chalane as well as prolonged drought and floods also contributed to deteriorating food security as well as the performance of the agriculture sector. The latest Intergovernmental Panel on Climate Change (IPCC) report published in 2021 warned that climate change is worsening, stressing the importance of accelerating the devise and implementation of bold adaptation strategies.

The growth and performance of the African agriculture remain constrainted as well by slack of agricultural productivity, market weaknesses and weak support to women engagement in the sector, despite progress being made. Crises affecting agriculture require better understanding, communication, forecasting and flexible responses in food systems to ensure increased resilience. Lack of access to data is hindering countries and development partners in making informed decisions on agricultural and food systems support and the private sector and entrepreneurs in developing solutions that will transform agriculture and food systems for the rural poor.

Signs of hope, however, abound as well. Productivity has been increasing in recent years. The African Continental Free Trade Agreement (AfCFTA) has entered into force, providing the opportunity to strengthen an African market of 1.2 billion people with a combined GDP of USD 2.5 trillion. From another perspective, while until recently it was commonly stated that the average age of the African farmer is around 55 years or 60 years, research by IFAD illustrated that this average is, or has moved down to, around 34 years, [1] illustrating a rejuvenation of the African agriculture (IFAD, 2019; Rural 21, 2020). It can therefore be expected that more innovations (process and product innovations pertaining to all activities, including but not limited to the digital sector) will progressively pour into the agrifood systems, if conducive environments are established.

1.2 The role of digital innovation

Access to digital technologies is increasing on the continent despite challenges such as high mobile data costs, poor infrastrcture and lack of digital literacy. ITU has estimated that there is a penetration rate of 33.8 percent for men and 22.6 percent for women across Africa. As a matter of fact, the gender gap has grown from 20.7 percent in 2013 to 33 percent in 2019 (ITU, 2019).

Currently, the average percentage of internet users in Southern Africa is 30.7 percent, an increased figure compared to that of some years ago. Mobile phone coverage, involving in many cases the use of smartphones even by smallholder farmers and

[1] Research conducted in 13 countries. Another study has shown that this average age range stands between 32 and 30 years.

young farmers, stands for example as follows: Kenya (103.77 percent), Ghana (90 percent), Cote d'Ivoire (87 percent), Tanzania (82 percent), Rwanda (76 percent), Uganda (57 percent) and Burundi (56 percent); even though other countries have less than 50 percent coverage, like Djibouti (42.5 percent) and South Sudan (20 percent).There are even trials of latest mobile connectivity technologies such as 5G in Lesotho, Rwanda and South Africa (FAO and ITU, 2021).

Falling costs of digital technologies, including mobile communications, computing power, Big Data and Artificial Intelligence are driving innovations in research and development of fresh solutions to improve incomes and resilience of farmers and food systems. This includes leveraging the power of satellite observation and geodata to produce early warning systems for pest and disease threats, and the development of novel solutions for supporting social protection. Many of the challenges in the region are being addressed by digital innovation, contributing to building more adaptive and agile value chains through collection of data and flexible applications. Armyworm and locust tracking, and predictive forecasting have ensured better pest management. E-commerce applications have addressed issues in supply and access to market in the light of COVID-19 restrictions. A further example is how digital financial inclusion is now reaching people who were previously unbankable due to their remote geographical location or mobility. New non-traditional sources of data are being investigated, such as data from mobile phones, combined with remote-sensing data to bring insights in Uganda[2].

The **digitalization of the African agriculture** has thus been expanding, including in rural areas, even though much progress still need to be made. In 2019, CTA and Dalberg identified 390 operational digital platforms spaning various use cases in Africa: advisory services, market linkages, financial services, supply chain management, macro-intelligence services (CTA, 2019). In the framework of the production of a Digital Agriculture Toolkit by FAO and AfDB in 2021, some additional platforms were identified, raising this number to 461. Some other platforms have been identified by the GSMA in a recent report (GSMA, 2020). All these platforms are produced and operated by international mobile network operators present on the continent, digital entrepreneurs, development organizations and governments as well. Digital applications are being used to improve value chain efficiency and attract youth engagement in the agriculture sector.

The 31st session of the FAO Regional Conference for Africa, held in October 2020, focused on innovation and digitalization to achieve the SDGs. This resulted in specific recommendations for Africa Technology and Digital Innovations for Accelerating the Modernization of Sustainable Food Systems. It is noted in the highlights of the conference that:

> Technology and digital innovations offer an important mechanism to incentivize youth to be involved in agrifood systems. The adoption and integration of ICTs across the globe has reduced information asymmetries and transaction costs, improved service delivery, generated new income streams and helped conserve resources. ICTs have the potential to transform youth's perception of the broad agricultural sector into a positive and fruitful source of job opportunities.[3]

The recommendations also emphasized that digital innovation needs to be supported through institutional, national, and international policies and **openness of data and necessary frameworks.** If we push for openness of data without adequate emphasis on the governance frameworks, it will not be sustainable. The conference recommended that FAO seek to create a **Digital Innovation Ecosystem**, which will bring together United Nations experts, young entrepreneurs, public sectors, researchers and civil societies to find innovative joint solutions that address the global challenges in the food and agriculture

[2] FAO Uganda project with DIAL, Dahlberg data and MTN.

[3] http:/www.fao.org/3/nc577en/nc577en.pdf

sector. These would need to be gender-responsive and sensitive. Key areas of actions identified by the conference are: **digitalization of agriculture and applications, support to evidence-based development policy** and **enabling environment.**

As digitalization has helped to provide effective response to the COVID-19 pandemic, many governments in Africa are increasingly looking for ways to hone their digital transformation, e-agriculture (or digital agriculture) strategies and their implementation. It is key to work with an inclusive approach, drawing on the recent brief on gender and ICTs and adopting the digital principles[4] supported by other UN agencies.

Similarly, promoting **viable business models** for digital agriculture service delivery, especially regarding services offered by entrepreneurs, is now crucial to favour scaling-up of initiatives and sustainability. Digital interventions and support developed for agrifood system transformation need to consider a holistic approach. Often a bundled solution will be used to support a value chain, for example, involving farmer registration, input support, access to markets and access to finance. These applications may build components that are of use to the digital innovation ecosystem, for example an e-extension system may mean a USSD system is setup that could be used for linked services from another project. Applications implemented to address one priority area such as supporting an inclusive value chain may support resilience with the addition of climate action advice. There is a need to pay particular attention to the types of interventions needed to enable an inclusive and participatory digital inclusion approach.

The Strategy will build on provisions of the **Digital Transformation Strategy for Africa** developed by the **African Union**, which has identified, among others, enabling policies and strategies, digital innovation and entrepreneurship as well as capacity-building as key area of focus for economic transformation. Other strategic frameworks such as the International Platform for Digital Food and Agriculture, led by FAO and the European Union, and African Union digital cooperation initiatives offer opportunities for fruitful collaborations.

1.3 Overview of FAO experiences in digital agriculture in the Africa region

For decades, FAO has been faciliting the use of digital technologies to support project activities and management in the African region, even though these were not implemented in the framework of a regional digital strategy. These initiatives may be grouped into nine categories:[5]

1. **ICT integration in various agriculture projects:** from the use of satellite services to address the desert locust invasion to the use of mobile services to respond to the COVID-19 crisis.
2. **Policy interventions:** Governments have been supported in policy and the development of e-agriculture strategies.
3. **Expert communities** and partners have been convened by FAO to develop collective digitalization approaches, for example the Digital Council formulation and the e-agriculture community exchanges.
4. **Data management:** statistics support, analysis with strategies for global decision systems, maintenance of ontologies and interoperability standards, etc.
5. **Capacity-building:** upskilling capacity for governments, development institutions, and individuals, through face to face, e-academy, and massive online open courses (for example, there were 3 000 African students in a last course).

[4] www.digitalprinciples.org.

[5] Examples of activities and services can be identified on the following webpages: http://www.fao.org/in-action/africa-digital-services-portfolio/en/, or http://www.fao.org/about/meetings/digital-agriculture-transformation/resources/fao-digital-services-portfolio/en/.

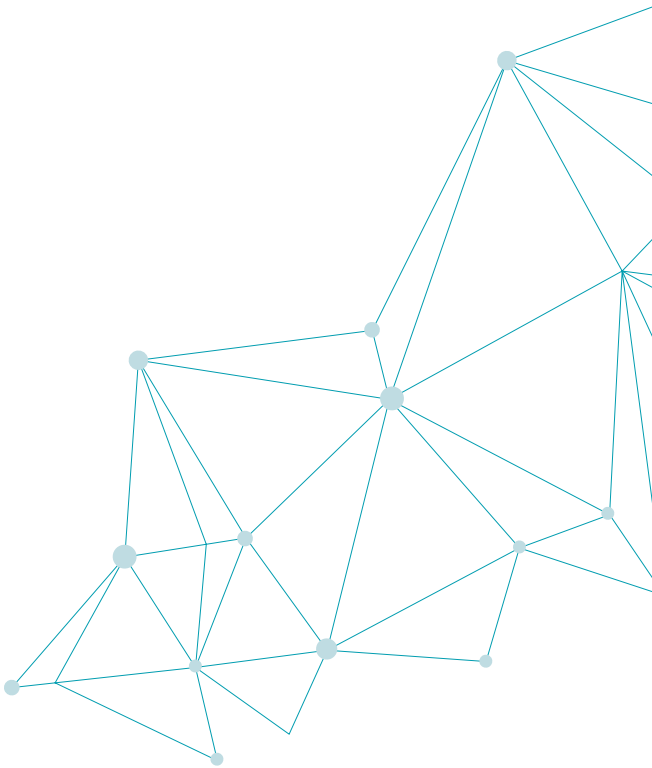
6. **Applications development** for use in the region has been specifically supported for digital services projects. Over 150 software tools have been developed by FAO (for activities in Kenya, Senegal and Somalia, etc.) and are detailed in the FAO **Digital Services Portfolio.**

7. **Youth engagement:** Recent activities include the organization of an African agriculture hackathon in Rwanda and the collaboration with the African Green Revolution Forum (AGRF) in the framework of which young digital innovators have been supported.

8. **Gender** is specifically supported and an approach is documented in initatives, including the DIMITRA programme and Young Women in Business studies.

9. **Knowledge management and communications:** FAO produces many publications on digitalization and promotes the applications through webinars, training, and social media; recent publications include the FAO and ITU's *Regional status report on agriculture readiness in sub-Saharan Africa* (soon to be published) and the *Toolkit to mainstream digital agriculture technologies,* prepared in collaboration with AfDB (Unpublished).

Many of these digital services need, however, to be strengthened and streamlined. There are important gaps and insufficient capacity, both at country and regional offices levels. The digital support provided should also be delivered in a more coherent manner, effectively leveraging available contributions from various FAO units and programmes. Opportunities for collaboration with local and other development stakeholders are also not sufficiently exploited, which limit reach and impacts.



2 INSTITUTIONAL STRATEGIC CONTEXT

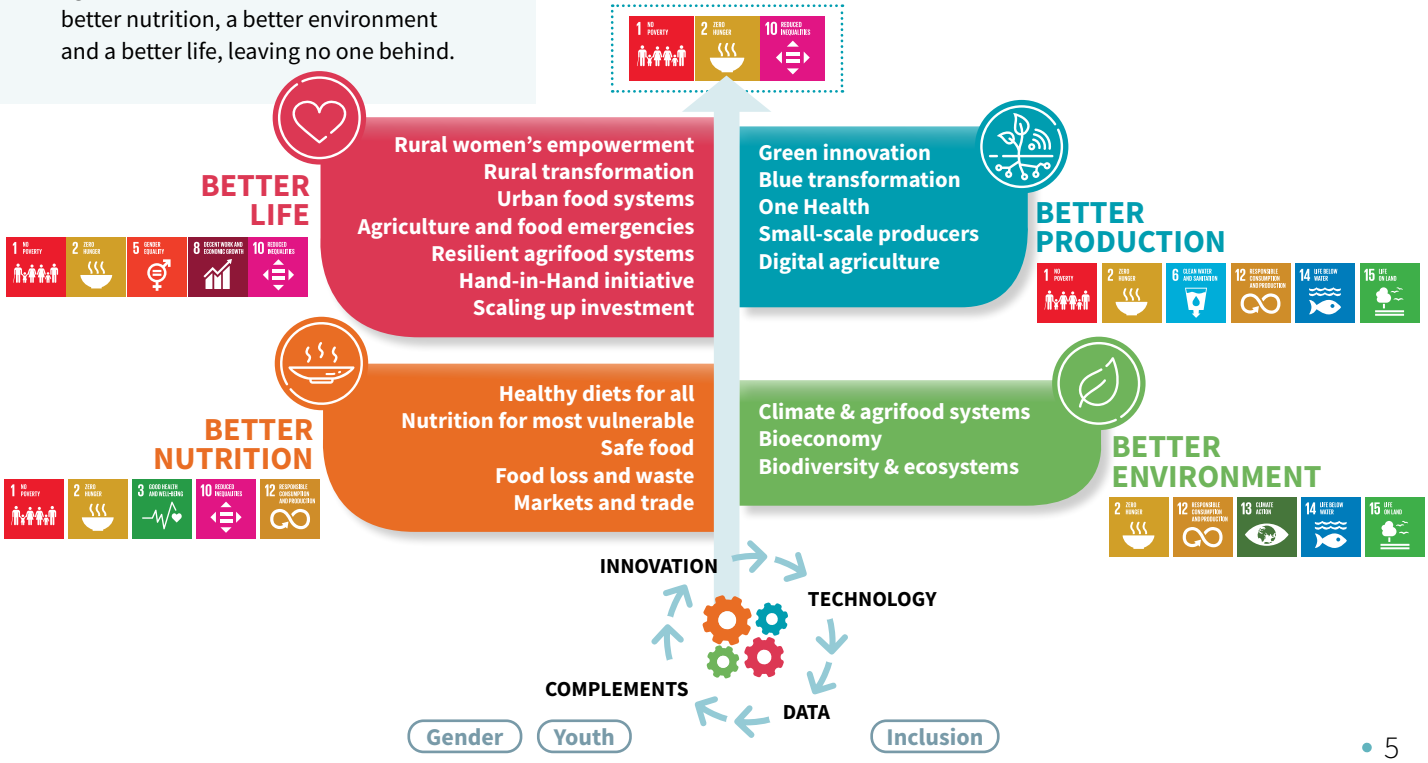
The RAF Digital Innovation Strategy has been prepared to respond to key African agrifood development challenges. It is supported by the new drive propelled by the FAO management to boost mainstreaming innovation, data and digitalization to effectively combat hunger and poverty. This drive is enshrined in the new FAO Strategic Framework 2022–2030 that aims to accelerate the "transformation to MORE efficient, inclusive, resilient and sustainable agrifood systems for better production, better nutrition, a better environment and a better life, leaving no one behind".

"Four Betters" have been defined in the FAO Strategy Framework, guiding the organization's interventions.

- **Better production:** ensuring efficient sustainable consumption and production patterns, inclusive food and agriculture supply chains.
- **Better nutrition :** ending hunger, promoting nutritious foods and increasing access to healthy diets.
- **Better environment:** protecting, restoring and promoting sustainable use of terrestrial and marine ecosystems, promoting a good environment for farming systems, and combating climate change through reduction, reutilization, recycling and residual management approaches.
- **Better life:** achieved by reducing inequalities – between urban and rural areas, rich and poor, and men and women – and promoting inclusive economic growth.

Figure 1: Key elements of the Strategic Framework of FAO

> Supporting the transformation to MORE efficient, inclusive, resilient and sustainable agrifood systems for better production, better nutrition, a better environment and a better life, leaving no one behind.



The FAO Strategic Framework also defined four cross-cutting/cross-sectional **"accelerators"** of programmatic interventions. These are **digitalization, technology, data** and **complements.**

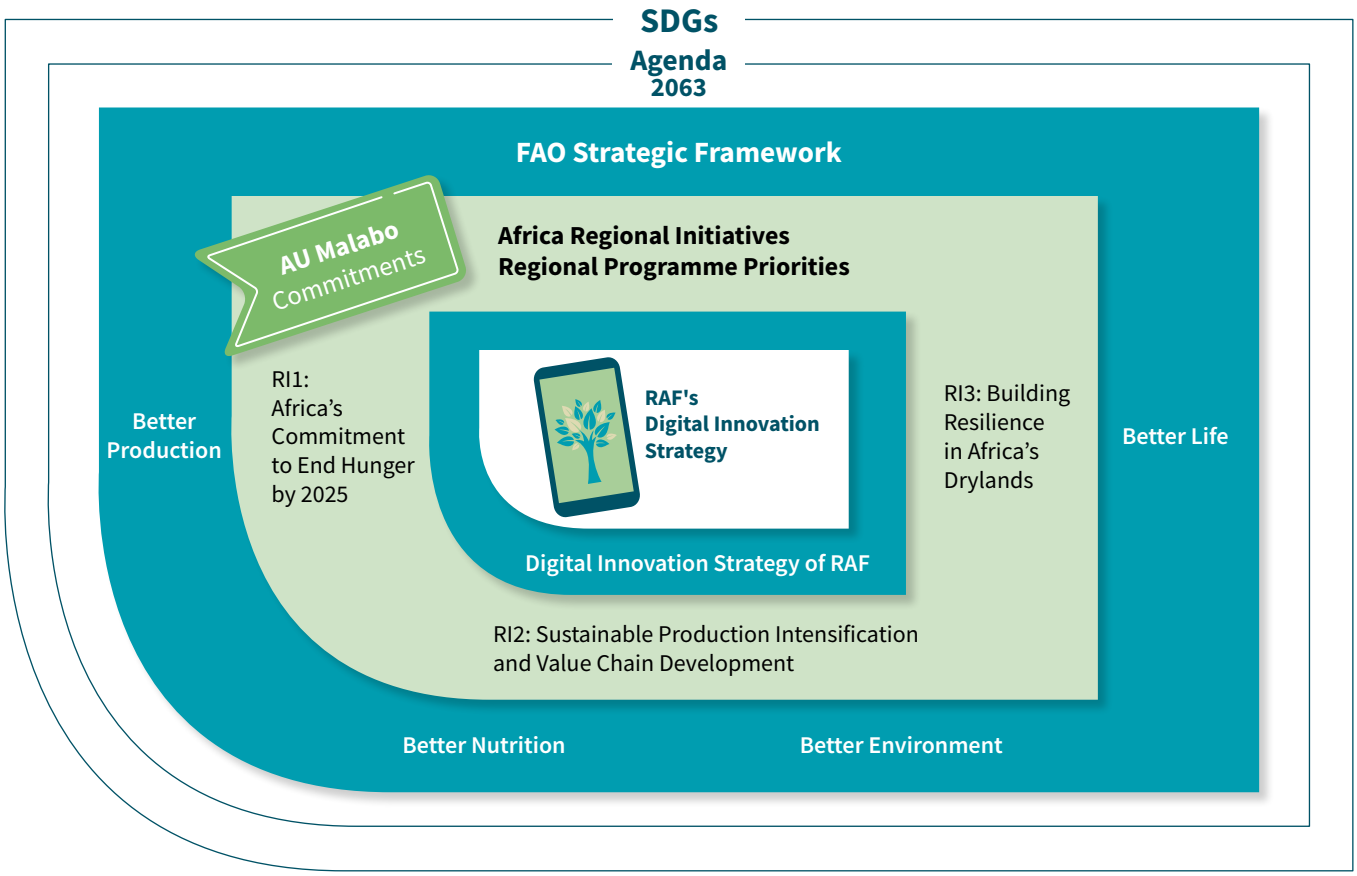
The Digital Strategy proposes interventions in support of the FAO four Programme Priority Areas in the African region: efficient and equitable food and nutrition systems; climate action and sustainable natural resource management; building resilience towards ending poverty; and sustainable agrifood production systems.

These priorities match the three African Regional Initiatives:

- Africa's Commitment to End Hunger by 2025;
- Sustainable Production Intensification and Value Chain Development in Africa; and
- Building Resilience in Africa's Drylands.

These programmatic ambitions will form the foundation for the implementation of the Strategy.

Figure 2: Strategic context of RAF Digital Innovation Strategy



3 THE DIGITAL STRATEGY FRAMEWORK

3.1 Vision and aim

3.1.1 Vision

The vision of the strategy is that **countries across Africa use food systems transformation to drive progress towards the Malabo targets and the Sustainable Development Goals (SDGs), drawing on FAO support.**

Figure 3: RAF Digital Innovation Strategy framework

Vision FAO's aspiration in the African region	Countries across Africa use food systems transformation to drive progress towards the Malabo targets and Sustainable Development Goals drawing on FAO support.
Mission Why the digital innovation strategic framework exists	*To ensure improved use of sustainable inclusive digital solutions to deliver agriculture and food system tranformation*
Objectives Results that the strategy aims to achieve	*Better informed development, improved digital interventions, stronger local, inclusive, sustainable innovations*
Strategy Long term plan aimed to achieve objectives	*INSIGHT through data, INTERACTION for better digital interventions and IMPACT through local innovation*
Approach Methodology for implementing the plan	Identify, discuss, develop, deliver and track
Tactics Smaller action plans that support the overall approach & strategy	Hand-In-Hand Initiative, International platform, Situation room, e-communities, e-agriculture, Young entrepreneurs, Digital Villages Initiative

3.1.2 Aim

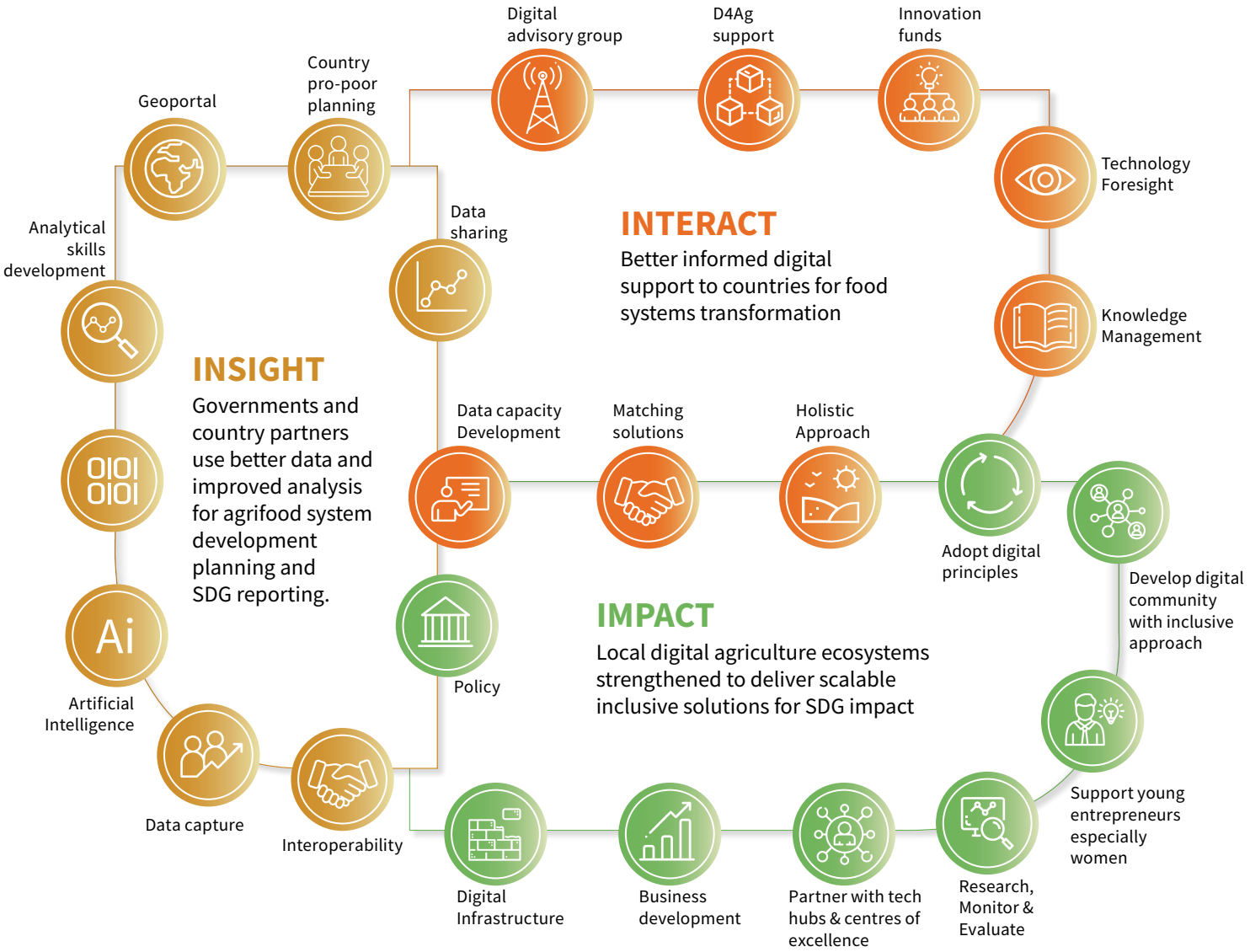
The RAF Digital Innovation Strategy aims to ensure "improved use of sustainable, inclusive digital solutions to deliver agriculture and food system transformation in the Africa region". It is articulated around three pillars:

1
Better informed country planning through quality data **(INSIGHT)**

2
Better informed digital support for food systems transformation **(INTERACT)**

3
Inclusive digital agriculture ecosystems **(IMPACT)**

Figure 4: Pillars, outcomes and key elements of the Digital Innovation Strategy



3.2 Strategic pillars, outcomes and outputs

3.2.1 Strategic Pillar 1 – INSIGHT: Better informed country planning through quality data

This pillar entails promoting better informed development through insights from quality data management and analysis. It focuses on using data to provide guidance and analyse technical and policy decisions. Work around the geospatial platform[6] of the FAO Hand-In-Hand initiative will be an important part of this pillar. In addition, building on existing regional agreements on data management such as the Nairobi Declaration on agriculture open data[7] or the Declaration for the better use of West Africa's agricultural open data (Muyiramye, Laperrière and Addison, 2020) and the work carried out by the Francophone Africa Open Data Community (*Communauté d'Afrique francophone des données ouvertes* [CAFDO])[8], many governments have pledged to make agriculture and nutrition-related datasets available.

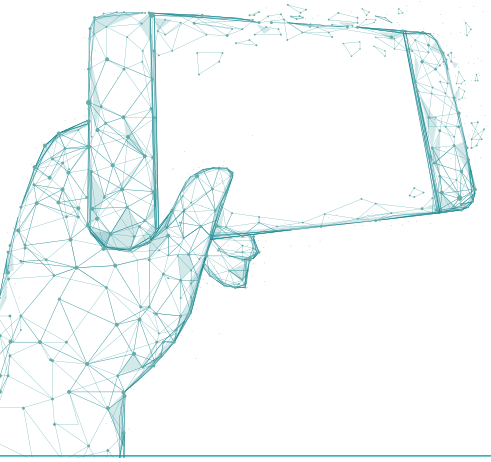
Expected outcome

African governments and country partners use better data and improved analysis for agrifood system development planning and SDG reporting.

Expected outputs and outline of activities

- Output 1.1: Data acquisition and management by government officers improved
- Output 1.2. Country use of HiH geoportal platform increased

Activities may take various forms, including face-to-face training of trainers, webinars, massive online open courses (MOOC), support to specific projects and innovation grants. Depending on the needs and opportunities, regional or subregional activities will be organised. RAF may also provide assistance to national pilot activities. The main targets of activities under this pillar are government officers and officials involved in national agrifood system development activities relevant for RAF regional priorities. Other key stakeholders supporting or involved in implementation of national projects may benefit from this support.



Hand-in-Hand Initiative

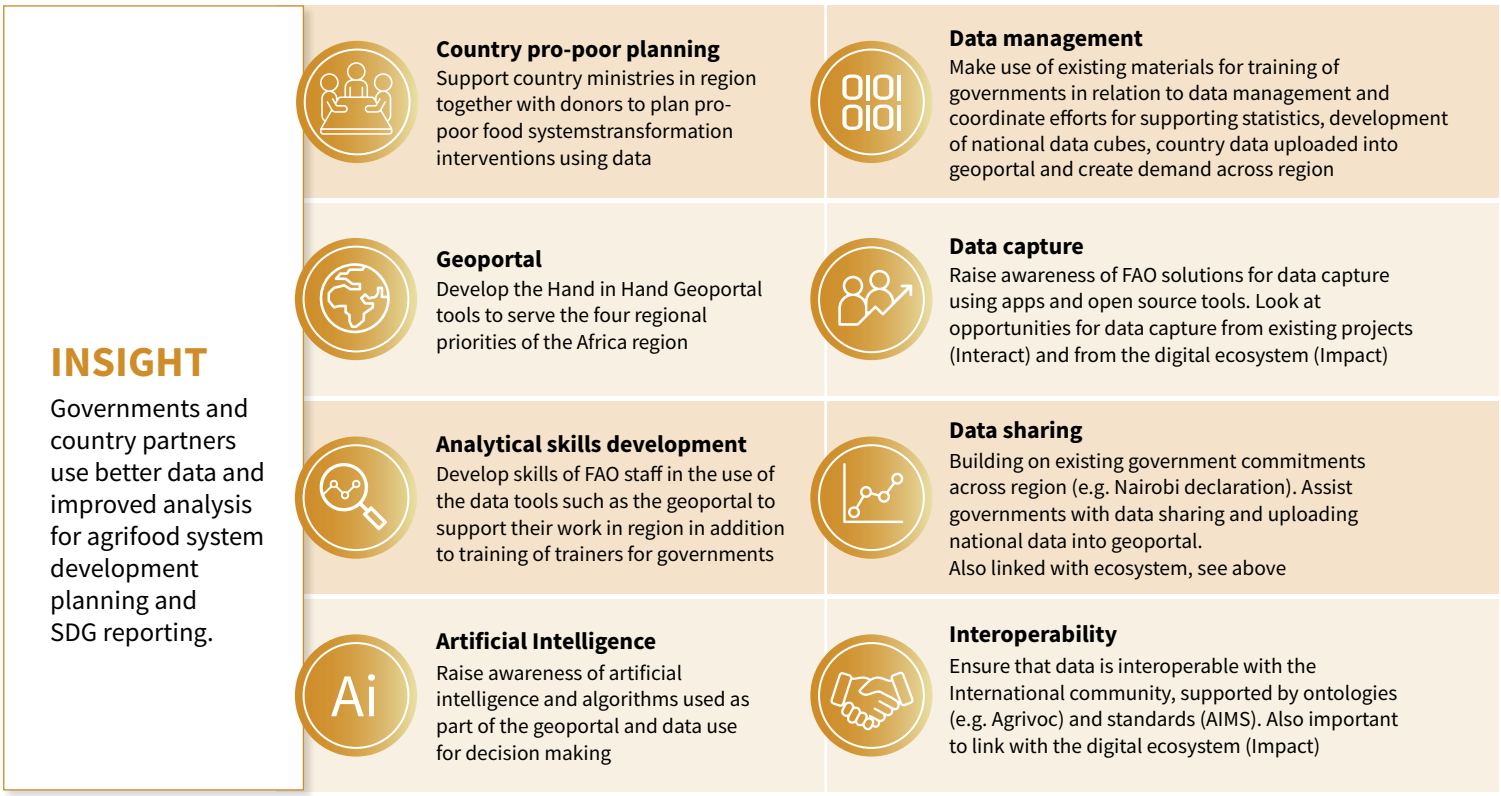
The Hand-in-Hand Initiative (HiHI) is an evidence-based programme to accelerate the Sustainable Development Goals (SDGs), particularly SDG 1 and SDG 2. Among others, it includes an advanced geospatial modelling and analytics platform, an innovation data lab and a monitoring and evaluation dashboard. The platform brings together over 20 technical units from multiple domains across FAO, from animal health to trade and markets, integrating data from across FAO on soil, land, water, climate, fisheries, livestock, crops, forestry, trade, social and economics, among others. The HiHI geoportal data can be combined with other sources. Several African countries are involved in the Initiative. It is being implemented with an eye toward fulfilling the United Nations Secretary-General's vision to bolster the United Nation's system's data management and analytics, integrated policy services, partnerships, and finance and investment.

(Source: Hand-In-Hand Initiative website)

6 http://www.fao.org/hih-geospatial-platform/en/.
7 https://www.godan.info/sites/default/files/documents/Nairobi%20Declaration.pdf.
8 https://www.cafdo.africa.

The following graph provides complementary insights on these activities

Figure 5: Insights on activities of Pillar 1



3.2.2 Strategic Pillar 2 – INTERACT: Better informed digital support for food systems transformation

This pillar, which may be dubbed **Digital Inside**, entails working internally to improve RAF digital interventions for food systems transformation by better integrating digital in operations and programmes. “Digital inside” refers to the fact that the digital work is not the focus of a project, but that digital solutions can improve the development outcome in terms of efficiency. It implies considerable change in RAF to improve the linkages between existing digital actions in order to leverage the activities and build synergies. It involves promoting a digital culture across RAF and country offices in the region to consider how existing projects can be enhanced with digital components. This relies on raising awareness of these new opportunities. This pillar will thus favour the increased use of digital solutions in the FAO Africa region. This would be demonstrated by evidence of impact from the use of digital solutions in the workplan and country programmes.

Capacity to digitally manage projects will also be honed. The aquired capacity will help FAO programme staff to better **interact and support** digital transformation at country partners’ level.

Expected outcome

Better informed digital agriculture support to countries for food systems transformation

Expected outputs and outline of activities

- Output 2.1. Project and programme personel in the RAF region acquire increased digital capacity to support food system transformation and food security
- Output 2.2. Progress reports on the use of data and digital agriculture across the RAF region produced to inform management and policy processes
- Output 2.3. New partnerships developed with key public and private stakeholders

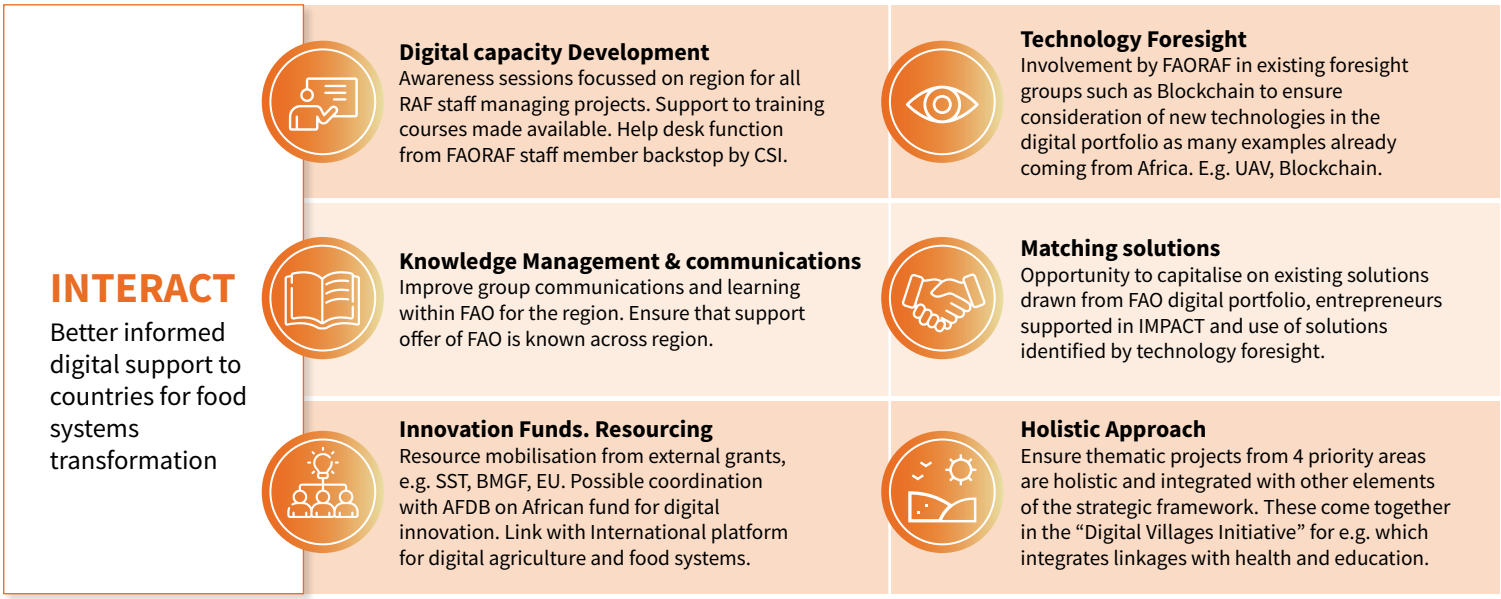
Activities implemented under this pillar will include capacity-building on geospatial data management and analysis, in line particularly with the HiH Initiative, and facilitation of project management and monitoring, leveraging digital tools in collaboration with FAO IT units.

To increase the scale and impact of the support provided to countries, **partnership projects and activities** will be developed with like-minded organizations, including AfDB, the African Union, the Alliance for a Green Revolution in Africa (AGRA), CGIAR centres, the European Union, IFAD, ITU, the United Nations Economic Commission for Africa (UNECA), USAID and the World Bank as well as bilateral partner organizations (AFD, ENABEL, GIZ, JICA, etc.). These will include policy dialogues with those organizations in view to create synergies and increase impacts.

A **Digital Advisory Group**, which will provide advice for implementing the strategy, will be established. It is included under this pillar in a tactical approach, but its recommendations will address the entire strategy.

The following graph provides complementary insights on these activities.

Figure 6: Insights on key activities of Pillar 2



3.2.3 Strategic Pillar 3 – IMPACT: Inclusive digital agriculture ecosystems

This pillar will provide support to establish and strengthen digital agriculture ecosystems in order to enable local inclusive implementation of projects and initiatives. FAO has been supporting e-agriculture strategy development for governments to create enabling environments for expanding digital agriculture adoption. Apart from public actors, the organization has supported entrepreneurs, including women, in developing digital solutions for agriculture. Linkages with ecosystem stakeholders that can support and sustain the latter will be key.

To ensure a sustainable environment for the development of digital solutions in the countries, FAO supports digital entrepreneurs by linking them with investors and value chain actors. Collaboration will be ensured with centres of excellence and local innovation hubs, supporting opportunities to include youth and particularly women in offering effective digital solutions for agriculture. There is a need to work with country governments in developing the building blocks required to encourage a digital ecosystem. This includes digital ID systems, farmer registries, legislation and incentives needed to link with the innovation communities and investors to achieve the social and environmental impacts in the SDG and Malabo targets.

Expected outcome

Local digital agriculture ecosystems strengthened to deliver scalable, inclusive, and sustainable solutions for SDG impact

Expected outputs and outline of activities

- Output 3.1: Inclusive digital agriculture ecosystem groups supported in the region
- Output 3.2: Young and women entrepreneurs supported to better benefit from digital agriculture
- Output 3.3: RAF countries' use of digital agriculture solutions increased and improved

Activities under this category will support building or scaling up inclusive digital agriculture policies, strategies, regulatory frameworks and ecosystems, which strongly impact and enable sustainable food system transformation in RAF countries. Digital capacity-building of relevant stakeholders as well as knowledge-generation and sharing to promote key digital agriculture issues and results will be organized. Key beneficiaries of activities will include governments, policy-makers, women groups, women entrepreneurs, young farmers and entrepreneurs, young digital agriculture service providers, private sector stakeholders, incubators and tech hubs, regulators, agribusinesses and other value chain stakeholders. A specific programme which will be implemented in the framework of the Digital Innovation Strategy is the **Digital Villages Initiative.** Several of its activities may fall within the framework of this Pillar.

The Digital Villages Initiative in Africa

The Digital Villages Initiative is an FAO corporate programme that aims at fostering digital rural transformation to combat hunger, poverty and inequality. It is being carried out through the establishment or support to 1 000 rural villages that include all the elements of digitalization needed for agrifood systems and rural transformation to achieve the SDGs. Three activity pillars are involved: the first involves activities focusing on *smart farming*, improved productivity by using relevant digital solutions; the second involves activities relating to *market linkages* and other digital services; and the last focuses on the village as a whole and involves *digital services that support rural transformation*, with the aim to enhance the delivery of public services in health, education, jobs, welfare, tourism such as eco-tourism and agri-tourism.

A pilot Digital Villages Initiative is being launched in Africa, implemented in the framework of this Digital Innovation Strategy. The programme will leverage national partnerships and collaboration at the international level (for example with ITU and the World Bank in Niger).

Figure 7: Insights on key activities planned for Pillar 3

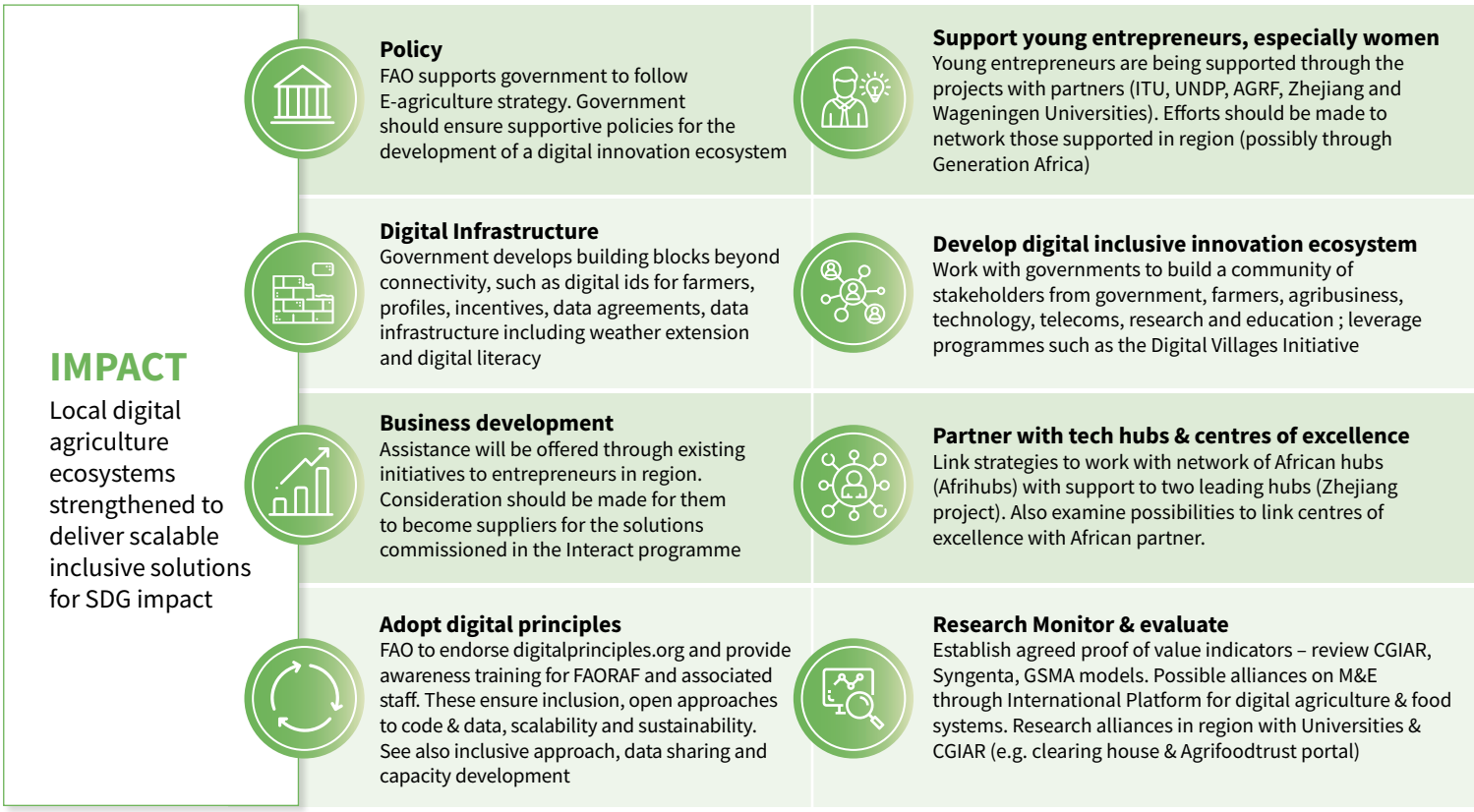
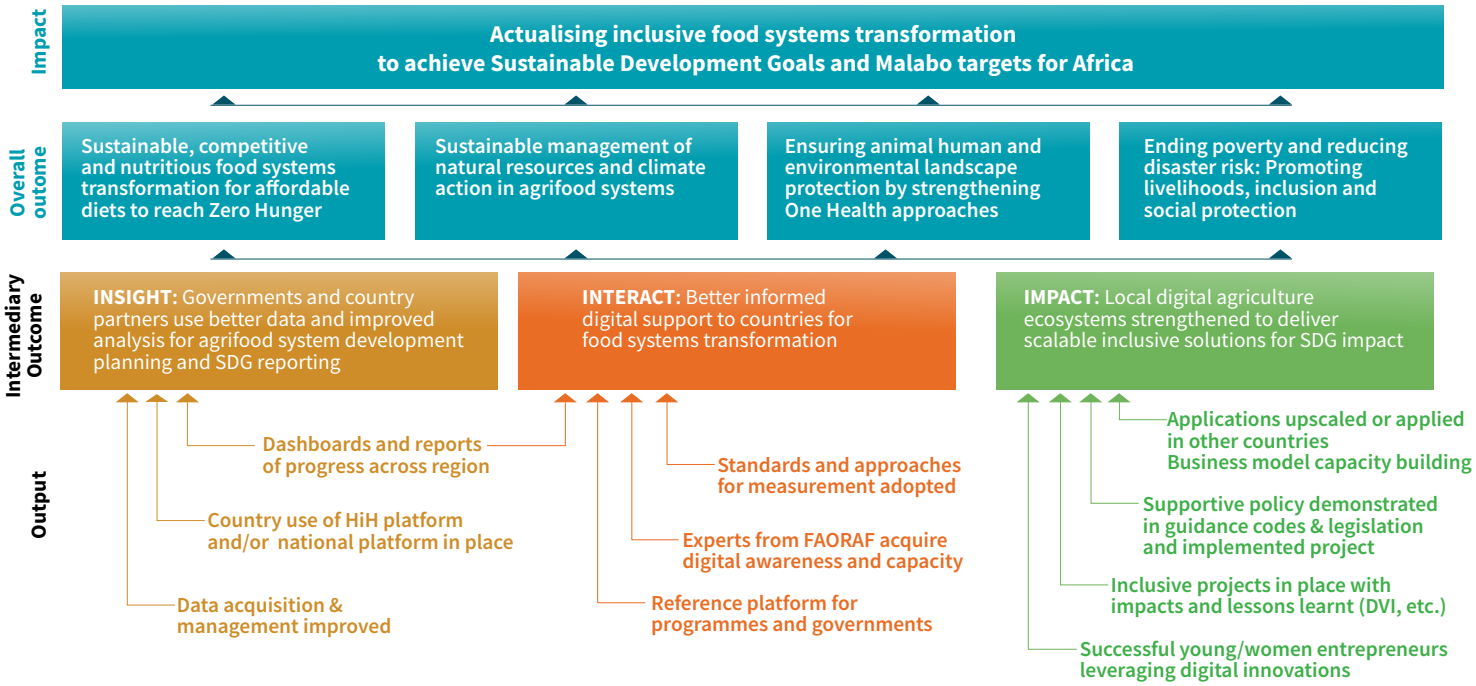


Figure 8: Summary of the theory of change of the Digital Innovation Strategy



Other specific projects may be developed around the creation of public good infostructure (such as farmer registries) or the use of innovative digital technologies or solutions to support resilience, climate-smart agriculture, market access, productivity, inclusiveness, and more widely, rural and food system transformations. The establishment of a Digital Agriculture Innovation Fund will be explored.

4 GUIDING PRINCIPLES

Although divided as intervention points, all the three strategic pillars require interrelated activities. There are several cross-cutting threads, which lead to guiding principles for the digital innovation strategic framework, to ensure it serves RAF mission of ensuring improved use of sustainable inclusive digital solutions to deliver agriculture and food systems transformation.

Social inclusion and gender equality: It is particularly important to address the digital gap between men and women, young and old, rural and urban, smallholder and large-scale farmer, the rich and the poor, those with higher levels of education and access to services and infrastructure and those with less access as well as people with disabilities and the marginalized. Vulnerable groups will need specific, targeted interventions to enable them participate in this digital transformation, including enabling policies, infrastructure, digital literacy and other training and skills development, small business management tools, and access to relevant content and resources.

Digital development principles: To ensure that the development of digital solutions serves the SDG goals and does not increase gaps between urban and rural, men and women and smallholder and larger farmers the steps outlined in the digitalprinciples.org project should be adopted.

Knowledge management, learning and communication: Throughout the projects, it is important to ensure the capitalization of lessons from the projects and ensure there is communication between the stakeholders through e-communities, publications, and outreach, adapting content to relevant local contexts.

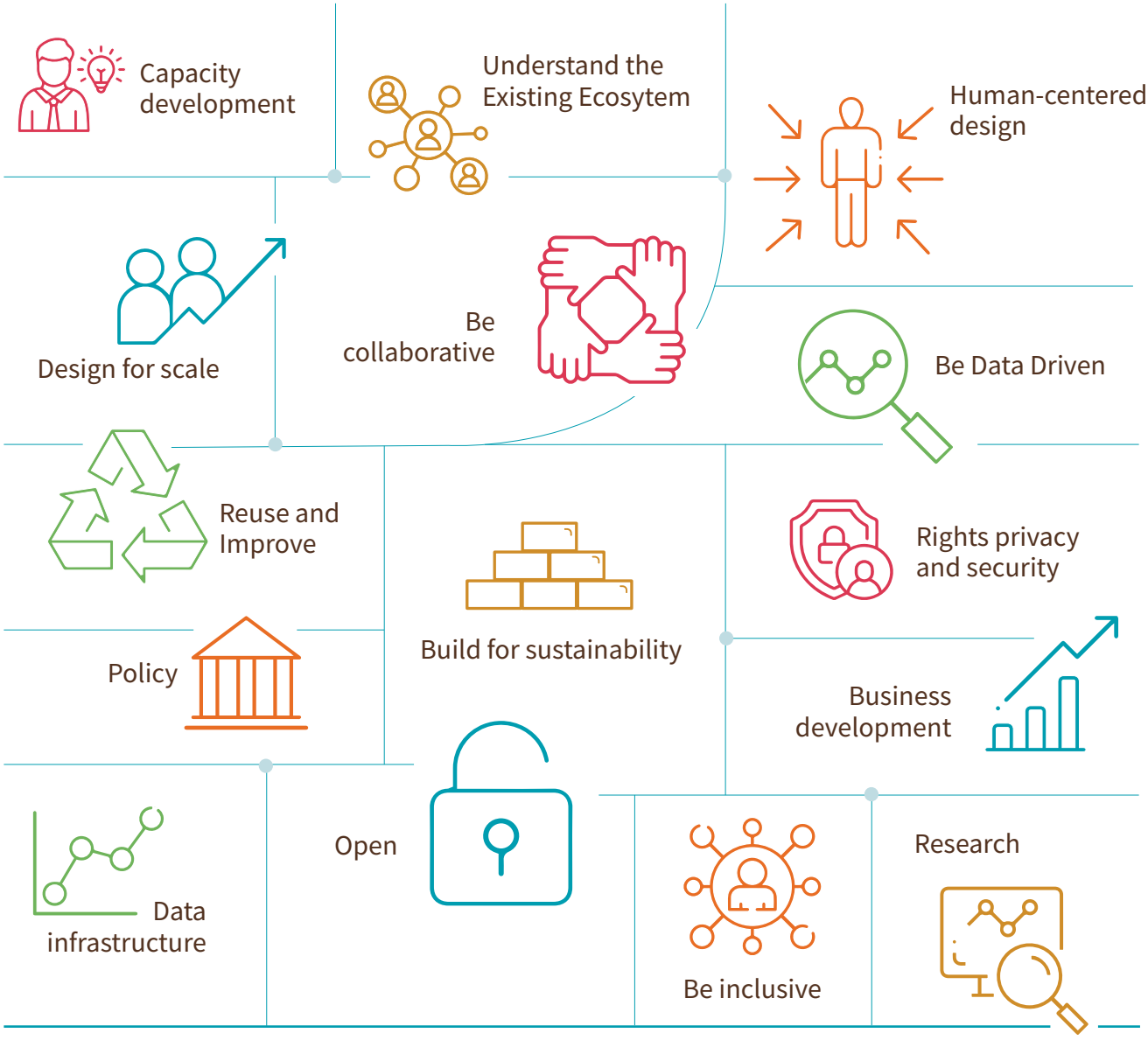
Data use and sharing: It is crucial to encourage use and sharing of data for evidence-based and solution-driven interventions in transforming food systems to deliver better in the fight against hunger and malnutrition. It is also important to link the opportunities for data collection with those for management and analysis.

Capacity development: Digital literacy and capacity development are key recommendations of the African Union Digital Transformation Strategy. The principle of continuous learning and awareness interventions is also critical.

Policy: There is a need to consider the policy elements required to implement and support digital agriculture. FAO's contribution in this area is illustrated by its work in e-agriculture strategy.

Holistic approach: It is important to ensure that digital support developed for agrifood system transformation considers a holistic approach.

Figure 9: Key principles and elements required for building sustainable digital projects and ecosystems (including the nine Digital Development Principles)



5 IMPLEMENTATION ARRANGEMENTS

5.1 Synergies within FAO

While many activities will be implemented directly by RAF, collaboration will be enhanced with other FAO divisions that have been implementing successful digital agriculture programmes in Africa or have been providing guidance in this area at corporate level, such as the Digitalization and Informatics Division (CSI) and FAO Investment Centre (CFI). The implementation of activities will leverage existing FAO assets such as the Digital Portfolio, solutions available at the country level, including the SAIDA platform in Senegal, the Form Management Tools in Somalia and the KIAMIS in Kenya.

5.2 Cross-cutting themes

Cross-cutting themes such as Knowledge Management, gender and youth will be addressed across all pillars. Special attention will be paid to supporting women digital agribusiness activities, addressing both women digital entrepreneurs and women agribusiness leaders interested in their company's digital transformation. Gender impact assessment studies will be required to ensure that digital interventions are reducing, and not expanding, gaps in access to finance, markets, inputs, and social protection.

5.3 Partnerships

Examples or institutions with which partnership can be established or strengthened include those presented in the following table (potential areas of collaboration are specified).

Policy	**Partners**
E-agriculture strategy support[9]	**ITU, ministries**
Incentive digital policies	**World Bank**
Smart Villages	**ITU, UNESCO, WHO,**
Digital agriculture toolkit	**ITU**
Expert communities	**Partners**
E-agriculture platform	**Various**
Data	**Partners**
Hand-in-hand	**World Bank**
Open data	**GODAN**
Gender	**Partners**
Young women in business study	**AU**
GALS tool and Dimitra approach (FAO)	**IFAD**
M&E	**Partners**
Digital agriculture readiness index	**ITU**

[9] http://www.fao.org/in-action/e-agriculture-strategy-guide/en/.

Youth Engagement		**Partners**	
Generation Africa		**AGRF**	
Initiative Agrihubs		**AfriLabs, ICT Chamber Rwanda, Jokalante Senegal**	
Smart Agrihubs		**Horizon2020 EU**	
Centres of excellence		**Zhejiang University**	
Capacity-building		**Partners**	
E-academy		**Various**	
MOOC		**GODAN**	
Apps development		**Partners**	
Digital services in Africa		**Private sector, young innovators, Digital Green, Digital Public Goods Alliance (DPGA)**	
Digital services portfolio		**Public institutions Various**	
Communications		**Partners**	
Online Social media		**Key partners (including government, etc.)**	
Scaling Up		**Partners**	
Resource mobilization		**AfDB, IFAD, World Bank, etc.**	

5.4 Human resources and resource mobilisation

The human resources needed for the implementation of key elements of the Strategy involve:

- A digital agriculture lead, who will be in charge of the implementation of the Strategy
- An intern or YPO
- Consultants as needed
- An Advisory Group which will provide guidance on activities
- Involvement of experts from FAO (RAF Country Offices, RAF IT Unit and units working on gender and youth

Relevant FAO experts at headquarters (for example, from CSI and CFI divisions which are leading some of the digital agriculture initiatives implemented in the RAF region) will support the implementation of the Strategy.

For the full deployment of the strategy's activities, adequate human resources should be ensured.

Apart from financial resoures that will be mobilized internally by FAO, additional funding will be required for the full implementation of activities identified in the strategy. An implementation plan will be separately developed.

5.5 Monitoring and evaluation

A monitoring and evaluation framework will be developed together with the implementation plan. Besides annual reviews, a mid-term evaluation of the Strategy will be carried out in 2023.

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