NATIONAL AGRICULTURAL VALUE CHAIN
DEVELOPMENT PROJECT (NAVCDP)

2023 DISRUPTIVE AGRICULTURAL TECHNOLOGIES MANUAL

VERSION 1

NAVCDP
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FOREWORD

The agricultural sector continues to play a critical role in the economy contributing to 22% of the gross domestic product, and 27% indirectly through its linkages with other sectors, while employing over 70% of the rural population and 40% of the total population. With Africa's population expected to double to nearly 2.5 billion people by the year 2050, it is now critical for stakeholders to put in place measures to increase food security by raising yields and productivity on existing farmland as well as increasing the number of farmers by making the sector more attractive to the youth.

The African continent's agriculture has the potential to be transformed into a powerhouse not only to feed a growing population but to create decent employment for millions of young people. However, this is only possible if the Government works together with non-profit and private sector players, and with the right policies, innovations and investments.

The National Agricultural Value Chain Development Project (NAVCDP) is a Government of Kenya project with funding from the World Bank and the National Government. The project will be implemented in 33 counties participating in the nine value chains selected for NAVCDP and guided by the National Project Coordination Unit (NPCU).

The NAVCDP Disruptive Agricultural Technologies Manual aims to provide a framework for the Ministry, Counties, KALRO, agtechs, agripreneurs and other value chain actors to collaborate under the four DAT themes to ensure increase in productivity and commercialization. The manual provides visibility on the technologies that will be used across the project, the key stakeholders and their responsibilities, minimum requirements to participate in the project, and the communication plan.

This manual has definitely provided a baseline that, if followed, will ensure the selected teams meet the minimum requirements to fulfill their roles.

ACKNOWLEDGEMENT

This Disruptive Agricultural Technologies (DAT) Manual was prepared by the NAVCDP NPCU, KALRO (represented by Simon Mulwa, the Assistant Director for ICT, and Kelvin Kiambe), the Data and Digital Agriculture Specialist at the World Bank, Beryl Agengo, representative of the agtechs- Kuza Biashara (Sriram Bharatam and Jollif Onyango), an independent consultant (Lavender Apollo), and under the guidance of the National Digital Agricultural Lead at the NPCU, Muthoni Muta.

The DAT Manual is well aligned to the experiences and learnings of the previous World Bank-funded projects (KCSAP and NARIGP) that initiated the implementation of the DAT in Kenya. The DAT manual provides a structure for a coordinated implementation of the manual within the identified DAT ecosystem in the achievement of the NAVCDP development objective as well as contributing to the Agriculture sector digital agenda.

Special gratitude is extended to the Ministry of Agriculture and Livestock Development, the World Bank, the county digital champions and the fiduciary teams for sharing their learnings. We also express our gratitude to the NAVCDP Coordinator for providing input and logistical support for the development of this manual.

DEFINITION OF TERMS

Agripreneur	An established commercial agri-entrepreneur who will be mentored and coached by business accelerator to sustainably deliver E-extension; Demand Generation - agro-inputs, services and market linkages; fulfillment of products and services; Record keeping, managing payments, commission generation and outputs to a set of 200 farmers using the agripreneur model.
Agtech Agent	An agricultural agent is a professional who provides technical assistance and advice to farmers, ranchers, and other agricultural producers. Agricultural agents work for government agencies, universities, or private organizations and are responsible for promoting agricultural practices that are sustainable, profitable, and environmentally responsible.
AgTech	An innovator who provides an agricultural digital solution and is selected for the World Bank's One Million Farmer Platform (OMFP) as part of the Disruptive Agriculture Technology (DAT) initiative.
AgTech Catalog	A comprehensive list of all services that the DAT agtech company provides to the NAVCDP program farmers. It includes a description of each service/product, the service level agreements, the cost, and the process for obtaining the service. The agtech catalog helps counties in understanding the services available, what they can expect from each service, and how to request the services they need. In the context of agriculture, an agtech catalog could contain information about digital services such as precision agriculture, e-marketplaces, agro-advisory services, and other services that support the agriculture sector.
Big Data	Is a high-volume, high-velocity and high-variety information asset that demands cost-effective, innovative forms of information processing that enable enhanced insight, decision-making, and process automation.
Bundled Services	Refers to a package of related services and products offered to farmers and other stakeholders in the agricultural sector under one common platform. These services and products are typically designed to meet the specific needs of farmers and help them improve their agricultural practices, increase their productivity, and achieve their goals.
Business Accelerator	An entity that provides support to early-stage and start-up businesses through investment, short-term mentoring and training. A Business Accelerator's long-term goals are to: help the businesses it supports to grow and become profitable quickly and make a return on its investment. In the agtech space, a business accelerator will support the agtechs in ensuring they are adopting the best model to support the farmers and other value chain actors they provide services and products to.
Data Platform	An integrated set of technologies that collectively meet an organization's end-to-end data needs. It enables the acquisition, storage, preparation, delivery, and governance of data, as well as a security layer for users and applications.

Data Sharing Agreement	A legal contract that governs the sharing of data between two or more parties. It outlines the terms and conditions under which data can be shared, including the purpose for which the data will be used, the responsibilities of each party, and the measures to be taken to protect the data's confidentiality, security, and privacy. Data sharing agreements are commonly used in various industries such as agriculture, healthcare, finance, and technology, where sharing of sensitive or confidential data is a common practice.
Digital Agriculture	Is the seamless integration of digital technologies into crop and livestock management, and other processes in agriculture. However, it is also about how this technology integrates and works across the supply chain, all the way from the farm to the consumer.
Digital Agriculture Leads	County-based staff who act as catalysts for technology-enabled change, helping to identify, implement and support value-adding digital projects.
Disruptive Agriculture Technology	Innovations that enable farmers and agribusiness entrepreneurs to leap-frog current methods to increase their productivity, efficiency, and competitiveness, thereby facilitating access to markets, improving nutritional outcomes and enhancing resilience to climate change.
e-Services	e-Services refer to the use of technology and digital tools to support various aspects of the agricultural industry, including production, distribution, and marketing. An e-service delivers technology, innovation and management practices (TIMPs) through data and digital services either as a single or bundled service.
Memorandum of Understanding	It's a type of agreement between two or more parties that outlines the terms and details of a cooperative relationship, but stops short of forming a legally binding contract. MOUs are commonly used in various industries including agriculture, government, business, etc.
TIMPs	Technology, Innovation and Management Practices (TIMPs).

LIST OF ABBREVIATIONS AND ACRONYMS

AATF	African Agricultural Technology Foundation
AP	Agripreneur
AEZ	Agro-Ecological Zone
ASTGS	Agricultural Sector Transformation and Growth Strategy
BDS	Business Development Services
CIG	Common Interest Group
CIMMYT	International Maize and Wheat Improvement Center
CPCU	County Project Coordination Unit
CSA	Climate Smart Agriculture
CTAC	County Technical Advisory Committee
DAT	Disruptive Agriculture Technologies
DPO	Data Protection Officer
FAO	Food and Agriculture Organization
FFS	Farmer Field School
FPO	Farmer Producer Organization
FLID	Farmer Led Irrigation Development
GAP	Good Agronomic Practices
GoK	The Government of Kenya
HR	Human Resource
ICT	Information and Communication Technology
IDA	International Development Association
KACC	Kenya Agro-Advisory Call Center
KALRO	Kenya Agricultural and Livestock Research Organization
KAMIS	Kenya Agricultural Market Information System
KAOP	Kenya Agricultural Observatory Platform
KCSAP	Kenya Climate Smart Agriculture Project
M&E	Monitoring and Evaluation
MIS	Management Information System
MoA&LD	Ministry of Agriculture and Livestock Development
NARIGP	National Agricultural Rural Inclusive Growth Project

NAVCDP	National Agricultural Value Chain Development Project
NPCU	National Project Coordination Unit
OMFP	One Million Farmers Platform
PDO	Project Development Objective
POs	Producer Organizations
PPADA	Public Procurement and Asset Disposal Act
PPDP	Public Private Dialog Platform
SLA	Service Level Agreement
SMS	Short Messaging Services
TIMPs	Technology Innovation and Management Practices
USD	United States Dollars
VMG	Vulnerable and Marginalized Group
WB	World Bank
SOP	Standard Operating Procedure

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CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

Digital technologies, data analytics, artificial intelligence, digitally-delivered services and apps are changing the agricultural ecosystem. These technological advances can support the goal of achieving more resilient, productive and sustainable agriculture as well as food systems that better meet consumer needs. These benefits are realized directly through the adoption of technologies by actors in the sector and indirectly by governments in order to deliver better policies.

Although significant efforts and investments have been made in digital technologies and applications for development amounting to billions of US dollars worldwide, progress has been hampered by a lack of coordination particularly by governments not taking a holistic approach to digital investments.

The agenda of a data and digital investment includes: Understanding the current state of data and digital services in the agriculture sector; Reviewing the role of stakeholders including government, private sector, target beneficiaries and development partners; Identifying the challenges and opportunities for investment within the ecosystem; Developing a roadmap for the implementation of data and digital investment initiatives that includes all stakeholders; Building capacity through training and awareness programs for farmers, agtechs, agents, agripreneurs, and other stakeholders; Establishing data sharing agreements and a data governance framework; Defining the criteria for selecting, pairing, on-boarding, incubating and mentoring agtechs, agents and agripreneurs; Addressing the specific needs and concerns of smallholder farmers through digital pathways strengthening the hybrid extension architecture, and; Evaluating the impact and sustainability of data and digital investment interventions.

The Agricultural Sector Transformation and Growth Strategy (ASTGS 2019-2029) is anchored on four key pillars which are: increasing small-scale farmer incomes, increasing agricultural output, value addition to boost household food resilience, enabling activities which include knowledge and skills building programs for technical and management skills, and strengthening of research and innovation for data and monitoring key food system risks to enable management of natural resource crisis.

1.1.1 Project Description

Project Development Objectives and Indicators

The development objective of NAVCDP is to *"increase market participation and value addition for targeted*[1] *farmers in select value chains in project areas'*. Progress towards achievement of this objective will be monitored using the following three indicators:

i. Farmers reached with agricultural assets or services under the project of which at least 50% are female farmers.
ii. Percentage increase in farmers selling more than 50% of their produce in the market.
iii. Percentage increase in farmers selling produce in value-added form (both on-farm and off-farm).

1.1.2 Project Components

Component 1: Building Producer Capacity for Climate Resilient Stronger Value Chains

Interventions and activities in Component 1 will be geared towards building producer-level capacity for enhanced market participation and transition towards commercial agriculture, with farmer groups and farmer producer organizations (FPOs) as primary platforms for program delivery. The component will drive sustainable productivity enhancement, climate-resilient and nutrition-sensitive production, and increased market participation for project farmers through improved access to credit, inputs and digital extension services while linking them to high-capacity Producer Organizations POs). Leveraging the existing institutional base of farmer CIGs/VMGs already mobilized under NARIGP and KCSAP, the project will build producer-level capacity for transitioning to high-value crops, adoption of climate resilient production technologies and increased value addition at the primary level. Linkage of CIGs to FPOs will be universalized for stronger market participation, and high-quality technical assistance support will be extended to FPOs for building long-term agri-business capacity. The inclusion of women smallholders will be a key focus area, with at least 50% of CIG members supported under the project estimated to be women farmers.

Component 2: Climate Smart Value Chain Ecosystem Investments

This component will focus on supporting enabling ecosystem investments identified as part of county level, regional level (spanning several counties) and national value chain development plans. These ecosystem investments, aimed at improving access to irrigation, boosting market participation of small-farmers and catalyzing higher value addition, will include:

a) Water resource management interventions comprising of Farmer-led irrigation development (FLID) interventions and investments including those related to water harvesting and water use,

b) Investments into market support and value addition infrastructure at county level,

c) Investment support for wide-scale adoption of Digital Agriculture Technologies and integration of Big Data platform for farmer services, and

d) Investment support for active linkages with agriculture research institutions, technical assistance and private sector linkages. Considering the level of operation and potential scale, ecosystem investments have been categorized under four sub-components. In addition to project resources, this component will strongly focus on crowding-in relevant investments from ongoing development initiatives, government programs and private sector partnerships.

Component 3: Piloting Safer Urban Food Systems

The overall objective of this component is to strengthen:

1. Urban and peri-urban agriculture, and
2. Urban market infrastructure.

Component 4: Project Coordination and Management

Financing and financial management of activities related to National and County level project coordination including planning, procurement, talent and HR management, environmental and social safeguards implementation, monitoring and compliance, development of a MIS and ICT services, regular M&E, impact evaluation, communication, knowledge management, and citizen engagement.

1.1.3 Project beneficiaries

NAVCDP aims to support about 4 million small scale farmers who will be transitioning or have potential to transition from being subsistence farmers to commercial farmers or are selling a small percentage of their produce commercially. Other beneficiaries of the project include value chain actors at various levels including extension workers, aggregators, logistics support providers and SMEs operating within the value chain. The project will place a strong focus on inclusion of women farmers within the supported value chains. The Data and digital initiatives aim at reaching 50% of the target beneficiaries.

1.1.4 Value chains to be supported

Sixteen (16) value chains have been selected based on a thorough qualitative and quantitative assessment of their potential. The selected value chains based on their ranking are: Dairy, Coffee, Chicken, Fruits

(Avocado, Banana, Mango), Vegetables (Irish potatoes, Green pea, Tomato), Apiculture, Pyrethrum, Cashew nut, Red meat, Rice and Cotton. However, the implementation of the digital investments will be value chain-neutral; it will be driven by the gaps within the value chain, and as demanded by the 'client'; the smallholder farmers.

Project coverage: NAVCDP will be implemented within 33 counties spread across seven (7) geographical clusters. The selected counties and regions are shown in Table 1 below.

Table 1: Distribution of selected counties by regions

Region	Counties
Central (5)	Nyeri, Muranga, Kirinyaga, Kiambu, Nyandarua
Eastern (6)	Machakos, Kitui, Makueni, Embu, Meru, Tharaka Nithi
Rift Valley (8)	Nandi, Uasin Gishu, Trans Nzoia, Narok, Kajiado, Nakuru, Bomet, Kericho
Western (4)	Kakamega, Busia, Bungoma, Vihiga
Nyanza (6)	Homa Bay, Migori, Kisii, Kisumu, Siaya, Nyamira
Coast (4)	Taita Taveta, Kilifi, Kwale, Tana River

1.1.5 Project cost and financing

The total cost of the project is estimated at US$ 275 million to be financed with an IDA loan for US$ 250 million and contributions from the government of US$ 25 million. The share of contribution between the county and national government will be based on resources expended at each level of government for Component four (4).

1.1.6 Period of implementation

The project will be implemented over a 5-year period commencing September 2022 to December 2027.

1.2 RATIONALE

A disruptive agricultural investment manual is a comprehensive guide that outlines the rationale for investing in data and digital technologies in the NAVCDP implementing counties. The manual outlines the benefits of these investments, including improved decision-making, increased efficiency, enhanced productivity, better access to information, and enhanced market connections. The manual provides guidance on how to identify, prioritize and implement data and digital interventions, as well as how to measure their outcomes and impacts.

In 2019/2020, the World Bank launched the Disruptive Agricultural Technologies (DAT) challenge and selected 14 leading agtechs to participate in the One Million Farmer Platform (OMFP). Due to the program high demand and success, the World Bank, in collaboration with the NPCU, expanded the initiative by including additional agtechs to the platform in subsequent years. This expansion was facilitated through a strategic match-making process at the national level, aimed at selecting agtechs capable of partnering with multiple counties. The program's remarkable success laid the foundation for the DAT initiative at the national level, which saw significant growth, starting with 16 counties in its first year and expanding to 27 counties and 27 agtechs by the second year. There was more demand in the productivity and marketing

areas with focus on data analytics and financial inclusion largely on access to credit. The current focus still being on the four thematic areas but with emphasis on productivity and e-extension services.

In today's fast-paced and highly competitive global market place, it is more important than ever for organizations in the agricultural industry to invest in disruptive agricultural technologies. This DAT manual provides a valuable resource for the various implementing actors within the project structures and relevant stakeholders to ensure they are able to make informed decisions about their investments and to fully leverage the benefits of technology and data in their operations. The manual will also inform the various thematic leads in the project on the possible and existing (the catalog) data and digital investments available to address the gaps and existing opportunities that can be addressed and leveraged on respectively across various value enterprises, FPOs, SACCOs, FLID, urban food systems, among others.

1.3 OBJECTIVE

This manual provides a step-by-step guide on the planning and implementation of digital interventions focusing on investments at the national and county levels to enable farmers, agtechs, agripreneurs and key partners to leverage data and digital investments to enhance productivity, commercialization and value addition whilst contributing towards policy dialogues and access to finance for smallholder farmers.

The manual serves as a valuable resource for agtechs, agents, farmers, organizations and other stakeholders in the agricultural sector who are considering making data and digital investments. It provides a comprehensive overview of the opportunities and benefits available, as well as guidance on how to effectively leverage, implement and manage them.

In addition, the manual provides guidance on how to identify, prioritize and implement data and digital projects, as well as how to measure their impact. The manual is critical for implementers to make informed decisions about their investments, to ensure they are able to fully leverage the benefits of technology and data, and to avoid potential pitfalls and challenges.

This will be done in three ways;

- Scaling up partnerships between the county governments and agtech providers,
- The agripreneurs model and capacity building, and
- Strengthening the Big Data platform at KALRO.

Target Audience/User of the manual

- MoA&LD
- NPCU
- KALRO
- Counties- CECM, CO Agriculture, CPCU
- Agtechs
- Agtechs Agents (where applicable)
- Agripreneurs
- Project partners
- Similar project implementers/Key stakeholders

CHAPTER 2

" Teamwork and intelligence wins' championships. Be part of the digital champions"

DISRUPTIVE AGRICULTURAL TECHNOLOGY ECOSYSTEM

2.1 INTRODUCTION

Africa accounts for 52% of arable farm lands in the world, yet there are more farmers than farm lands in Africa. Skyrocketing increase in population, urbanization and government development planning policies lead to increase in demand for land use of arable land for other non-agricultural purposes. Research has shown that by 2030, 30-60 million hectares of arable land in Africa would have been converted to other non-agricultural use (Chukwuemeka, 2022). With the decrease in arable farmland and climate change, it is crucial to adopt DAT in upcoming frameworks concentrating on increase in yield and productivity without necessarily increasing the farmland.

DATs are digital innovations that enable farmers, agripreneurs and agtechs to leap-frog from existing methods and increase their efficiency, productivity and competitiveness contributing to the data and digital investments ecosystem.

These innovations can range from the use of digital tools for data collection, analysis and visualization, to the development of new technologies such as precision agriculture, digital marketplaces/linkages, digitally-delivered services and apps, e-advisory services and e-extension services.

The goal of data and digital services in agriculture is to improve efficiency, productivity, market participation, value addition and profitability, while also promoting sustainability and food security. These services can help farmers to make informed decisions, increase their competitiveness, and access new markets. By leveraging technologies and concepts such as big data, artificial intelligence, the Internet, mobile technologies and devices, and the Internet of Things (IoT), data and digital services in agriculture can help to address many of the challenges faced by farmers such as climate change, water management, market linkage and access to finance.

2.2 DATA AND DIGITAL SERVICE THEMES

The scaling-up of partnerships between the county governments and agtechs is intended to facilitate access to good quality inputs, extension services, financial services and market linkages as part of the existing One Million Farmer Platform (OMFP). These services will be aligned to four main themes i.e. productivity, market linkages, data analytics and financial inclusion. The array of solutions and services to be offered will include:

2.2.1 Advisory and Information for Agricultural Productivity

This theme covers e-extension services, real-time Climate Smart Agriculture advisory directly to farmers, as well as the delivery of credible and actionable information to increase productivity (addressing inclusion). This will help transitioning from time, labour, input and resource-intensive practices to more efficient, innovative and sustainable planning, production, and management systems.

2.2.2 Market Linkages

This area focuses on digital tools that enhance market access and integration for smallholder farmers. These tools aim to improve connections to quality inputs and link farmers with buyers willing to pay competitive prices.

2.2.3 Farmer Financial Inclusion

Farmer Financial Inclusion spotlights on innovators, organizations and businesses that connect farmers with credit and savings products, agricultural insurance and other cutting-edge financial services, empowering them to invest in their farms.

2.2.4 Data Analytics and Agricultural Intelligence

The thematic area targets solutions that leverage data infrastructure, remote sensing and mapping technologies, artificial intelligence, blockchain, precision agriculture tools, and computing power to support data-driven decision-making for policymakers, public agencies, and private service providers in the agriculture sector.

2.3 ROLES AND RESPONSIBILITIES

2.3.1 National Project Coordination Unit

The NPCU will work closely with thematic leads and lead the digitization of services to farmers and farmer institutions for improved productivity, value addition and market access through the data and digital ecosystem (re)-build. The NDAL will provide leadership and guidance to project staff at the national, county, KALRO and other partners involved in implementing digital agriculture activities.

The role and responsibilities of the NPCU level will be:

- Coordination of Digital Initiatives: Oversee all digital-related project activities to ensure they align with national priorities and support seamless project implementation.

- Resource Allocation: Manage and optimize resource distribution to county governments based on approved work plans and budgets.
- Capacity Building: Lead the capacity-building initiatives at both national and county levels, ensuring tailored approaches based on county-specific needs.
- Collaboration with Stakeholders: Facilitate co-creation with key ecosystem stakeholders, including Business Accelerators, KALRO and county technical departments, to drive digital innovation.
- Infrastructure Scaling: Strengthen infrastructure to support national programs and ensure scalability through partnerships with Digital Public-Private Dialogue Platforms and digital business accelerators.
- Performance Monitoring and Learning: Organize participatory planning, monitoring and evaluation exercises to assess implementation progress and identify capacity gaps at the county level.

2.3.2 County Project Coordination Unit

All counties operating in NAVCDP will implement DAT innovations. The CPCU will work closely with the County Technical Advisory Committee (CTAC) and the implementing community structures in identifying and prioritizing the data and digital gaps in the county. Through the PICD, the CDAL should ensure data and digital gaps are fore-grounded as well as the proposed digital interventions. The CDAL, in collaboration with NPCU and KALRO, will develop and design a needs assessment tool to conduct gap mapping and analysis regarding e-services1, input provision and aggregation among others, and sharing the results with the agtechs and agripreneurs. The agtechs and the agripreneurs will implement customized services that solve the needs identified. In this process, the CDAL at the CPCU will:

- Mobilize farmers to attend meetings and trainings with the agtechs and agripreneurs;
- Ensure that profiled CIGs/VMGs/FPOs/sub-projects (to include FLID) are the target beneficiaries for the agtechs solutions/services.
- Facilitate trainings offered through agtechs and agripreneurs targeting the "profiled farmers", CPCUs, relevant county technical departments' staff and county leadership where applicable. Participate in the selection, incubation and mentorship of the agripreneurs.
- Collaborate with the ward officers as well as other technical leads at the county to ensure that the agtechs receive adequate support on the ground from the county teams.
- Offer guidance and provide budgets for expenditure towards procurement of relevant material, including licensing costs and equipment to ensure the use of the digital technologies wherever needed and guided by the approved county-specific DAT work plans.
- Monitor implementation of DAT activities as well as provide feedback and guidance.
- Prepare reports on implementation progress, aligned to the MIS, Data and Digital Trackers, OMFP and learnings as required by the NPCU and KALRO.

[1] *An e-service is a service that delivers technology, innovation and management practices (TIMPs) through data and digital services either as a single or bundled service.*

2.3.3 Target Beneficiary

The target beneficiaries refer to individuals, groups, organizations and communities who directly or indirectly benefit from a project. In agriculture, project beneficiaries can include farmers, rural communities, agribusinesses agro-dealers and others who are directly involved in the production, processing and marketing of agricultural products. Many agricultural projects aim to improve the livelihoods of project beneficiaries by increasing their income, providing access to new technologies and knowledge, and addressing other challenges facing the agricultural sector. The specific project beneficiaries will vary depending on the project's objectives and target population. In the case of NAVCDP project, the target beneficiaries are expected to:

- Be a member of a CIG/VMG/FPO/SACCO/Sub-project to receive trainings from agtechs, agtech-agents, agripreneurs and other service providers;
- Actively participate and collaborate with agtechs, agripreneurs and other SPs to explore and discover better ways of farming and commercialization techniques;
- Be willing to receive and adopt at least one digital service (demonstrate continuity);
- Provide feedback and suggestion for continuous improvement of the programme;
- Demand for appropriate TIMPs that can graduate them towards commercialization, and;
- Attend training and fora that have been initiated by the lead farmers/community-based facilitators, agtechs and agripreneurs.

2.3.4 Role of the AgTechs

An agtech is considered as an entity that uses technology to improve efficiency, productivity and sustainability in the agricultural sector through innovations in tools, processes or systems. The technology is characterized as disruptive.

The roles of the agtech in the DAT ecosystem will be to:

- Offer unique/innovative solutions to project beneficiaries.
- Participate in continuous farmer registration and mobilization, collecting additional data as needed to support their continuous innovations.
- Strengthen their HR architecture to enhance their footprints in their respective counties of operation. This may include, where required, hire qualified agents to support in their innovation.
- Support the counties in meeting their digital needs, financial inclusion, market linkages, extensions services or access to quality input products.
- Work with KALRO to disseminate TIMPs, data products and services, as well as validate their products.
- Report monthly or as agreed on their progress to the county teams as well as KALRO (for dashboard purposes).

- Train county staff, community-based facilitators and lead farmers on digital services, data-driven decision-making and partnership management.
- Actively participate in the national curative forums and match-making.

2.3.5 Role of Agripreneurs

An agripreneur will be identified and selected through a participatory process by the implementing counties, incubated and mentored by a Business Accelerator (BA) to sustainably deliver e-extension and demand generation - agro-inputs, services and market linkages; fulfillment of products and services; record keeping, commission generation and outputs to a set of 350 to 500 farmers using the agripreneur model. The allocation of agripreneurs to specific wards will be redistributed based on the number of farmers in each ward as determined by the CPCU.

2.3.6 Roles and responsibilities of the Agripreneurs

1. Participate in coaching, mentorship programs and sessions as per the OMFP program design.
2. Act as a key ambassador for smallholder farmers' empowerment using the agripreneurs' model.
3. Play the central role of consolidating farmers' agro-inputs, mechanization and marketing requirements, and facilitating transactions for approximately 350 to 500 smallholder farmers within their area of operation in collaboration with the agtechs and the county.
4. Collaborate with the county teams to develop FFS/FFBS for learning purposes with support from agtech. This will entail close collaboration with the extension linkages lead at national and county.
5. Collaborate with the counties on farmer mobilization, farmer registration and collecting additional data as needed to support their innovations, and trainings on behalf of the agtechs and generate reports to the county.
6. Work with KALRO and the county to disseminate TIMPs and e-Services, as well as validate products/services and capture feedback.
7. Report to the agtechs with data that has been validated at county level.
8. Provide feedback to the county, agtechs, BA on opportunities, gaps and learnings that may inform implementation.

2.3.7 Role of Kenya Agricultural and Livestock Research Organization (KALRO)

KALRO is a corporate body created under the Kenya Agricultural and Livestock Research Act of 2013 to establish a suitable legal and institutional framework for the coordination of agricultural research in Kenya with the following goals:

- To encourage, streamline, coordinate, and regulate crop, livestock, genetic resources and biotechnology research in Kenya.
- To expedite equitable access to research information, resources and technology, and promote the application of research findings and technology in the field of agriculture.

KALRO, with the support of the World Bank Group, through the KCSAP and NARIGP, embarked on digitizing the agricultural sector in Kenya and in establishing the Big Data platform to transform the agriculture and food system in the country. The Big Data Platform is enabling KALRO to integrate Agro Weather Data, Market Data (being collected across all physical markets in Kenya), and leverage the farmer data to provide customized, geospatial, and timely Agro weather and market information to farmers and policymakers. In addition, climate-smart agronomic advisories (good agricultural practices) across 19 value chains have also been digitized and made available to farmers via apps, a web portal, and through an IVRS system.

NAVCDP will partner with KALRO to further strengthen and expand the existing inventory of TIMPs with emphasis on climate resilience, nutrition and safer food production practices. It will also support the strengthening of the existing Big Data platform at KALRO as the foundational database for insight-driven, more productive, resource-efficient and climate-resilient farming.

The Big Data platform will support wider farmer outreach by supporting digitization of more farmers, deepening data around savings, credit, cash flows and access to market at the farmer level and mapping of other key stakeholders to enable access to financial services and market linkages for farmers under the project.

The twin projects have also laid groundwork for digitally-integrated value chains. KALRO has developed a Big Data Platform with a database of 6.4 million farmers with spatial data and producer details being utilized to provide integrated Agro-weather and market information to farmers and agricultural institutions.

The OMFP has seen 27 high potential Ag-tech start-ups signing formal agreements with 33 counties to support digital solutions in the areas of extension, credit, agro-advisory and market linkages.

The Big Data Center is responsible for:

1. Collecting and managing large amounts of data: Carried out from a variety of sources, including satellite imagery, weather data and farmer surveys.
2. Analyzing data: Analyzing data to support KALRO's research initiatives and develop new technologies and management practices for agriculture in Kenya.
3. Developing new technologies: Developing new technologies and tools for agriculture, such as precision agriculture, which involves using data and analytics to optimize crop production.
4. Promoting data-driven decision-making: Encouraging data-driven decision-making in agriculture in Kenya through providing data and analysis to support evidence-based decision-making.
5. Collaborating with other stakeholders: Through incorporating other stakeholders in the big data ecosystem, including government agencies, universities and private sector companies, to develop and implement big data solutions for the agriculture sector in Kenya.

Overall, the KALRO Big Data Center is playing a key role in promoting the use of big data in the agriculture sector in Kenya. The Big Data Centre is helping to improve decision-making, enhance crop management, and promote sustainable agriculture practices in the country.

The Role of KALRO in Kenya Integrated Agricultural Management Information System (KIAMIS)

The Ministry of Agriculture and Livestock Development (MoALD) has implemented KIAMIS to:

- Improve agricultural data collection.
- Centralize database management.
- Facilitate data sharing.

KALRO serves as the data custodian for the comprehensive farmer registration dataset ensuring data consistency, accuracy and security through:

- Regular updates through the continuous farmer registration coordinated by MOA.

KALRO organizes information from the registration exercise and provides access platforms, including:

- API integrations.
- Dashboards to support data-driven policymaking.
- Agricultural initiatives like the Fertilizer Subsidy Program.

KALRO ensures compliance with the Data Protection Act 2019 by:

- Safeguarding sensitive information in KIAMIS.
- Partnering with various organizations to develop a data protection framework for dataset organization and sharing.

To enhance the KIAMIS system, KALRO is:

- Integrating it with other data collection efforts ensuring it remains a comprehensive and up-to-date resource for informed decision-making.

The Role of KALRO in the Agripreneur System

KALRO in Supporting CDALs in the Agripreneur Express of Interest (APEOI) System:

Facilitates the implementation of the agripreneur model for County Directors of Agriculture and Livestock (CDALs).

System Development and Administration:

- Designs and manages the Agripreneur System, a centralized platform for online application submissions.
- Ensures system integrity, security, and adaptability to evolving program requirements.

Data Management and Technology Support:

- Provides CDALs with access to critical data, including national farmer registration insights.
- Supports the identification of eligible youth for the agripreneur program.
- Aligns the selection and shortlisting processes with program objectives.

Training and Capacity Building:

- Offers technology training and capacity-building initiatives for CDALs.
- Maintains a web portal for efficient application management and candidate evaluation.

Role of KALRO in Supporting the Agtechs:

KALRO plays a key role in signing Memorandums of Understanding (MoUs) with agricultural technology companies to implement the digital components of the National Agricultural Value Chain Development Project (NAVCDP). By leveraging its research skills and scientific expertise, KALRO seeks collaboration with Agtech firms to offer services like technical advice and solution validation, enhancing Kenya's agricultural ecosystem. These partnerships ensure that digital innovations- such as precision agriculture, weather forecasting tools, and pest control technologies- are scientifically relevant and tailored for smallholder farmers across various value chains.

2.3.8 Role of Business Accelerator

The Business Accelerator (BA) will be selected through a competitive process based on their ability to facilitate the required processes, develop necessary capacities, or provide the needed support services, as outlined in the Terms of Reference (ToRs) prepared by the NPCU for various activities. Their performance will be reviewed annually and renewed based on satisfactory performance, availability of funds, and continued need for technical support.

The role of the BA in supporting DAT will be two-fold; first, to guide the development, roll-out and implementation of the Agripreneur model, second, to enhance access, dissemination, and assessment of

data services within the Big Data platform. This will be achieved across national level, county (CPCU, agtechs, agripreneurs), and at the community level (project beneficiaries, community structures, and business entities).

2.3.9 Other partners

Other partners will be included on a need basis to ensure that the implementation of the digital and data investments at the national and county governments are fully supported to meet the Project Development Objective (PDO). The inclusion of the partners will also be based on their capacity to support capacity building, and strengthen sustainability mechanisms.

CHAPTER 3

DISRUPTIVE AGRICULTURAL TECHNOLOGY IMPLEMENTATION FRAMEWORK

3.1 INTRODUCTION

This chapter aims to enhance understanding of how the DAT ecosystem, a multiplicity of partners, will pragmatically inter-connect with each other to achieve the project's objectives and function as one within the available resources while contributing to the sector's digital agenda.

The implementation framework will spell out the selection criteria of the ecosystem partners and the roles and responsibilities each will play.

3.1.1 Selection Criteria

3.1.1.1 Selection of Counties

All NAVCDP counties will implement data and digital investments. The counties will undertake a needs assessment yearly to help them understand their gaps, identify their needs, and be able to identify and select the agtechs to work with, as guided by the NPCU.

3.1.1.2 Selection of AgTechs

The criteria set out to support the selection of agtechs are as below:

- Be legally registered with the relevant government authorities in Kenya.
- Show evidence of operating in the country (have footprints) for at least two years.
- Willing to work in the NAVCDP implementing counties.
- Demonstrate a revenue-generating business model.
- Demonstrate potential to scale or be in the scaling stage of the business.
- Address at least one of the 4 DAT theme.
- Have achieved at least 3X impact (three times the average annual increase).
- Demonstrate that the provided solution combines digital technologies, data analytics and innovations, Internet of Things (IOT), innovative business models or digital and analog outreach.

3.1.1.3 Selection of Agripreneurs

The eligible APs will be selected as per the following criteria:

i. Holder of a post-secondary certificate in agriculture (agronomy, horticulture, livestock production/health, range management, agricultural economics, agribusiness management, agricultural engineering).

ii. Holds a Kenyan National ID & should not be more than 35 years.

iii. Should be a resident in the ward of AP application.

iv. Should be digitally literate and in possession of a smartphone.

v. Should be able to communicate fluently in English, Kiswahili and local dialect.

vi. Experience in the field of agricultural development will be an added advantage.

vii. Participation in the farmer profiling exercise will be an added advantage.

viii. Should be available for the period of the contract.

ix. Counties are encouraged to ensure 30% of either gender in the recruitment process.

3.1.2 Implementation activities by NPCU

The NPCU will work closely with the KALRO and CPCUs to drive the data and digital investments agenda. To achieve this, in the first year, the current DAT cohort (referred to as agtechs) from the KCSAP and NARIGP projects will be on-boarded as the first agtechs. The on-boarding process involves:

- Counties identifying their gaps.
- NPCU sharing a detailed catalog of all agtechs with the counties.
- NPCU facilitating a match-making exercises between the county and the agtechs.
- NPCU curating the match and ensuring alignments.
- CPCUs and agtechs, once paired, agreeing on a mutual work plan and budgets, and signing off the MOUs guided by the NPCU.
- The NPCU will develop a pre-selection criterion, conduct a market research, request for EOI, headhunt where possible, and shortlist agtechs to be included in a catalog annually.

After year one, with support from the World Bank, the NPCU will develop a catalog of agtechs who will then be on-boarded as agtech members. The agtechs are required to meet the eligibility criteria under 3.1.1.2 to be considered into the match-making exercise.

A match-making exercise is proposed as an activity to be conducted every year to onboard additional agtechs to work with the counties. This will allow the counties to add on additional services from the agtechs on need basis. The exercise will provide the agtechs with a platform to showcase their solutions to the counties allowing the county teams to better appreciate the offerings and select the most suitable ones. The NPCU will be tasked with ensuring that there is a balance between the agtechs and the counties so that there is adequate distribution of the proposed solutions.

The role of the agtechs will be to implement their solutions at the farmer level to support the County Government in meeting its goals as per PDO.

3.1.3 Implementation activities by the Counties

Using the catalog generated, the NPCU will invite the agtechs shortlisted as well as representation of the county leadership (CECM, Agriculture), CPCs and the County Digital Agricultural Lead to a match-making exercise. Each county present will be required to meet with all the agtechs available and discuss the solution being offered and weigh if the same meets the county needs. If there is synergy, then a match is made. The county will select a minimum of three (3) agtechs to partner with in any given year. The selection should be informed by the project-county prioritized value chains. The CPCU will then initiate the inception meeting at the county level.

In terms of the agripreneurs, the counties will be responsible for selecting the right candidates as agripreneurs at the ward level and ensure that all the agtechs leverage the presence of the agripreneurs to reach the farmers and drive adoption for their innovative services/products. The CPCU and BA will select a County Mentor who would work closely with the county CDAL, hold agripreneurs accountable, manage the day-to-day operations, drive adoption and use and ensure that the reporting is happening on a regular basis.

The CPCU, will support the agtechs and agripreneurs in the following ways:

1. Based on the catalog from NPCU, through a match-making exercise, select agtechs to work in the county.
2. MoU signing and renewal based on performance.
3. Select and contract youth/women to support the project as agripreneurs.
4. Link the agripreneurs and agtechs with relevant POs, SACCOs and CIG/VMGs.
5. Arrange for farmer field days and other mobilization exercises for agtechs through agripreneurs at ward level.
6. Finalize all data and digital investments procurement requests.
7. Facilitate an inception and monitoring meetings with the county leadership (representation from CPSC and CTAC), CPCU, CTDs, SCAO, WAO and the agtechs and agreed on clear deliverables with timelines.
8. Review reporting templates and share the same with the agtech providers for M&E purposes.
9. Work with KALRO on the dashboard reporting to help monitor county progress.

The NPCU will be trained on agtech procurement specific needs and will cascade the same to CPCU, County Procurement, agtech and relevant community structures. The MoU signing exercise should be aligned with the development of an Annual Work Plan and Budgets every financial year. CPCU should support KALRO in ensuring correct updates are done in the farmer registry.

The following key activities will be funded towards this objective:

1. Mobilization of farmers to enable them be linked up with agtech providers.

2. Training and capacity building of county staff and farmers on digital technologies and also specifically as part of the implementation of the partnerships with the agtech providers.
3. Digital equipment, software and licenses that are essential for enabling the access to the range of services.
4. Technical assistance and specific consultancy costs specific to agtech solutions.
5. Monitoring and evaluation of the implementation.
6. Documentation of success stories and learnings.

3.1.4 Implementation activities by the AgTechs

Agtechs will support in responding to the agricultural needs at community level structures to include CIGs/VMGs/FPOs/SACCOs, and also supporting the county teams to strengthen the extension architecture, whilst building capacity towards TIMPs and related e-services uptake contributing to increasing commercialization and value addition.

The key agtech activities are:

- Offer innovative solutions to farmers and express their interest and capability to work in specific value chains and counties.
- Participate in the match-making process organized by the NPCU. The NPCU will do the match-making exercise based on the preferences given by the counties and by the agtech and prepare the final list.
- Shortlisted agtechs will coordinate with the counties where they got shortlisted, meet them and pitch to a larger county team on their solution and get into detailed discussions and negotiations.
- To jointly develop and, on need basis, revise the work plans and budget.
- Where applicable, sign the county-level MoU to commence the formal implementation process.
- Participate in workshops organized by the county where the agtechs would do a ToT on their products, services, the specifications, pricing terms, etc., to the county agripreneurs, lead farmers, county-based staff or agents (where applicable) to support implementation.
- Based on the value chain, products and services that the agtech offers, respective agripreneurs would be assigned to work closely on the pre-sales process, creating awareness about their products/services, capturing the demand and passing the same to the agtech to plan for service delivery.
- Report to the county as per the reporting tools; and to KALRO, who will deploy a digital system that would capture the interactions between all the actors, create an interface for the CPCU, NPCU, program M&E teams to track, monitor and report the progress made by agripreneurs, agtechs, etc.

3.1.5 Implementation activities by the Agripreneurs

i. The APs will be mentored and supported through a staged AP approach, leveraging both digital and physical resources.

ii. The APs mentorship program consists of three stages: Bootcamp, Incubation, and Commercialization, spread over 18 months. These stages are designed to support APs in overcoming challenges and seizing opportunities as depicted in table 2 below.

Table 2: AP Mentorship Levels

Bootcamp (Month: 1)	Incubation (Month: 2-12)	Commercialization (Month: 13-18) & beyond
Activities: Foundational training on essential entrepreneurial skills. Conducting KYC on farmers and project institutions Awareness creation on TIMPs	**Activities:** Training on business & Financial skills. Mobilizing farmers and facilitating membership in SACCO/FPO Technical assistance and TIMPs training Engage farmers on extension services and technology adoption in collaboration with the agtechs. Demand assessment and understand market dynamics	**Activities:** Continued extension services and sale of agricultural inputs, equipment, and services. Expansion of reach to farmers/institutions increasing income potential. Access to scale-up capital and advanced mentorship opportunities.
Outcome: Agripreneurs establish a strong customer base and gain essential skills to kick-start their entrepreneurial journey.	**Outcome:** Agripreneurs gain a deeper understanding of the agricultural sector, access to working capital, and are equipped to provide extension services to farmers.	**Outcome:** Agripreneurs enhance their market presence, increasing their income potential, and can access the resources and support needed to grow and thrive in the agribusiness

3.1.6 Implementation activities by KALRO

KALRO will provide a suite of digital services to the agtechs through its e-services platforms; online portals, mobile applications, SMS, call centre and IVR, and other digital tools. Additionally, KALRO hosts the Big Data Platform nationally and will be the custodian of the One Million Farmer Platform (OMFP). The key implementing activities to be undertaken by KALRO include:

- Provide support and maintenance of the big data infrastructure through subscription and licenses.
- Hosting of the Agriprenuer model systems, data and Networks.
- Capacity building of various stakeholders to include KALRO technical staff; NPCU, agtechs; agripreneurs; County staff/ CPCU; and smallholder farmers.
- Continuous data enriching through data collection and curation.
- Sharing of e-services content to agtechs for dissemination.
- Upgrading, maintaining and development of additional products and services for the e-services platform.

CHAPTER 4

" Tell our money what to do"

DATA AND DIGITAL INVESTMENT FIDUCIARY GUIDELINES

4.1 FINANCIAL PROCEDURE

The CPCU will ensure funds disbursed to the county are ring-fenced for DAT activities as provided for in the approved work plan and budget developed jointly by the counties and agtechs after signing the MoU with clear deliverables and timelines or milestones.

DAT work plans and budgets approvals will be done at the National level and any adjustment to the work plans and budgets should be done through formal requests sent to the NPC copying the NDAL seeking a "No Objection" to effect the adjustment. However, the adjustment should be agreed on by both the agtech and the CPCU.

4.2 PROCUREMENT PROCEDURE

The method that will be used in the Procurement of agtechs is Direct Procurement though in some instances Request for Quotation is also applicable (See Annex 2). Section 103 of the Public Procurement and Disposal Act (PPAD) 2015 allows for direct Procurement; "103. (1) A procuring entity may use direct procurement as allowed under sub-section (2) as long as the purpose is not to avoid competition. (2) A procuring entity may use direct procurement if any of the following are satisfied: The goods, works or services are available only from a particular supplier or contractor, or a particular supplier or contractor has exclusive rights in respect of the goods, works or services, and no reasonable alternative or substitute exists. The NPCU shall authorize direct procurement of agtech innovation technologies, goods, services and works. The procedure for direct procurement has been annexed in Annex 7.

Below are some of the challenges and mitigations common during the procurement process:

Table 3: Anticipated challenges and recommended mitigations

Challenges	Recommended Mitigations
Accounting and procurement officers have inadequate information on agtech activities and application of procurement procedures on sourcing of agtechs	Continuous sensitization of accounting and procurement officers on agtech activities and procurement procedures on sourcing of agtechs
Agtechs are not familiar with public procurement procedures	Procurement officers to sensitize the agtechs on procurement procedures immediately after signing of MoUs
Delays in delivery of goods and services by the agtechs	Enforce adherence to the terms and conditions in the signed MoUs and work plans

Challenges	Recommended Mitigations
Lack of value realization in implementation some activities e.g. platform licenses	Agtechs to embed license fee into the product or service offering or a one-off long-term license Allocation of funds for renewal of licenses by the County Government through the Accounting Agriculture Officer
	Contribution by beneficiaries to keep the license running Agtechs to share their sustainability model and plan at inception

CHAPTER 5

ENABLING ENVIRONMENT

5.1 5.1 Introduction

Digitalization could be a game changer in boosting productivity, profitability and resilience to climate change. However, it takes a village.

As outlined in the Digitalization of African Agriculture Report – 2018/2019, in agriculture this effort should have four inter-connected pillars: Digital innovations, big data and analytics, business development services, and the enabling environment. An enabling environment for data and digital investment in agriculture refers to the set of conditions and factors that support and strengthen the development, deployment, and use of data-driven technologies and services in the sector.

Farmer registration and usage numbers in the DAT initiative suggest that it has been able to develop an attractive and proven value proposition, with potential for commercial returns. The current challenge, which goes beyond the DAT ecosystem, is scaling which requires an enabling environment to increase and strengthen the gains in the Digital Agriculture ecosystem focusing on implementation, access/dissemination and sustainability.

The enabling environment includes digital (such as broadband internet and data storage facilities, favorable policies i.e. public policies which will include regulatory policies, and organizational policies that will address the specific consortium needs etc. data governance and mobile internet); and non-digital (a supportive ecosystem of national, county private-sector actors, and a skilled workforce capable of utilizing digital tools and services - roads, knowledge and energy).

A favourable enabling environment is critical to realizing the potential benefits of digital investment in agriculture, including improved productivity, better access to information and markets, and contributing to improved food security.

NAVCDP will adopt a Digital Public-Private Dialogue Platform (DPPDP) that facilitates communication and engagement, and will integrate the public sector- both at national and county; private sector; regional players; and small holder farmers and farmer groups to exchange experiences informing the DAT processed, implementation, access and sustainability.

The platform will include features such as: Discussion forums; Chat rooms; and Online meetings, and collaboration tools that enable stakeholders to engage in real-time dialogue, share documents and data, and participate in virtual events and webinars.

5.2 Policy and Regulatory Frameworks

5.2.1 Supportive Government Policies

In Kenya, a robust policy framework is essential for promoting digital innovation in agriculture. The government should establish clear policies that encourage the integration of digital technologies into agricultural practices. This includes:

National Agricultural Policy: Developing comprehensive policies that support the adoption of digital tools and technologies in farming, aligning with national development goals such as BET Agenda, ASTGS and Vision 2030.

Inclusivity: Ensuring policies consider the needs of smallholder farmers, promoting equitable access to digital innovations across different regions and communities.

5.2.2 Regulations on Data Governance

Effective data governance is critical for safeguarding farmers' information and enhancing trust in digital platforms. Kenyan policies should focus on:

Data Protection Act Compliance: Implementing regulations that align with the Data Protection Act of 2019 to ensure farmers' data privacy and security. This includes clear guidelines on data ownership and consent.

Data Sharing Frameworks: Establishing protocols for sharing agricultural data among stakeholders such as KALRO, agritech firms, and government agencies, to facilitate better decision-making while protecting sensitive information.

5.2.3 Digital Financial Services Regulations

Given the role of digital financial services in enhancing farmers' access to credit and insurance, Kenya needs:

Regulatory Frameworks: Clear regulations governing digital lending and insurance products, ensuring they are accessible and fair. The Central Bank of Kenya can play a pivotal role in collaboration with banks and other institutions in overseeing these services.

Consumer Protection: Implementing consumer protection laws that prevent exploitative practices and promote transparency in digital financial transactions.

5.2.4 Rural Connectivity Initiatives

Improving rural connectivity is vital for the success of digital agriculture in Kenya. Key initiatives should include:

Infrastructure Investment: Increasing government investment in expanding broadband and mobile network coverage in rural areas. Programs like the Universal Service Fund can be leveraged for this purpose.

Public-Private Partnerships: Encouraging collaborations between the government and private telecommunications companies to enhance internet accessibility. This can involve subsidies for telecom firms that extend services to remote regions.

Community Access Points: Establishing community resource centers equipped with internet access, training, and digital tools, enabling farmers to utilize available technologies.

5.2.5 Incentives for Agritech Companies

To stimulate growth in the agritech sector, Kenya should introduce various financial incentives including:

Tax Incentives: Offering tax breaks for agritech firms investing in innovations that enhance agricultural productivity and sustainability, encouraging local solutions tailored to Kenyan agricultural challenges.

Grants and Subsidies: Allocating government funding to support agritech start-ups and initiatives that aim to enhance digital agriculture. Programs like the Kenya Climate-Smart Agriculture Project could be expanded to include such support.

Innovation Hubs: Creating incubators specifically for agritech innovations, providing mentorship, funding and resources to young entrepreneurs and start-ups in the agricultural sector.

5.2.6 Monitoring and Evaluation Frameworks

To ensure the effectiveness of policies promoting digital agriculture, Kenya should implement robust monitoring and evaluation systems. These include:

Data Collection Mechanisms: Developing frameworks for collecting data on the adoption and impact of digital technologies among farmers, such as through the Kenya National Bureau of Statistics.

Stakeholder Feedback: Establishing feedback mechanisms for farmers and stakeholders to share their experiences with digital innovations, allowing for policy adjustments based on real-world challenges.

Regular Policy Assessments: Conducting periodic reviews of agricultural policies to adapt to technological advancements and emerging agricultural challenges, ensuring alignment with national development objectives.

5.2.7 Digital Infrastructure

5.2.7.1 Reliable Broadband Internet and Mobile Network Coverage

Access to reliable broadband internet is foundational for the successful implementation of digital agriculture in Kenya. Key considerations include:

- Infrastructure Development: Expanding fiber optic networks and satellite connectivity in rural areas to ensure consistent internet access. The government can collaborate with private telecom companies to enhance infrastructure in underserved regions.
- Universal Service Fund Framework (USF): The Kenya Information Communications Amendment Act 2009 (KICA 2009) and the Kenya Information and Communications Regulations 2010 (KICR US&A 2010), established the Universal Service Fund (USF) under the Communications Authority of Kenya (CAK) to complement private sector initiatives towards meeting universal access objectives. The fund seeks to enhance digital inclusion and foster equitable access to communication services; it is crucial to promote the rollout of communications infrastructure in rural, remote, and underserved areas. Ensuring the availability of communication services is also essential for persons with disabilities, women and other vulnerable groups, allowing them to participate fully in society. Additionally, supporting the development of capacity-building initiatives in information and communication technologies (ICTs) and technological innovation will empower communities to utilize these tools effectively. Expanding communication services to schools, health facilities, and other organizations that serve public needs will further strengthen community resources and access to information. Finally, facilitating the development of and access to a wide range of local and relevant content will ensure that digital tools meet the specific needs of various communities, enhancing overall engagement and usability.

Robust mobile network coverage is essential for enabling farmers to utilize digital services effectively. Initiatives to enhance mobile connectivity should focus on:

- Telecom Partnerships: Partnering with telecommunications providers to improve signal strength and coverage in remote farming regions. This could involve incentivizing companies to invest in infrastructure where connectivity is currently weak.
- Community Mobile Access Points: Establishing community-based mobile access points to provide internet connectivity, allowing farmers to use mobile apps for agricultural services even if they lack personal devices.

5.2.7.2 Digital Platforms for Service Delivery

The development of digital platforms is crucial for delivering essential tools and services to farmers. This includes:

- Mobile Applications: Creating user-friendly mobile apps that provide weather forecasts, market prices, and good agricultural practices (GAPs). These apps should be designed with input from farmers and other stakeholders to ensure they meet their needs.
- Integrated Platforms: Developing integrated digital platforms that combine various services, such as access to extension services, market linkages and financial products, streamlining the user experience for farmers.

5.2.7.3 Data Storage and Processing Facilities

Effective data management is critical for leveraging digital agriculture. Key elements include:

- Local Data Centers: Establishing local data centers i.e. Big Data platform at KALRO, to support the processing and analysis of agricultural data, ensuring faster access and minimizing latency issues for users in Kenya.
- Cloud-Based Services: Utilizing cloud-based solutions for data storage and processing, enabling real-time data collection and analysis. This can enhance the efficiency of data analysis by utilizing high performance systems with respect to data sovereignty regulations.

5.2.7.4 Real-Time Data Collection and Analysis

The ability to collect and analyze data in real-time is vital for making informed decisions in agriculture. This can be achieved through:

- IoT Devices: Implementing Internet of Things (IoT) devices that monitor soil moisture, weather conditions, and crop health, providing farmers with timely data to optimize their practices.
- Data Analytics Tools: Providing farmers and agricultural stakeholders with access to data analytics tools that help interpret collected data and derive actionable insights for improved productivity and sustainability.

In summary, the implementation of Internet of Things (IoT) devices in Kenya can transform agriculture by providing real-time data on soil moisture, weather conditions, and crop health. These devices help farmers optimize irrigation, plan planting schedules, and detect pests or diseases early, which is crucial in a country facing climate variability and water scarcity. Additionally, access to data analytics tools enables farmers to interpret the data generated by IoT devices, allowing them to make informed decisions that enhance productivity and sustainability. By analyzing market trends, farmers can better time their sales for optimal profits, while data analytics also supports the adoption of sustainable practices by minimizing chemical use. Overall, integrating IoT and data analytics in Kenyan agriculture can significantly improve yields and food security.

5.3 5.3 Access to Financial and Technical Resources

Digital financial services (DFS), including mobile banking, digital payment platforms, and access to credit or insurance, help farmers and agribusinesses make investments in digital tools. Technical assistance and capacity-building initiatives to train farmers and agribusinesses on how to use digital technologies effectively.

5.3.1 Mobile Banking and Payment Platforms

- Revolutionized Transactions: Platforms like M-Pesa allow seamless money transfers and payments, improving financial management for farmers.
- Increased Safety: Reduces reliance on cash transactions, promoting safety and transparency.

5.3.2 Access to Credit and Insurance

- Innovative Financing Solutions: Digital financial services provide micro-loans tailored for smallholder farmers, enabling them to purchase essential inputs and equipment.
- Risk Mitigation: Digital insurance products help protect farmers against losses from climate variability and market fluctuations.

5.3.3 Investing in Digital Tools

- Enhanced Efficiency: Access to DFS allows farmers to invest in technologies like IoT devices and data analytics software, leading to increased yields and better-quality produce.

5.3.4 Workshops and Community Engagement

- Demonstrating Benefits: Community workshops highlight the advantages of digital financial services and promote best practices in financial management.
- Knowledge Sharing: Engaging local extension officers fosters a supportive learning environment.

5.4 Partnerships and Collaboration

Collaboration between governments, private sector players, research institutions and international organizations allow for the pooling of resources, expertise and networks to drive innovation in the agriculture sector. This collaborative approach helps to remove barriers to innovation, facilitate knowledge sharing, and enable the adoption of digital technologies that can transform the agriculture sector and improve the livelihoods of farmers. Public-private partnerships (PPPs) help leverage resources, share risks, and ensure the sustainability and scalability of digital agricultural innovations.

5.4.1 Collaboration with Stakeholders

Partnership development through collaboration among government agencies, NGOs, and the private sector enhances the relevance of training and facilitates resource sharing. This collaborative approach ensures that training programs are tailored to address the specific challenges faced by farmers, making them more effective and practical in real-world applications.

Shared Risks and Benefits

In a PPP, both the public and private partners share the risks (such as financial risk, operational challenges, or political changes) and benefits (such as increased revenue or improved public services) of the project.

Long-term Agreement

Public-Private Partnerships (PPPs) involve long-term agreements, such as contracts or Memorandums of Understanding (MOUs), that typically span from 1 to 5 years. These agreements are in place to ensure the sustained operation of the project for the foreseeable future.

Co-investment and Resource Sharing

This includes the contribution of funding, technology and physical infrastructure. The private sector offers technical expertise, while the public sector provides regulatory support and guarantees. This collaboration allows for a more efficient and sustainable allocation of resources to address various challenges and opportunities.

Performance-based Outcomes: There is a clear project objective with performance metrics that ensure parties meet their commitments. Private partners often have incentives to meet certain performance targets to maximize their returns.

5.5 Capacity Building

Capacity building and training are essential for the successful development and implementation of e-services and digital solutions in Kenya's agriculture sector. The primary focus is on enhancing the knowledge, skills, and competencies of smallholders, agricultural workers, organizations, and communities, enabling them to adopt, utilize and benefit from these technologies effectively.

5.5.1 Training Programs

- Hands-On Training: Sessions educate farmers on using mobile banking, digital payments, and online applications for credit and insurance.
- Importance of Digital Literacy: Ensures farmers are equipped to effectively utilize available services.

5.5.2 Collaborative Training Programs

Training initiatives will be rolled out in partnership with the NPCU, the Kenya Agricultural and Livestock Research Organization (KALRO) and other stakeholders. These programs will encompass hands-on practical training, online sessions and workshops covering various topics, such as data management, digital technologies, and agribusiness practices. The ultimate goal is to enhance the effectiveness and sustainability of the e-services platform, ensuring stakeholders can maximize the benefits of digital technologies in agriculture.

5.5.3 E-Service Training for AgTechs and Agripreneurs

KALRO, in collaboration with NPCU and the Business Accelerator, will develop a capacity-building plan to provide e-service training specifically for agtech companies and agripreneurs. This training will focus on strengthening their knowledge and capacity in utilizing digital tools and services to support agricultural value chains, thereby improving the livelihoods of smallholder farmers. Participants will learn to effectively engage with e-extension services, including digital advisory and market information services, thereby enhancing access and dissemination of vital information.

5.5.4 Training County Staff on E-Services

Providing training to county staff in agripreneurship will equip them with the necessary skills and knowledge to understand the needs and opportunities for agribusinesses in their regions. This training

will cover essential topics such as e-extension, marketing, financial management, business planning, and relevant government policies and programs that support agribusiness. By building the capacity of county staff, they will be better positioned to assist smallholder farmers, drive economic growth, and improve livelihoods through access to digital systems.

5.5.5 Lead Farmers and Last Mile Training

The Lead Farmer training model adopts a participatory approach to capacity building in agriculture. In this model, selected successful farmers - known as lead farmers - receive training in best practices, new technologies, and innovative farming methods. They will then disseminate this knowledge to other farmers in their communities through on-farm demonstrations, workshops, and mentorship programs. This approach facilitates rapid information sharing and builds capacity at the community level, leading to higher adoption rates of improved practices and technologies, ultimately boosting agricultural productivity and sustainability.

5.5.6 Enhancing Digital Literacy Across the Agricultural Workforce

Developing the skills and knowledge of farmers, agricultural workers and institutions to effectively use digital technologies is crucial. This involves implementing comprehensive training programs, workshops, and hands-on support to ensure the agricultural workforce is equipped with digital literacy. By enhancing digital skills, workers can make informed decisions that maximize the benefits of digital tools, thereby improving efficiency and productivity in their operations.

5.5.7 Implementation of E-extension; E-Services)

Various stakeholders play essential roles in supporting e-extension and e-services in agriculture. Government agencies create policies and provide the necessary infrastructure to facilitate these services, while the private sector contributes technology and expertise through the involvement of AgTechs and Business Advisors (BAs). Research institutions like KALRO and CGIAR offer scientific research, technical expertise and knowledge to enhance the effectiveness of e-extension initiatives. Farmers and farmer organizations represent the needs of the farming community, providing feedback to ensure that e-extension services remain relevant and effective. Service providers, including organizations such as DAT Cohorts, KALRO, and Agripreneurs, deliver e-extension and e-services directly to farmers and other stakeholders, offering training and technical assistance. Lastly, development partners like NAVCDP provide both financial and technical support to bolster e-extension and e-services initiatives. Together, these stakeholders create a collaborative environment that enhances agricultural productivity and support for farmers.

5.5.8 Access and dissemination

Access and dissemination refer to the process of making information, knowledge and technologies available and accessible to the target audience. In the context of data and digital investments, it involves providing farmers and other agricultural stakeholders with access to digital technologies, information and services to support their activities. This can include providing training and support to use the technologies, as well as ensuring the information and services are relevant, up-to-date and easily

accessible. The goal is to improve the adoption and usage of digital technologies and services in the agricultural sector to support sustainable agriculture practices.

The role of various stakeholders in Access and Dissemination of data and digital technologies is as shown in table 4 below.

Table 4: *Stakeholders Roles in Access and Dissemination of data and digital technologies*

STAKEHOLDER	ROLE
Government Agencies	Create policies and provide infrastructure to support and data and digital technologies.
Private Sector	Provide technology and expertise to support data and digital technologies.
Research Institutions	Provide scientific research, technical expertise and knowledge to support data and digital technologies.
Farmer and Farmer Organizations	Represent farmers' needs and provide feedback on data and digital technologies to ensure they are relevant and effective.
Service Providers	Provide data and digital technologies to farmers and other stakeholders.
Development Partners	Provide financial and technical support to support data and digital technologies.

5.5.9 Sustainability

Big Data infrastructure

Sustainability of big data initiatives can be achieved through various streams such as revenue generation through providing data-driven products and services, collaboration and partnerships with private sector and government entities, leveraging existing infrastructure and resources, and ensuring that data management processes are efficient and cost-effective.

Additionally, building capacity and skills within the organization, involving the community in data collection and management, and implementing effective data governance frameworks can also contribute to the sustainability of big data initiatives.

AgTech and Agripreneur model

Data and digital technologies can be provided at a fee to recover the costs of their development and maintenance, as well as to ensure their sustainability. This proposed fee-based model can incentivize providers (agripreneur/agtech) to improve their goods and services and ensure that users receive quality and reliable services.

The fees can be adjusted based on the type and level of goods and services provided, as well as the target beneficiaries. Taking into consideration affordability of the goods and services for the target

beneficiaries, especially smallholder farmers, in order to ensure that the solutions provided are accessible and have a positive impact on their lives.

Capacity building

In the context of the disruptive agricultural technologies ecosystem, capacity building may include training and development programs for farmers, agripreneurs, government staff and other stakeholders.

The objective of capacity building is to ensure that all actors involved have the necessary skills and knowledge to effectively use and maintain the technology and to contribute to the sustainability of the ecosystem. This could involve providing technical training, improving access to information and resources, promoting collaboration and partnerships, and encouraging the uptake of innovative solutions.

Support from National government

The national government can play a crucial role in supporting and maintaining the ecosystem for disruptive agricultural technologies through various initiatives and policies. These can include providing funding for research and development, creating a favourable regulatory environment, and promoting the adoption of new technologies through education and outreach programs.

Additionally, the government can partner with private sector organizations and academic institutions to build capacity and foster collaboration in the development and implementation of new technologies. The government's role in promoting and

sustaining the ecosystem is critical in ensuring its success and ensuring that it meets the needs of farmers, agripreneurs and other stakeholders in the agricultural sector.

CALENDAR OF ACTIVITIES

The calendar lists out the key milestones or activities that will be undertaken during the first year of the project.

Table 5: Calendar of Activities

#	Activity	Responsible	M1		M2	M3	M4	M5	M6	M7	Ad hoc	Yearly	Quarterly
	NPCU Activities												
1.	Recruitment and onboarding of Business Accelerator	**NPCU**	X		X								
2.	Development of agripreneur rollout framework	**NPCU, CPCU**	X		X								
3.	Recruitment and on-boarding of Agtechs	**NPCU, CPCU**			X	X							
4.	Match-making Agtechs to counties and offer guidance on pairing and budgets	**NPCU, CPCU**			X X		X						
5.	On-boarding and continuous sensitization activities for CDAL	**NPCU, CPCU**	X	X	X		X	X	X	X			
6.	Sensitization and capacity building of all teams including CPCUs, agripreneurs, agtechs	**NPCU, CPCU, KALRO**	X	X	X		X	X	X	X			
7.	Linkages with other components	**NPCU, CPCU**	X	X	X		X	X	X	X			
8.	PMEL&L of overall DAT activities	**NPCU, CPCU**					X	X	X				
9.	Development, updating and sharing of e-services	NPCU	X	X	X		X	X	X	X			
	KALRO Activities												
10.	Map agtech needs that can be accessed through the big data. Data needs, use, frequency of sharing	KALRO, Agtech, CPCU											

11.	Data analytics and reporting on Big Data	KALRO										
12.	Farmer database update and Database management	KALRO	X	X	X	X	X	X	X			
	CPCU Activities											
13.	Recruitment and onboarding of agripreneurs	CPCU, Agtechs		X								
14.	Onboarding agtechs into NAVCDP, KALRO TIMPS & MEL	CPCU		X								
15.	Farmer mobilization and trainings	CPCU, Agtech	X	X	X	X	X	X	X			
16.	Offer guidance and provide budgets	CPCU	X	X	X	X	X	X	X			
17.		CPCU										
	Agtech Activities											
18.	Training of county staff and agripreneurs on technologies provided	Agtech, KALRO		X	X	X	X	X	X			
19.	Farmer mobilization, registration and onboarding	Agtech, CPCU, Agripreneur	X	X	X	X	X	X	X			
20.	Dissemination of e-services products	Agtech, KALRO	X	X	X	X	X	X	X			
21.	PME&L and reporting	Agtechs			X			X				
	Agripreneur Activities											
22.	Participating in coaching and mentoring programmes	Agtech, CPCU, KALRO, BA	X	X	X	X	X	X	X			

23.	Collaborate in farmer mobilization and registration	Agripreneur, Agtech, CPCU	X	X	X	X	X	X	X			
24.	Offer digital solutions to target farmers	Agripreneur, Agtech, KALRO	X	X	X	X	X	X	X			
25.	Training farmers on GAP and digital solutions	Agripreneur, KALRO, Agtech		X	X	X	X	X	X			
26.	Reporting to agtechs and validation by the county	Agripreneur			X	X	X	X	X			

CHAPTER 6

" What is measured gets done".

PARTICIPATORY MONITORING, EVALUATION AND LEARNING

6.1 Introduction

Participatory Monitoring, Evaluation and Learning (PMEL) is a process of engaging different stakeholders, especially targeted project beneficiaries in the implementation, and assessment of development programs and projects. It is essential in generating better M&E information and/or to empower stakeholders. The PMEL increases accountability and ownership, improves the quality programme/project, and enhances learning and decision-making. The PMEL is facilitated through an agreed standards set of tools and methods used to enable effective M&E.

Participatory Monitoring, Evaluation and Learning (PMEL) are strongly tied to NAVCDP goals. As part of citizen engagement, the project engages with the communities intensively and to ensure their participation and complete ownership in the planning, preparation and implementation of the targeted milestones. This ensures that beneficiaries learn from other beneficiaries' experiences and best practices. The process will involve regular collection, analysis and use of data on program inputs, outputs, outcomes and impact. Feedback from stakeholders will help to inform adjustments and improve implementation, ensuring that project remain relevant and responsive to changing needs of NAVCDP target beneficiaries.

Data is paramount in the PMEL process and supports establishment of baselines, assess the implementation progress and guide setting of performance goals. In this background, data will be collected at the national, county and community levels. The main tools for data collection will be questionnaires and checklists customized from those contained in NARIGP/KSCAP M&E Manual and digitalized for use. The project will enshrine DAT indicators in its web-based PMIS to assist in timely data collection, analysis, reporting and management of information on achievements and lessons learned. The data collection will focus on the results indicators as stipulated in the project results framework, among others, as discussed in the following section.

6.2 NPCU and KALRO DAT PME&L

1. Number of farmers and farmer groups sensitized on e-services, at least 50% to be farmers.
2. Percentage increase in farmers with improved market access.
3. Percentage increase in farmers selling produce in value added form (both on farm and off farm).
4. Number of CIG members who have taken up/using DAT.
5. Number of Lead farmers who have taken up/using DAT.
6. Number of POs who have taken up/using DAT.
7. Number of farmers using/adopting E-services.

8. Number of Agri-Tech agencies partnered with as part of the One Million farmer Platform.
9. Number of farmers accessing productivity services/market linkages/credit services through the partnerships with Agri-Tech agencies.
10. Statistics on:
    a. Adoption rate of recommended practices and technologies.
    b. Increased yield and income.
    c. Improved access to markets i.e. volume of produce transacted through digital Platform.
    d. Increased resilience to environmental and economic shocks.
    e. Increased use of digital technologies.
    f. Improved access to credit and financial services.
    g. Enhanced capacity and skills of farmers.
    h. Improved soil analyses.
11. Numbers of agtechs on boarded
    a. Per value chain.
    b. Per thematic area.
    c. Number of agripreneurs on boarded.
    d. Number of agripreneurs completed incubation and mentorship.
12. Data – disparity in reported data by the counties and the cohorts; reporting on value chains not within the project's target beneficiaries.
13. Bundling opportunities and capitalization of the same.
14. Align to the 4 tracks of:
    a. Efficiency - the process to mobilization, sensitization and trainings.
    b. Outputs, outcomes and impact.
    c. Sustainability at beneficiary level and agtech level to include pragmatism of the agtech's service/ products model to uptake.
    d. Environment and Social Safeguards; Prudency in funds utilization; and value for money.
15. Aligned to the fiduciary requirement:
    a. Procurement status.
    b. Funds flow and utilization.

16. Cross-cutting aspects:

a. Environmental and Social Safeguards.

b. Gender mainstreaming and social inclusion.

17. Gaps, opportunities and learning points using evidence-based testimonies from beneficiaries.

6.3 Gender Mainstreaming, Social Inclusion and Integration

Gender concerns will be integrated in Data and Digital planning, implementation, participation, and monitoring and evaluation since gender mainstreaming and social inclusion are vital in achieving the PDO objectives. The NAVCDP's VMGMF provides guidelines for social inclusion and gender mainstreaming. All stakeholders for the investment will be accountable to gender mainstreaming and social inclusion by ensuring the collection and reporting of gender-disaggregated data.

Any grievance/conflict resulting from NAVCDP supported data and digital activities, awareness will be created during implementation period on availability and contacts for robust grievance management mechanism channels to include escalation mechanism. Special channel will be created for handling Gender Based Violence (GBV) and sexual exploitation and abuse/sexual harassment issues, as stipulated in the NAVCDP SEAH plan.

The Project will undertake targeted training of trainers (ToTs) workshops for the DAT ecosystem teams, awareness creation and sensitization forums at the community level, targeted communication and information sharing, youth involvement in ICT and social media, as well as tailored training and skills development programs.

NAVCDP will integrate gender and social inclusion issues during the community mobilization and planning stage processes in order to: identify the different categories of farmers (men, women, youth, VMGs) within the wards, and establish the socio-economic status, constraints, needs and priorities for men, women, youth, and VMGs.

6.4 Communication of the DAT Ecosystem

A communication plan will enable enhancement of information and knowledge management among stakeholders for effective and efficient implementation of the programme. The goal of this plan is to contribute to the productivity and ease of implementation of activities by the team to facilitate value addition to farmers.

The flow of information from the national level to grassroots will be carried out in many ways ranging from workshops, seminars, letters, internal memos, and appraisal while communication from grassroots implementers to the national level will mainly be done through reports. Letters may also be used depending on the subject being communicated.

Knowledge Management is the process of capturing, distributing, and effectively using knowledge, while communication is the art of imparting or exchanging information by speaking, writing, or using other communication media. The strategic knowledge management and communication approaches to be used in NAVCDP will include interpersonal communication (workshops, meetings, roadshows, conferences, farm visits etc.,), mass media, social and digital media/ ICT/Internet.

Communication within and out of the DAT ecosystem will align to the project's communication and knowledge management pathways as outlined in the Communication manual.

Annexes

Annex 1: AgTech Catalog

One Million Farmers Platform Cohort Members

Catalogue

Category 1: Productivity

- **Aquarech**, a mobile-based service delivery platform is linking fish-farmers to feed suppliers and markets which aggregates demand as a business enterprise is resulting in a significant increase in productivity – Website
- **agriBORA** makes smallholder farmers visible, bankable and accessible by offering farmer groups access to technology to support their production activities through tools for data – website
- **DigiCow**, (operating as Farming tech Solutions) is a mobile-based service delivery platform linking small livestock owners to veterinary and artificial insemination services and feed suppliers which aggregates demand as a business enterprise is resulting in a significant increase in milk productivity. Website
- **Farmers Pride**, (also operates as Shambas Pride) which combines franchise model, technology and village youth agents to bridge inputs, services and information gap among rural smallholder farmers – Website
- **Hello Tractor**, provides technology IoT hardware and software for tractor owners to better manage their equipment, fuel, and operators while servicing smallholder farmers in need of mechanization services resulting in an increase in crop productivity. Website
- **Kuza**, a smallholder farmer ecosystem management platform that leverages the last-mile entrepreneurial agents to increase the income of smallholder farmers at scale Website
- **Precision Agriculture for Development**, which reaches farmers with personalized agricultural advice through their mobile phones - Website
- **SunCulture**, which develops and offers solar-powered smart irrigation systems. Website

Category 2: Market linkages

- **Farmshine**, is a digital platform that connects farmers with information, suppliers and service providers they need to help them access the markets – website
- **M-Shamba**, a digital extension platform that uses interactive voice response services to extend and transfer agricultural technologies to smallholder farmers. Website

- **TruTrade Africa**, which uses cloud-based mobile and online applications to provide smallholder farmers with linkages to market and fair prices for their produce. Website

Category 3: Financial inclusion

- **ACRE Africa**, links farmers to crop, livestock and index insurance products to shield them against unpredictable weather conditions
- **Amtech** is an agtech company that offers loans to small-scale farmers who are registered in groups through credit scoring enabling them access other services – website
- **Apollo Agriculture** is an agtech company that helps small-scale farmers maximize profits by bundling services such as financing, farm inputs, advice, insurance and market access. Website

Category 4: Data analytics

- **AgroCares**, (partnering with Fadhili Kenya) provides a handheld scanner that allows instant, on-the-spot and affordable monitoring of nutrients in soil, feed and leaf. It is combined with an app thus providing quick on-site access to key nutrients in soil with an option to provide advice on fertilizer applications.
- **Astral Aerial**, which operates affordably priced drones that can cover 1000 acres per flight, with sensors to detect crop health. Website
- **Digital Green**, who offers FarmStack that is an open-source product suite, enabling data sharing among farmers, agriculture service providers, and government organizations by addressing key barriers to data sharing at each level of the agricultural ecosystem
- **Cropnuts** provides laboratory, precision agriculture and soil fertility and fertilizer use advisory services. Partnering with farmers to increase their profitability, by raising crop yields through better soil and fertilizer management, and by reducing their input costs through a combination of building healthy soils and adopting precision farming technology – website
- **Oakar Services**, a geospatial consulting firm focused on providing GIS, remote sensing, and other related geospatial consultancy services
- **UjuziKilimo**, a real-time soil testing service using technology to provide precise and actionable agricultural information to farmers using sensors and mobile phone technologies

Annex 2: Disruptive Agricultural Technologies MoU

Disruptive Agricultural Technology (DAT) Memorandum of Understanding

Preamble

The One Million Farmers Platform is an initiative of the World Bank Group and other partners to ensure that One Million smallholder farmers can utilize digital solutions to increase their productivity, profitability and resilience.

This MEMORANDUM OF UNDERSTANDING is made between the COUNTY GOVERNMENT OF ..... and the DISRUPTIVE AGRICULTURAL TECHNOLOGY (DAT) INNOVATORS (hereinafter also referred to as agriprenuers/ agtechs) comprising of *...List all the agriprenuers that the county will partner with*..... on .....date and year..... (Hereinafter referred to jointly as "the Parties").

WHEREAS

A. The Republic of Kenya (Recipient) has negotiated and signed a Financing Agreement dated..... (the "Financing Agreement") with the International Development Association (IDA) (hereinafter called the World Bank) for an amount of Euro 223,300,000 (the "Credit") to fund National Agricultural Value Chain Development Project (hereinafter called NAVCDP or simply, the Project);

B. The Recipient has agreed with the World Bank that the Ministry of Agriculture and Livestock Development (MoA&LD), will be the lead implementing agency for NAVCDP and will facilitate the County Governments as envisaged in the Financing Agreement and the Project Implementation Manual through a grant, and

C. The County Government of ..... has signed a Participation Agreement with MoA&LD for the implementation of NAVCDP activities in ..... County, part of which will focus on investments at the County level to enable the farmers to leverage Data & Digital technologies to enhance their productivity and profitability and also contribute towards policy dialogues and access to finance for smallholder farmers.

NOW THEREFORE

In consideration of the commitments and agreements contained herein, the Parties agree as follows:

1. OBLIGATIONS OF THE COUNTY GOVERNMENT

The county shall provide full support to the agtech and cover costs for farmer mobilization, training, and operational expenses at the county level where applicable. The county will leverage resources available under the World Bank project, NAVCDP and utilize other county resources towards investments at farmer level to include:

i. Mobilization of farmers to attend various meetings and trainings with the DAT innovators

ii. Identifying CIGs/VMGs and Producer Organizations to work with the DAT innovators;

iii. Training expenses at the farmer level on the technologies offered through technical assistance the by the DAT innovators;

iv. Expenditure towards procurement of relevant material and equipment to ensure the use of the digital technologies wherever needed;

v. Licensing costs wherever applicable; and

vi. Monitoring implementation of the work on the ground and providing feedback and guidance.

2. OBLIGATIONS OF THE AgTech/ DAT INNOVATOR

2.1 The agtech will provide technical assistance to the county through their human resources and expertise in digital technologies. They will leverage this support received from the County, World Bank and other partners where applicable. Details of the specific role of each of the innovators are provided as Annex 1 of this MoU (Innovators Catalogue).

2.2 In the implementation of NAVCDP under component 2.3, the INNOVATOR will be eligible for allocation of NAVCDP resources upon compliance with the following minimum conditions:

i. Signing of Memorandum of Understanding at the county level;

ii. Participate in developing agtech-specific work plans and budgets aligned to clear deliverables that are time-bound, which are then submitted to the NPCU for approval to implementation.

iii. The Innovators will access funds through a facilitated process at the county level and guided by the county's fiduciary procedures and protocols;

iv. Timely submission of reports to CPCU then to NPCU in accordance with the developed reporting templates as laid out in the PIM;

3. VALIDITY

3.1 This MoU shall be valid for a period of one year, from the date of the last signature by the Parties below or such a later date as may be modified by the County Government;

3.2 This MoU may be terminated by either party by giving a thirty (30) days written notice to the other party with approval of the World Bank.

3.3 This MoU will become invalid in the event of cancellation of the Financing Agreement by the World Bank before the end of the Project Period;

4. DISPUTE RESOLUTION

Any dispute that may arise out of the implementation and interpretation of this MoU will be settled amicably through mutual consultations.

5. AMENDMENT

This memorandum of understanding may be amended or extended for convenience by either party at any time, by mutual agreement expressed in writing by both parties' duly authorized representatives.

6. LEGAL STATUS OF MoU

The term of this MOU is for a period of one year from the effective date of this agreement and may be extended upon written mutual agreement. Any party may terminate this MOU upon thirty (30) days written notice without any penalties or liabilities.

7. NOTICES AND ADDRESSES

Any notice or request required or permitted to be given or made under this MoU shall be in writing. Such notice or request shall be deemed to have been duly given or made when it shall have been delivered by hand, certified mail, overnight courier or fax to the Party to which it is required to be given or made at the address specified below or such other address as shall be hereafter notified.

For COUNTY GOVERNMENT OF .....

(*INCLUDE PHYSICAL ADDRESS*)

8. AUTHORIZATION

The signing of this MOU is not a formal undertaking. It implies that the signatories will strive to reach, to the best of their ability, the objectives stated in the MOU. On behalf of the organization I represent, I wish to sign this MOU and contribute to its further development.

County Government and AgTech

Governor/CEC/CO **(whichever is applicable)** **Name of County**		
AgTech **(List all those that the county has partnered with)**		
Name of agtech/ Title/ contacts (1)	**Name of agtech/ Title/ contacts (2)**	**Name of agtech/ Title/ contacts (3)**
Name of agtech/ Title/ contacts (4)	**Name of agtech/ Title / contacts (5)**	**Name of agtech/ Title/ contacts (6)**

Annex 3: Data Sharing Agreement

DATA SHARING AGREEMENT

BETWEEN

KENYA AGRICULTURAL AND LIVESTOCK RESEARCH ORGANIZATION [KALRO]

AND

{INSERT PARTY/PARTIES}

Data Sharing Agreement

1.0. Preamble

This Data Sharing Agreement is made this ..... day of ..... 2023 (the "Effective Date") between Kenya Agricultural and Livestock Research Organization a body corporate established under the Kenya Agricultural and Livestock Research Act No.17 of 2013 (hereinafter referred to as "KALRO" which expression shall where the context so permit include its successors and assign) - and of P.O. Box 57811-00200 Nairobi and {insert the other party).

WHEREAS, {Insert name of Partner} is willing to submit certain data to KALRO consistent with the terms of this Agreement; and

WHEREAS, in support of their cooperative efforts, the parties now wish to enter into this

data transfer agreement in order to further define their roles and responsibilities in supporting the One Million Farmer Platform, and to provide lines of accountability regarding the sharing of data toward their respective missions. Both parties agree that they shall work together towards the implementation and support of the One Million Farmers Platform that will support smallholder farmers at the county level. The One Million Farmers Platform is an initiative of the World Bank Group and other partners to ensure that One Million small holder farmers can utilize digital solutions to increase their productivity, profitability and resilience.

IT IS NOW AGREED as follows:

2.0. Definitions and interpretation

2.1. In this Agreement the following words and phrases shall have the following meanings, unless expressly stated to the contrary:

a. "Act" means the Data Protection Act 2019;

b. "Data Controller" has the meaning given under Section 2 of the Act;

c. "Data Processor" has the meaning given under section 2 of the Act;

d. "Data Protection Legislation" means the Data Protection Act, 2019 and all applicable laws and regulations relating to Processing of personal data and privacy, including where applicable the guidance and codes of practice issued by the Data Commissioner;

e. "Data Subject" has the meaning given in section 2 of the Act;

f. "Data Recipient" has the meaning of the organization/person receiving the data in this agreement;

g. "Parties" means the parties to this Agreement,

h. "Personal Data" has the meaning given under Section 2 of the Act;

i. "DAT" means Disruptive Agricultural Technologies;

j. "Project" means One Million Farmers Platform;

k. "Processing" has the meaning given under Section 2 of the Act;

l. "Shared Information" means the information to be shared as set out in {insert clause} of this Agreement.

2.2. In this Agreement:

a. Person means a natural person;

b. A reference to any statute, enactment, order, regulation or other similar instrument shall be construed as a reference to the statute, enactment, order, regulation or instrument as amended by any subsequent statute, enactment, order, regulation or instrument or as contained in any subsequent re-enactment.

2.3. Headings are included in this Agreement for ease of reference only and shall not affect the interpretation or construction of this Agreement.

2.4. References in this Agreement to Clauses, Paragraphs and Annexes are, unless otherwise provided, references to the Clauses, Paragraphs and Annexes of this Agreement.

2.5. In the event and to the extent only of any conflict or inconsistency between:

a. The provisions of the Clauses and the provisions of the Annexes, the provisions of the Clauses shall prevail; or

b. The provisions of this Agreement and the provisions of any document referred to or referenced herein, the provisions of this Agreement shall prevail.

3.0. Commencement and Term

This Agreement shall commence on the date of last signature and shall continue in effect until the Project/data share has been completed in accordance with the requirements of this Agreement unless otherwise subject to earlier termination.

Data Provider

3.1. Purpose of Data Sharing

The parties are entering into this agreement, and [PARTY B] is granting KALRO access to the Farmer Data for the purpose of implementing the One Million Farmer Platform. The data will be used to monitor progress of the DAT cohort in implementing their deliverables towards the OMFP. The data will help access impact on use of technologies at farmer level and help us analyze how farmers utilize digital solutions to increase their productivity, profitability and resilience. (the "Purpose").

3.2. Description of Data

"Data" includes [SHORT DESCRIPTION OF THE DATA, SUBJECT MATTER OF DATA], further described in [ANNEXURE 1], attached to this agreement.

3.3. License Grant to Use Data.

[PARTY B] hereby grants to KALRO a limited, non-exclusive, non-transferable, and revocable license to access, copy, and use the Data (the "Data").

4.0. Data Recipient

4.1. Limited Use. KALRO will use or disclose the Data only in furtherance of the Project or as required by Law.

4.2. Further use of Shared Information

i. The Data Recipient agrees not to Process the Shared Information for purposes that are incompatible with the purpose in this Agreement.

ii. The Data Recipient agrees not to Process the Shared Information, except as necessary for the performance of the data share and to achieve the purposes in this Agreement, unless expressly authorized in writing by the originator.

4.3. Safeguards Around Data. KALRO shall use appropriate safeguards to protect the Data from misuse and unauthorized access or disclosure, including

a. maintaining adequate physical controls and password protections for any server or system on which the Data is stored,

b. taking any other measures reasonably necessary to prevent any use or disclosure of the Data other than as allowed under this agreement.

5.0. Personal Information

KALRO will not attempt to identify any Person whose information is contained in any Data or attempt to contact those Persons unless requested by World Bank for verification and monitoring purposes.

6.0. Protection of personal data

6.1. The Parties, agree to process any Personal Data in the Shared data in accordance with the requirements of this Agreement, and in particular they agree that they shall:

a. have an information risk policy.

b. process the Personal Data only to the extent, and in such manner, as is necessary for the data share or as is required by Law.

c. handle all personal information within the scope of this data sharing agreement as if it were marked at least PROTECT PERSONAL DATA while it is within the data control of the Data Recipient. Where it is already done so, mark and handle information to a higher level where justified [for example, as a result of aggregation of data].

d. ensure that all Personnel required to process the Personal Data are informed of their obligations under this Agreement with regard to the security and protection of Personal Data and that those obligations are complied with and that they successfully complete information risk awareness training at least annually.

e. notify the other Party within five Working Days if it receives a complaint, breach or request relating to that Party's obligations under the Data Protection Legislation.

f. provide the other Party with full cooperation and assistance in relation to any complaint or request made, including providing that Party with full details of the complaint or request;

g. permit the other Party or its Representative (subject to reasonable and appropriate confidentiality undertakings), to review the Data Recipient's Personal Data Processing activities (and/or those of its agents, subsidiaries and sub-contractors) and comply with all reasonable requests or directions by the other Party to enable them to verify and/or procure that it is in full compliance with its obligations under this Agreement.

h. provide a written description of the technical and organizational methods employed by them for Processing the Personal Data;

6.2. Each Party shall comply at all times with the Data Protection Legislation and shall not perform its obligations under this Agreement in such a way as to cause the other Party to breach any of its applicable obligations under the Data Protection Legislation

7.0. Security of Shared Information

7.1. In addition to the requirements in Clause 7.0 in respect of Personal Data, the Data Recipient agrees to process all the Shared Information in accordance with the following security requirements:

a. a. access to the Shared Information, any copies made of the Shared Information and the information contained in them is limited solely to the persons specified in this agreement;

b. b. access to the Shared Information is minimized to the smallest pool of accessible records possible;

c. c. the confidentiality of the Shared Information will be preserved in outputs and publications;

d. d. shared Information will only be accessed, via a secure system, a stand-alone PC or a closely controlled Local Area Network (LAN) with restricted access.

e. Access to the secure infrastructure will be via password or pass-phrase;

f. the means of access to the Shared Information (such as passwords or pass-phrases) will be kept secure and not disclosed to any person, under any circumstances other than those specified in this agreement;

g. stand-alone PCs and LANs, which have Internet access via broadband, will not have live Internet links while the Shared Information is in clear/unencrypted text on the machine;

h. hard copies and backups of shared information will be stored in a secure, access restricted filing cabinet;

i. personal data should be held and accessed on paper or ICT systems on secure premises or under circumstances where an information security risk assessment has been undertaken and processing has been authorized by the Data Controller.

8.0. Duplication and copies

8.1. The Data Recipient agrees that no duplication of the Shared Information may take place or copies of the Shared Information be made other than as agreed in the description of the Project or with the written consent of Party B.

9.0. Duration of the Project/data share

9.1. The Shared Information will be provided for the period of 24 months unless agreed otherwise.

9.2. The maximum duration of the data share will not exceed four years.

9.3. Requests for extension to the period of the Project must be referred to KALRO for approval prior to the expiry date.

10.0. Review

10.1. A review of the information sharing is to be conducted by KALRO and {PARTY B} at least twice annually.

11.0. Actions at end of the data share

11.1. At the end of the data share, the Data Recipient agrees to destroy all copies of the Shared Information, including temporary copies, CDs, printed copies, personal copies, derived datasets and all electronic copies in a controlled way, i.e.:

a. Destroy paper records by incineration, pulping or shredding so that reconstruction is unlikely;

b. Dispose of electronic media that have been used for protected personal data through secure destruction, overwriting, erasure or degaussing for reuse.

11.2. The Data Recipient will ensure that the Shared Information is destroyed to the standards that meet government standards for secure and complete destruction.

11.3. After the Shared Information has been destroyed, the Data Recipient will sign a declaration to confirm that the Shared Information and all copies of the Shared Information have been destroyed and to the required standards.]

12.0. No Modification of Data

[PARTY B] shall not copy, decompile, modify, reverse engineer, or create

derivative works out of any of the Data.

13.0. Permitted Disclosure

KALRO may disclose the Data

a. only if and to the extent that Party B consents in writing to the disclosure, and

b. to KALRO's officers, directors, employees, or Affiliates, who

a. Need-to-know the Data in furtherance of the Project,

b. Have been informed of the obligations of this agreement, and

c. Agree to abide and be bound by the provisions of this agreement

14.0. Required Disclosure

If KALRO is compelled by Law to disclose any data, it shall

a. Provide Party B with prompt written notice so that Party B may seek a protective order or other appropriate remedy and/or waive compliance with the provisions of this agreement,

b. Cooperate with Party B to obtain a protective order or other appropriate remedy, and

c. If the parties cannot obtain a protective order, other appropriate remedy, or otherwise fail to quash the legal process requiring disclosure, KALRO will disclose the requested Data only to the extent necessary to satisfy the request.

15.0. Unauthorized Disclosure

15.1. Report.

d. Within three days of KALRO becoming aware of any unauthorized use or disclosure of the Data, KALRO shall promptly report that unauthorized use or disclosure to Party B.

e. The Data Recipient acknowledges that any loss or unauthorized release of the Shared Information can be treated as valid grounds for terminating this agreement by the other Party.

f. Any loss or unauthorized release of the Shared Information by the Data Recipient will allow the other Party to request that a full investigation into the cause of the loss or unauthorized release be undertaken; or allow it to undertake such an investigation itself.

g. The Data Recipient fully indemnifies the other Party for all financial liability that may arise from loss or unauthorized release of the Shared Information by the Data Recipient.

15.2. Cooperation and Mitigation.

KALRO shall cooperate with any remediation that Party B, in its discretion,

determines is necessary to

a. Address any applicable reporting requirements, and

b. Mitigate any effects of such unauthorized use or disclosure of the data, including measures necessary to restore goodwill with stakeholders, including research subjects, collaborators, governmental authorities, and the public.

16.0. Publications

16.1. Copies of Proposed Publications. KALRO shall provide Party B with copies of any proposed publication or presentation at least three months in advance of the submission of the proposed publication or presentation to a journal, editor, or other third party.

16.2. Review Period. Party B will have [three] months after receipt of the materials to object to the proposed presentation or publication, because there is patentable or potentially patentable subject matter that needs protection.

16.3. KALRO's Objection. If Party B does makes an objection, KALRO shall refrain from publishing or presenting the materials for [three] months from date of its receipt of Party B's objection.

16.4. No Response from Party B. If Party B does not respond to KALRO's submission of materials for its review for [three] months, KALRO may proceed to publish or present these materials.

16.5. KALRO Information. KALRO will not, without Party B's prior written consent, publish or present any information that Party B has supplied to KALRO in connection with the Data on One Million Farmer Platform.

16.6. Publication after End of Research. KALRO may publish or present any material relating to the One Million Farmer Platform six months after the date of submission of the final report referred to in section RESEARCH WORK or the date of termination of this agreement, as applicable.

17.0. Intellectual Property Ownership

17.1. No License to Existing Intellectual Property. The parties hereby acknowledge that this agreement does not constitute a grant by either party to the other of any license or right to either party's Intellectual Property existing as of the Effective Date.

17.2. Ownership of Developed Intellectual Property. If either party develops any new Intellectual Property in connection with this, the parties shall enter into a separate definitive agreement regarding the ownership of that new Intellectual Property.

18.0. Use of Name

Neither party will use the other party's name, logos, trademarks, or other marks without that party's prior written consent.

19.0. Representatives

19.1. The Parties will each appoint a representative to be the primary point of contact in all matters relating to this Agreement:

FOR: KALRO

FOR {Insert Partner Details}

Name:

Title:

Address:

Tel.:

Fax.:

E-mail:

FOR {Insert Partner Details}

Name:

Title:

Address:

Tel.:

Fax.:

E-mail:

19.2. The Parties agree that these nominated representatives will correspond at regular intervals throughout the term of the information sharing to discuss activity in general and will provide updates to each other on matters of mutual interest.

19.3. The persons who will be supervising the Processing of the Shared Information are {Complete with the name of the persons in KALRO and {Insert Partner Details} who will supervise the processing of the Shared Information}.

20.0. Termination

20.1. Termination on Notice. Either party may terminate this agreement for any reason on 30 Business Days' notice to the other party.

20.2. Termination for Material Breach. Each party may terminate this agreement with immediate effect by delivering notice of the termination to the other party, if

i. the other party fails to perform, has made or makes any inaccuracy in, or otherwise materially breaches, any of its obligations, covenants, or representations, and

ii. the failure, inaccuracy, or breach continues for a period of 30 Business Days' after the injured party delivers notice to the breaching party reasonably detailing the breach.

20.3. Termination for Insolvency. If either party becomes insolvent, bankrupt, or enters receivership, dissolution, or liquidation, the other party may terminate this agreement with immediate effect.

21.0. Return or Destruction of Data and Property. On the expiration or termination of this agreement, or on Party B's request, KALRO will promptly

21.1. return the Data and any other property, including Confidential Information, provided by Party B,

21.2. destroy all copies it made of Data and any other property it has in its possession or control, and

21.3. if requested by Party B, deliver a certificate confirming KALRO's compliance with its obligation under this section.

22.0. Indemnification

22.1. Indemnification by KALRO (as an indemnifying party) will indemnify Party B (as an indemnified party) against all losses and expenses arising out of any proceeding

i. brought by either a third party or Party B, and

ii. arising out of KALRO's breach of its obligations under this agreement.

22.2. Mutual Indemnification. Each party (as an indemnifying party) will indemnify the other (as an indemnified party) against all losses arising out of any proceeding

i. brought by either a third party or an indemnified party, and

ii. arising out of the indemnifying party's willful misconduct or gross negligence.

22.3. Notice and Failure to Notify

i. Notice Requirement. Before bringing a claim for indemnification, the indemnified party will

a. notify the indemnifying party of the indemnifiable proceeding, and

b. deliver to the indemnifying party all legal pleadings and other documents reasonably necessary to indemnify or defend the indemnifiable proceeding.

ii. Failure to Notify. If the indemnified party fails to notify the indemnifying party of the indemnifiable proceeding, the indemnifying party will be relieved of its indemnification obligations to the extent it was prejudiced by the indemnified party's failure.

22.4. Exclusive Remedy

The parties' right to indemnification is the exclusive remedy available in connection with the indemnifiable proceedings described in this section [INDEMNIFICATION].

23.0. General Provisions

23.1. Entire Agreement. The parties intend that this agreement, together with all attachments, schedules, exhibits, and other documents that both are referenced in this agreement and refer to this agreement,

i. Represent the final expression of the parties' intent relating to the subject matter of this agreement,

ii. Contain all the terms the parties agreed to relating to the subject matter, and

iii. Replace all of the parties' previous discussions, understandings, and agreements relating to the subject matter of this agreement.

23.2. Assignment. Neither party may assign this agreement or any of their rights or obligations under this agreement without the other party's written consent.

23.3. Notices

i. Method of Notice. The parties will give all notices and communications between the parties in writing by (i) personal delivery, (ii) a nationally-recognized, next-day courier service, (iii) first-class registered or certified mail, postage prepaid to the address that a party has notified to be that party's address for the purposes of this section.

ii. Receipt of Notice. A notice given under this agreement will be effective on

a. the other party's receipt of it, or

b. if mailed, the earlier of the other party's receipt of it and the fifth business day after mailing it.

23.4. Governing Law. This agreement will be governed, construed, and enforced in accordance with the laws of the State of Kenya.

23.5. Severability. If any part of this agreement is declared unenforceable or invalid, the remainder will continue to be valid and enforceable.

23.6. Waiver

i. Affirmative Waivers. Neither party's failure or neglect to enforce any rights under this agreement will be deemed to be a waiver of that party's rights.

ii. Written Waivers. A waiver or extension is only effective if it is in writing and signed by the party granting it.

iii. No General Waivers. A party's failure or neglect to enforce any of its rights under this agreement will not be deemed to be a waiver of that or any other of its rights.

iv. No Course of Dealing. No single or partial exercise of any right or remedy will preclude any other or further exercise of any right or remedy.

23.7. No Third-Party Beneficiaries. Unless explicitly stated otherwise elsewhere in this agreement, no Person other than the parties themselves has any rights or remedies under this agreement.

IN WITNESS WHEREOF, the Authorized Representatives of the Parties have executed this Data Sharing Agreement on the dates indicated below.

For and on Behalf of Kenya Agricultural and Livestock Research Organization [KALRO]

NAME:

TITLE: Director General

SIGN.....

DATE .....

WITNESSED BY:

NAME:

TITLE: Ag. Principal Legal Officer

SIGN.....

DATE.....

For and on behalf of [PARTY B]

NAME: .....

TITLE: .....

SIGN.....

DATE.....

WITNESSED BY:

NAME: .....

TITLE: .....

SIGN.....

DATE.....

Annex 4: Memorandum of Understanding

(Insert Second organization logo ...)

MEMORANDUM OF UNDERSTANDING

BETWEEN

KENYA AGRICULTURAL AND LIVESTOCK RESEARCH ORGANIZATION

Kaptagat Road, Loresho, P.O. Box 57811- 00200,

NAIROBI, KENYA

AND

(Full Name of organization ...)

(Street address, P.O. Box ...)

(City, Country...)

PREAMBLE

This MEMORANDUM of UNDERSTANDING (hereinafter referred to as "MOU" is made on

..... the ..... day of ..... Two Thousand and Twenty between:

Kenya Agricultural Livestock and Research Organization, established under and pursuant to the provisions of the Kenya Agricultural and Livestock Research Act No.17 of 2013 of the laws of Kenya located on Kaptagat Road, Loresho, and of P.O. Box 57811-00200, Nairobi, Kenya (hereinafter referred to as "KALRO" which expression shall where the context so admit include its successors and assigns) of the first part

AND

(Organization name and description)

(Organization ...) and KALRO are individually referred to herein as a "Party" and collectively as the "Parties".

RECITALS

WHEREAS KALRO, is a public institution doing agricultural and livestock research and development within the scope of the government, and its mission is to conduct agricultural research through application of science, technology and innovation to catalyze sustainable growth and development in agriculture and livestock product value chains;

WHEREAS ***(Organization ...)*** ...

WHEREAS KALRO and ***(Organization ...)*** ...

WHEREAS, this MOU is based on principles of trust, equality and mutual benefits;

NOW, THEREFORE, the Parties have come to the following understanding:

OBJECTIVE

The objective of this MoU will be to establish a framework to facilitate cooperation between the two institutions on ...

ARTICLES OF OBLIGATIONS

In order to collaborate effectively, the Parties agree to the following obligations:

ARTICLE 1: OBLIGATIONS OF KALRO

1.1 KALRO will facilitate (organization ...) to access its content in agricultural and livestock sectors during execution of specific Scope of Works (SOWs)

1.2 KALRO will facilitate and support (organization ...) in establishing collaboration with other KALRO partners focusing on agricultural and livestock research and other relevant technology dissemination during the execution of specific Scope of Works (SOWs)

1.3 Other obligation...

ARTICLE 2: OBLIGATIONS OF (ORGANIZATION ...)

2.1 (Organization ...) will work within the established and/or agreed frameworks under KALRO either directly or through other KALRO partners.

2.2 (Organization ...) will identify opportunities for collaboration with KALRO that will advance the Parties' shared interests.

2.3 Other obligation...

ARTICLE 3: JOINT OBLIGATIONS

The Parties agree to:

3.1 Develop joint proposals whenever opportunities arise to seek grant funding for agricultural innovations and knowledge activities

3.2 Other obligation...

ARTICLE 4: DURATION

4.1 This MOU shall become effective immediately upon signature by the appropriate authorized representatives of each of the two institutions and shall remain valid for a period of (years ...) subject to review and/ or termination as may be necessary by either party

4.2 This MoU may be renewed by mutual written agreement of the parties hereto, executed at least (months ...) prior to the expiration of the initial term

ARTICLE 5: TERMINATION

5.1 Either Party may terminate the MoU at any time upon notice of its decision at least three (3) months in advance, without the right to any compensation for the other Party. If at the moment of the unilateral termination, specific tasks are pending, they will continue until the end of the said specific task.

5.2 Upon termination any gains or losses in the pursuance of the provisions of this MoU shall be shared on mutually agreed ratios, failing such agreement, the same shall be shared equally between the parties.

5.3 Termination for Cause: Each Party shall have the right to terminate this Agreement or any SOW immediately upon written notice in the event (a) the other Party is in material breach of this Agreement or such SOW and such breach is not cured within thirty (30) days after receipt of written notice of the breach; or (b) if the other Party makes a general assignment for the benefit of creditors or files a voluntary petition

in bankruptcy, or if an involuntary petition in bankruptcy or similar proceeding is filed against such other Party and is not dismissed within ninety (90) days.

5.4 Survival: Articles 6, 11 and 12 shall survive the termination of this Agreement for any reason, together with any accrued but unpaid payment obligations and any other provisions which by their plain meaning are intended to survive.

ARTICLE 6: CONFIDENTIALITY

6.1 During the course of this MOU, either party may acquire confidential information or trade secrets of the other.

6.2 Confidential information of a party means all information of whatever description, whether in permanently recorded form or not and whether or not belonging to a third party, which by its nature is confidential or which the party identifies as confidential to itself.

6.3 It does not include information that is:

- Independently created or rightfully known by, or in the possession or control of, the other party and not subject to an obligation of confidentiality on the other party;
- In the public domain (otherwise than as a result of a breach of this agreement);
- Required to be disclosed by law
- Was or is independently developed by the Receiving Party without use or reference to any information obtained from the Disclosing or any Party acting on behalf of the Disclosing Party, as demonstrated by the Disclosing Party's written records.

6.4 The Parties together with their representatives, agents and personnel shall keep confidential anything which the other designates as, or which might reasonably be expected to be, confidential, unless otherwise required by a competent authority.

ARTICLE 7: NON-EXCLUSIVITY

Unless otherwise agreed, this MOU is a non-exclusive agreement, and both Parties are free to carry out other projects of any nature whatsoever with third parties.

ARTICLE 8: GOVERNING LAW

The Parties agree that the laws of Kenya shall apply to this MOU.

ARTICLE 9: SETTLEMENT OF DISPUTES

9.1 Amicable Settlement

The parties undertake for themselves, their agents and/or servants to observe all established rules and regulations and to make further rules and regulations to govern the use of facilities in the conduct of any

or all of the functions of this MOU. The parties shall use their best efforts to settle amicably all disputes arising out of or in connection with this MOU or interpretation hereof.

9.2 Right of Arbitration

Any dispute between the parties as to matters arising pursuant to this MOU which cannot be settled amicably within **THIRTY (30) DAYS** after receipt by one party of the other party's request for such amicable settlement may be submitted to an Arbitrator mutually agreed upon by the parties for a decision in accordance with the provisions of the Arbitration laws of Kenya.

ARTICLE 10: FORCE MAJEURE

Neither party shall be liable in damages or have the right to terminate this MOU for any delay or default in performing hereunder if such delay or default is caused by conditions beyond its control including, but not limited to Acts of God, Government restrictions (including the denial or cancellation of any operational or other necessary license), wars, insurrections and/or any other cause beyond the reasonable control of the party whose performance is affected.

ARTICLE 11: INDEMNITY

The parties do always agree to keep each other fully and properly indemnified against all damages to or losses of any of their respective facilities resulting from negligent acts of omission or commission of their respective agents and/or servants.

ARTICLE 12: INTELLECTUAL PROPERTY AND CO-AUTHORSHIP

12.1 KALRO shall retain ownership of all intellectual property rights, title and interest to all its education content on agriculture and livestock that is not subject to this Agreement.

12.2 Organization's IP

12.3 The Parties acknowledge and agree that all rights in and to any Intellectual Property created or arising from the content creation and design other than the Intellectual Property described in 12.1 & 12.2 shall be owned jointly by the parties and the revenue made from commercializing the co-created content shall be shared equally.

12.4 Other IP agreement on research e.g. Parties shall periodically review the results of research projects to determine if any research findings, including processes and methods, constitute patentable technology.

12.5 Other IP agreement on disclosure of proprietary information e.g. Parties agree that prior to any disclosure of proprietary information by one party to the other concerning specific aspect of this collaboration, the disclosing party may require the other to execute a confidentiality agreement in respect of the information.

12.6 Other IP agreement on publications e.g. Material for publication or presentation from the joint collaborative activities shall be submitted for clearance to KALRO to ensure that no patentable discoveries are published prior to protection by patents.

12.7 Other IP agreement

ARTICLE 13: RELATIONSHIP BETWEEN PARTIES

Nothing contained herein shall be construed as establishing a relationship of agent and principal or master and servant as between the parties. Each party shall have full control of its operations and undertakings and shall have full responsibility for activities and duties carried by and on its behalf.

ARTICLE 14: INSURANCE

In carrying out the functions of this MOU, each party will insure its own employees and ensure that all adequate safety precautions are in place.

ARTICLE 15: NOTICES

Any notification, request or consent required or permitted to be given or made pursuant to this MoU shall be in writing. Any such notification, request or consent shall be deemed to have been given or made when delivered in person to the authorized representative at the Head Office of the party to whom the communication is addressed or when sent by registered mail, fax or E-mail (signed attachments) to such party at the following address:

For: KENYA AGRICULTURAL AND LIVESTOCK RESEARCH ORGANISATION

The Director General,

Kenya Agricultural and Livestock Research Organization,

P.O. Box 57811-00200, NAIROBI.

Fax: (254)-2-4183344.

E-mail: DirectorGeneral@kalro.org

For: **Other organization**

(Key contact)

(Organization)

(P.O. Box)

(Fax)

(E-mail)

PROVIDED THAT a party may change its address, E-mail and fax number for communication hereunder by notifying the other party of such change pursuant to this clause.

Notice shall be deemed to have been received one day after dispatch by electronic means and five days after dispatch by ordinary post.

ARTICLE 16: AUTHORIZED REPRESENTATIVE

Any action required or permitted to be taken and any document required or permitted to be executed under this MOU may be taken or executed:

- On behalf of KALRO by the Director General or any other Officer appointed in writing by the Director General to carry out that function
- On behalf of **organization** ....

In witness thereof, the representatives of the agreeing Parties duly authorized sign this MOU on the date indicated below:

KALRO **ORGANIZATION**

By: _____By: _____

(*Signature*) (*Signature*)

Name: _____ Name: _____

Title: _____ Title: _____

Date: _____ Date: _____

In the presence of (....)_____In the presence of (....)

Signature: _____ Signature: _____

Name: _____ Name: _____

Date: _____ Date: _____

Annex 5: KALRO - Digital Investments

Big Data Platform

Big data refers to the extremely large and complex datasets that are difficult to process and analyze using traditional data processing tools. The volume, velocity and variety of data is such that it can only be processed and analyzed effectively with specialized technologies and methodologies. The main objective of the big data platform was to increase agricultural productivity and build resilience to climate change risks in the targeted smallholder farming and pastoral communities in Kenya.

The Big Data Platform & Ecosystem

The big data platform and ecosystem refer to the technology, tools, and infrastructure that enable organizations to collect, store, process, and analyze large amounts of structured and unstructured data.

Big Data ecosystem consists of following components:

1. Data sources: various sources from which data is generated and collected, such as social media, IoT devices, and enterprise applications.
2. Data storage: systems for storing large volumes of structured, semi-structured, and unstructured data, such as Hadoop HDFS, NoSQL databases, and cloud storage.
3. Data processing: technologies for processing and analyzing big data, including batch processing with MapReduce, real-time stream processing with Apache Spark, and SQL-on-Hadoop tools like Hive and Impala.
4. Data visualization: tools for visualizing and exploring data, such as Tableau, QlikView, and D3.js.
5. Tools and platforms: a range of specialized tools and platforms for big data processing, including Apache Hadoop, Apache Spark, Apache Storm, and Apache Flink.
6. Applications: various applications built on top of the big data ecosystem, such as: - yield forecasting

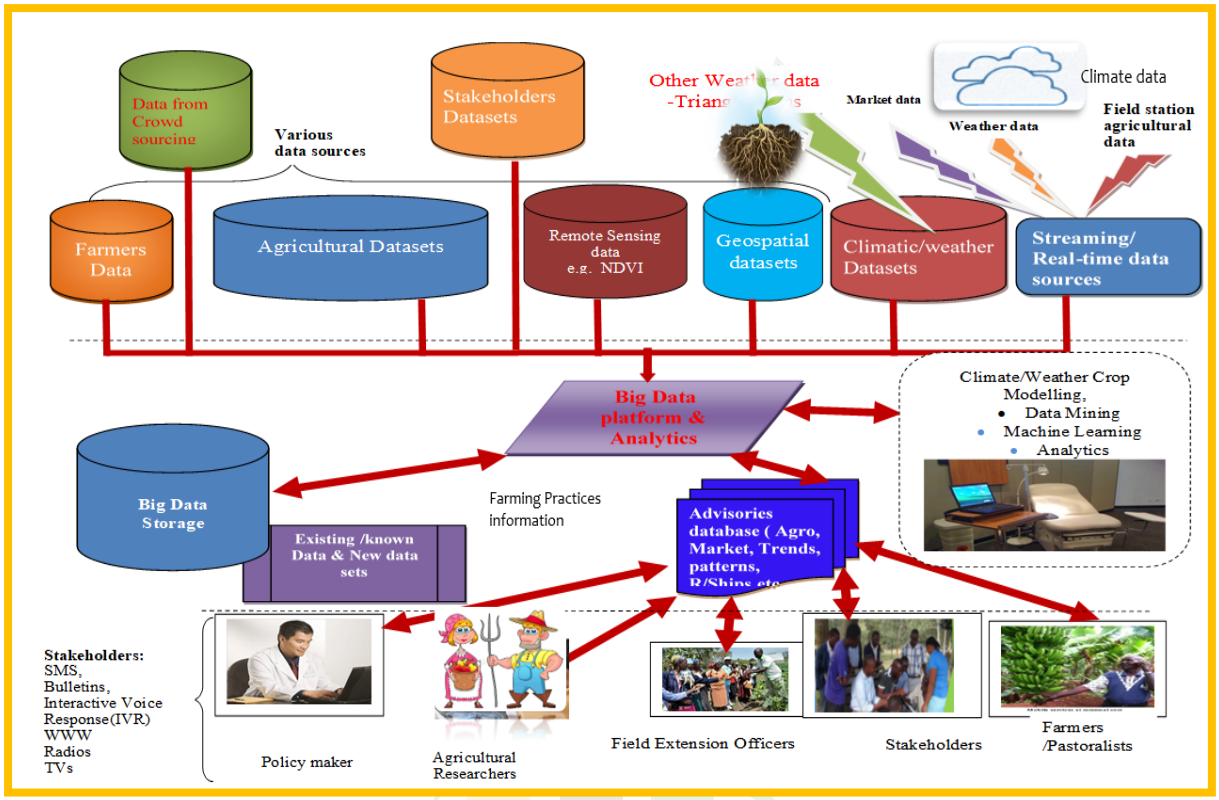


Fig: Big data infrastructure

Linking Private Sector to the Big Data Platform

The private sector, including agricultural companies and farms, can link to the agricultural big data platform to improve their operations, increase efficiency, and drive profitability. Here are some ways they can do this:

1. Precision agriculture: Companies can use big data to optimize their crop management, including soil analysis, seed selection, and irrigation management, to improve yields and reduce costs.

2. Livestock management: Companies can use big data to optimize livestock management, including feed optimization, health monitoring, and breeding programs, to improve animal welfare and reduce costs.

3. Market intelligence: Companies can use big data to gain a better understanding of market trends, consumer behavior, and supply chain dynamics, helping them to make better decisions and respond more quickly to changes in the market.

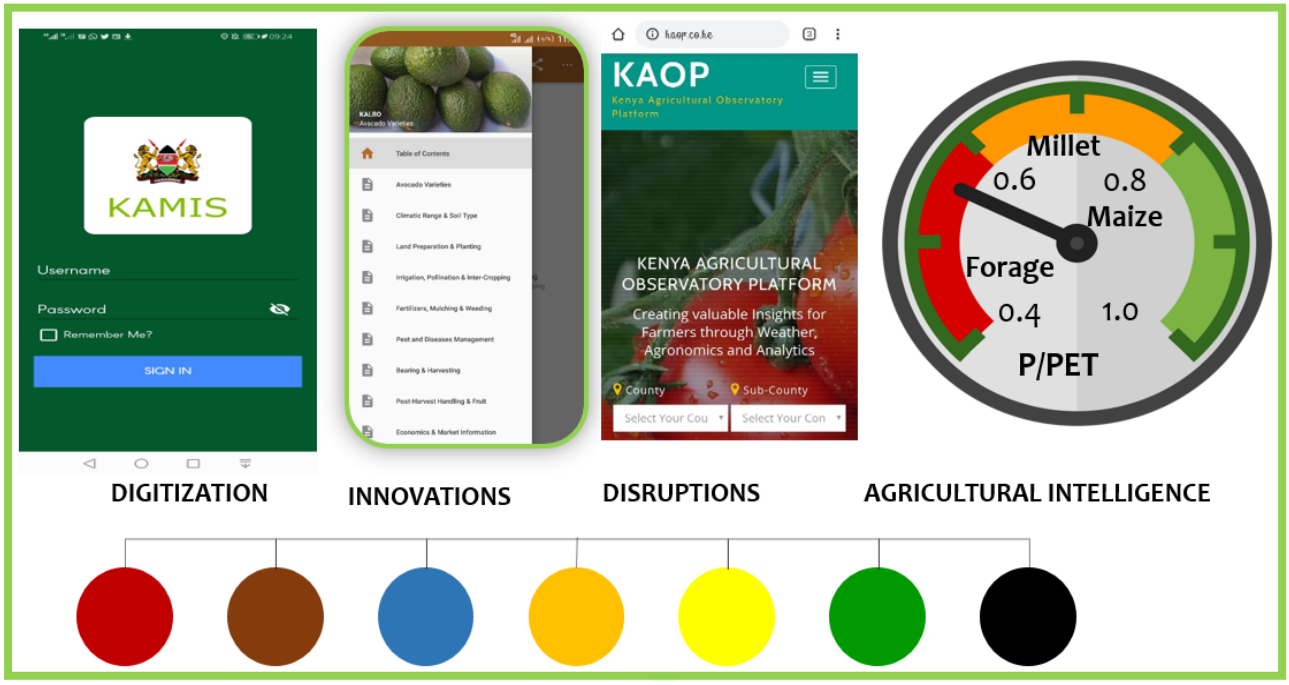
4. Weather monitoring: Companies can use big data to monitor weather patterns and make predictions about future weather conditions, helping them to plan and prepare for adverse weather conditions.

5. Supply chain optimization: Companies can use big data to optimize their supply chain, including logistics management, demand forecasting, and supplier management, to reduce costs and improve efficiency.

By linking to the agricultural big data platform, private sector companies can improve their operations, increase efficiency, and drive profitability.

Products and Services Catalogue

Agricultural e-services support the growth and modernization of the agricultural industry, providing farmers with access to new tools and resources to improve their operations and drive success.



Some of the KALRO list of products and services include:

Product/Service	Description
Kenya Agricultural Observatory Platform	The KAOP (Kenya Agricultural Observatory Platform) (KAOP) is an integrated online platform that uses geo-data from satellites to generate real-time and location specific Agro- advisories to farmers and other stakeholders. The platform can be accessed through the web via https://www.kaop.co.ke/ or as a mobile app via the Google Play store.
Selector	The Crop/Livestock/Pasture Selector service is a big data platform that provides farmers with location specific information on the favorable crops, pasture varieties to grow and best livestock breeds to keep on their farms. The service uses parameters such as temperature, humidity, temperature, humidity, soil pH and weather.
Suitability Mapping	The suitability mapping which would show how each individual crop and livestock genetically engineered to perform best in certain environments. The Suitability Mapping Platform answers the question of what does well where. The service can be accessed via https://suitability.kalro.org and also Download the KALRO selector application from Google Play Store.
Kenya Agro-Advisory Call Centre	The Kenya Agro-Advisory Call Center (KACC) is a facility for helping farmers get agricultural advisory services thus helping farmers get the necessary advice. Farmers are able to make calls at the call centre and ask questions directly with the Call centre representatives. Contact details for the KALRO Call centre (interactive voice response system) is 0111010100.
KALRO Mobile Apps	KALRO has developed more than 40 farmer-facing mobile applications that are aimed at helping the farmers to increase agricultural productivity by the use of KALRO digital farming platforms and Technologies, Innovations and Management Practices (TIMPs). These include mobile apps like the Laikipia GAPs app, KALRO GAPs, Digital Diary, KALRO KilimoBora, Vaccine Expat etc.

Product/Service	Description
One Million Farmer Platform	The One Million Farmer Platform (OMFP) aims to accelerate the impact and return on investment from Disruptive Agricultural Technologies (DAT) Cohort partners as well as KALRO data lake and data infrastructure investments. The platform enables the collection of data sets that are then transformed, aggregated, shared and visualized by different agricultural ecosystem actors.
Kenya Agricultural Market Information System	Kenya Agricultural Market Information System (KAMIS) is a web platform that was developed to provide information on markets and trade, leading to more efficient and competitive transactions in food trade between surplus and deficit regions. The platform can be accessed via the link http://kamis.kilimo.go.ke/.

Access

The list of KALRO products and services can be accessed via web and mobile platforms. Different services and products are offered through various formats such as phone calls, SMS, USSD, mobile applications, IVR, maps and the web. This enabled usage of the data and services to a wide range of end users who include the farmers, extension officers, policy makers, traders, aggregators, agripreneurs, agtechs, counties, project partners, NPCU and other stakeholders.

Data

KALRO has been using digital solutions to register farmers and map other stakeholders participating in various agricultural enterprises. The registration exercise has enabled KALRO to collect data which can be analyzed to support decision making processes and provision of site-specific interventions by various products, services, projects, stakeholders and policy actors.

Besides the farmer data, KALRO also manages other data sets including crop data, market data, research data, satellite data, Agro-Ecological Zone (AEZ) maps data, agronomic data, earth observation data, weather data, soil data. The data is aggregated at the Big Data center from where various products and services are developed and disseminated to stakeholders.

Data Sharing Ecosystem

A data sharing ecosystem refers to a network of individuals and organizations that are involved in the collection, storage, analysis, processing and dissemination of data and digital services. The main components of a data sharing ecosystem are: the data governance group[2], data producers, data consumers, data management systems, data analysts, data sharing agreements and data privacy and security.

A data sharing framework will provide a set of guidelines and rules that govern how data is collected, stored, used, and shared between different parties. The main aim of the data sharing framework is to ensure that personal data is protected and used responsibly, while also allowing for the efficient sharing of data for legitimate purposes.

The data sharing ecosystem will promote the efficient and effective sharing of data to support research, decision-making, and innovation by facilitating the sharing of data to enhance collaboration, reduce duplicative efforts, and promote the development of new technologies and insights.

The data ecosystem will provide solutions for problems that include fragmented platforms and services, trust and compliance issues; and farmers lacking control over their data.

Joining the data ecosystem will require one to establish a MoU/DSA with the data custodian/steward i.e. KALRO. Data providers will additionally provide a usage policy for handshaking with consumers of their data.

Roles and responsibilities of:

Data Ownership - GoK, World Bank, NPCU

A consortium will be formed which includes GoK, World Bank, and the NPCU will act as the data owner and provide overall direction in the below areas;

- Overall strategy and programme stewardship.
- Together with other stakeholders, develop policies to be used in the programme.
- Programme awareness and preparedness for the selected counties.

Data Custodians/Stewards - KALRO

KALRO will be the custodians of the data and digital services. They will ensure:

- Data management in terms of privacy and sharing.

[2] *The Stakeholders/Data owners will set out a set of policies that align with both local and international standards. This will set out clear guidance on data usage, sharing, privacy and protection. A steward will implement the ecosystem with guidance from the data governance group and police the participants (data providers and consumers) within the ecosystem.*

- Data security.
- Provision of reports.
- Provision of analytics.
- API development.

Data Protection in the Agricultural Sector, Kenya

In Kenya, data protection in the agricultural sector is governed by the Data Protection Act of 2019, which applies to all sectors, including agriculture. The act provides for the protection of personal data, and sets out the obligations of data controllers and processors, as well as the rights of data subjects.

Some key aspects of data protection as defined in the data protection Act, in the agricultural sector in Kenya include:(1) data collection, (2) data storage (3) data usage (4) data sharing and (5) data breach reporting.

By complying with the provisions of the Data Protection Act, agricultural organizations in Kenya ensure that they are protecting the personal data of their customers and employees, and avoiding the risk of legal liability and reputational damage.

Open access agriculture sector in Kenya

In the agriculture sector in Kenya, open access is seen as important for promoting knowledge sharing, innovation, and the dissemination of research findings. Some of the key initiatives promoting open access in agriculture in Kenya include:

1. Kenya Agricultural and Livestock Research Organization (KALRO): KALRO is the national research organization for agriculture and livestock in Kenya, and it is committed to promoting open access to its research outputs.

2. Kenya Open Data Initiative: This government-led initiative aims to promote open access to government data, including data related to agriculture, health, education, and the environment.

3. Kenya National Digital Repository: This platform collects and disseminates scholarly output, including research articles, theses, and dissertations, with a focus on agriculture research.

4. African Agricultural Technology Foundation (AATF): AATF is a non-profit organization that promotes the use of science and technology in agriculture in Africa. AATF is committed to promoting open access to its research outputs.

5. International Maize and Wheat Improvement Center (CIMMYT): CIMMYT is a global research organization that works to improve maize and wheat in developing countries, including Kenya. CIMMYT is committed to promoting open access to its research outputs.

Overall, open access initiatives in the agriculture sector in Kenya are aimed at increasing the visibility, impact, and dissemination of research findings, as well as promoting knowledge sharing and innovation in

the sector. These initiatives are seen as important for ensuring that the research produced in Kenya is accessible to a wider audience, including researchers, practitioners, policymakers, and the general public.

Start-up activities:

1. Data Ecosystem access/ Awareness – Workshop by KALRO & AgTechs.
2. Data privacy and Big Data / Data Ecosystem access/ Awareness – workshop.
3. Establishing an Agriculture and Livestock data sharing network in Kenya: Establishing a baseline to data sharing policy for network participants.
4. A detailed data mapping exercise to identify internal and external data sources which could contribute to data sharing use cases within the Agriculture and Livestock Sector network.

KALRO and Counties

5. Baseline - to inform users? To the dissemination of the same? (both physical and virtual - survey monkey).
6. Data Sharing Ecosystem framework.
7. Schematic presentation of the integration between KALRO/ agtechs/ agripreneurs.

Deliverables and timelines

All agtechs on-boarded need to provide work plans that indicate deliverables at each milestone. Deliverables could include number of farmers reached vs targets, crop yield increase or improvement of processes e.g. access to market, inputs etc.

Depending on the nature of the agtech, some of the deliverables may be linked to payment approval.

Guideline for Work plans is as below;

- To include targets (numbers of beneficiaries reached within the implementing counties and wards).
- Development of work plans and Budgets with deliverables.
- Integration of thematic areas within the component.
- What is the process of identifying the gaps/pain points (map program-specific gaps)?
- Bundling – attribution.
- To include dissemination pathways.
- Traceability - tracking sensitization and uptake (translation).

Annex 6: RASCI Model

RASCI Matrix

Responsible, **A**ccountable, **S**upporting, **C**onsulted and **I**nformed

Definitions

Responsible

Supporting

Consulted

Informed

No.	Activity	NPCU	County	BA	AgTech	AP	KALRO
1	Campaign to identify agripreneurs	C,I	R	R,A	C		I
2	Selection of agripreneurs	C,I	R,C	R,A	C,I		I
3	Incubation of agripreneurs	C,I	C,I	R,A	I		S,I
4	Assign CIGs, farmers to agripreneurs	I	A	C	I	I	I
5	Incubation of agripreneurs	S,I	S,I	R,A,S	R,I	R,A	R,I
6	Mobilization of farmers	I	R,A	I	I	I	C,I
7	Digitization of farmers, their farms (KYC of farmers)	R	R	R,A,S		R,A	R
8	Provide e-extension services to SHFs on good agricultural practices and educate them on agtech's products/services					R,A	R
9	Demand capture for Agtech's products and services			S	C,I	R,A	
10	Coordinate fulfillment of agtech's products and services			R,A,S	C,I	R,A	
11	Reporting	S,I	S,I	R,S	I	R,A	A

No.	Activity	NPCU	County	BA	AgTech	AP	KALRO
12	M&EL	R,A,S	R,A,S	R,A	C,I		A
13	OMFP digital platform	C,I	C,I	C,I	C,I		R,A
14	Learnings Platform	C,I	C,I	R,A,S	I	R,A	I

Annex 7: Procurement Procedure

Below is the procurement procedure:

The procurement will involve the agtechs and the counties. Once they have an approved budget which indicates the list of items to be procured by each party, they will then submit for approval and start the implementation afterwards.

- Development of a work plan budget /procurement plan by agtechs and Counties.
- Requisition from the agtechs - Items that have been approved for procurement.
- Approval of the above requisition by the CDAL.
- Identification of procurable items and hence method of procurement.
- Seek authorization to use direct procurement method.
- Raising of internal requisition by the CDAL as per the procurable item list.
- Approval by the CPC.
- Approval by the accounting officer.
- Uploading on STEP and seeking a "No Objection".
- Prepare a tender document but indicate it's a Direct Procurement document.
- Issuing of tender document to the agtechs.
- Evaluation of the bidder.
- Professional opinion.
- Notification of award.
- Acceptance letter from the agtechs.
- Contract signing.
- Issuing of LPO/LSO.
- Delivery note.
- Inspection and Acceptance/Inspection report.
- Form S13 - (This is a supply document at County level).
- Invoice.
- Stock ledger/asset register.
- Branding of procured items.
- Form S11-to be issued to users (Supply document).

REQUEST FOR QUOTATION

Quotation requests need to be requested as per the PPADA 2015. The following details need to be included in the RFQs;

REFERENCES

Chukwuemeka, E. (2022, April 14) "Problems facing Agriculture in Africa: 9 major challenges and solutions". *Bscholarly*: https://bscholarly.com/problems-facing-agriculture-in-africa/

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NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT